



# CM2018 - TU Delft

11th International Conference on Contact Mechanics and Wear of Rail/Wheel Systems

Delft, the Netherlands  
24 - 27 September 2018

Venue: Lijm & Cultuur,  
Rotterdamseweg 272, 2628 AT  
Delft, The Netherlands

## SUNDAY 23 SEPTEMBER

17:00 - 19:30 Registration open, welcome reception Lijm en Cultuur Monumental Site: Rotterdamseweg 272, 2628AT, Delft, The Netherlands.

## MONDAY 24 SEPTEMBER

07:30 - 08:15 Registration

08:15 - 09:10 Welcome by Rector Magnificus Prof.dr.ir. Tim van der Hagen, Prof. Zili Li and Prof. Rolf Dollevoet

09:15 - 10:00 Wolfgang Schoech and Richard Stock. STRATEGIC RAIL REPROFILING - PLEASE READ THE USER GUIDE. Session Chair: Roger Lewis

10:00 - 10:45 Wanming Zhai, Xuesong Jin, Zenfeng Wen, Xin Zhao. WEAR PROBLEMS OF HIGH-SPEED WHEEL/RAIL SYSTEMS IN CHINA: OBSERVATIONS, CAUSES AND COUNTER MEASURES. Session Chair: Roger Lewis

10:45 - 11:15 Coffee break

ROOM 1	ROOM 2	ROOM 3
1.1a - 11:15 - 12:30	1.1b - 11:15 - 12:30	1.1c - 11:15 - 12:30
<div style="background-color: #4F81BD; color: white; padding: 5px; font-size: 0.8em;">1.1a Contact mechanics 1 Chair: Irina Goryacheva</div> <div style="padding: 5px;"> <p>Daolin Ma, Chengbo Zhou and Ping Wang. <i>A MESO-SCALE DYNAMIC MODEL FOR WHEEL/RAIL ROLLING CONTACT CONSIDERING SURFACE ROUGHNESS</i></p> <p>Bin Zhu and Jing Zeng. <i>A METHOD TO GET PROPER VIRTUAL PENETRATION VALUE IN SEMI-HERTZIAN WHEEL/RAIL CONTACT PROBLEM</i></p> <p>Hao Gao, Katharina Babilon, Raphael Pfaff, Feng Gan and Alexander Reich. <i>MODEL OF WHEEL-RAIL CONTACT FOR SANDING AND ADHESION ENHANCEMENT</i></p> <p>Klaus Six, Tomislav Mihalj, Gerald Trummer, Christof Marte, Visakh V. Krishna, Saeed Hossein-Nia and Sebastian Stichel. <i>ASSESSMENT OF RUNNING GEARS REGARDING ROLLING CONTACT FATIGUE OF WHEELS AND RAILS BASED ON STOCHASTIC SIMULATIONS</i></p> </div>	<div style="background-color: #4F81BD; color: white; padding: 5px; font-size: 0.8em;">1.1b Friction and adhesion 1 Chair: Akira Matsumoto</div> <div style="padding: 5px;"> <p>Hua Chen, Takemasa Furuya, Shinya Fukagai, Shinichi Saga, Koichi Murakami and Takumi Ban. <i>SURVEY ON OCCURRENCE OF WHEEL SLIPPING/SLIDING CAUSED BY FALLEN LEAVES ON TEST LINE</i></p> <p>Kei Ishizaka, Stephen R Lewis, Deborah Hammond and Roger Lewis. <i>INVESTIGATION OF LEAF CHEMISTRY AND LEAF LAYER: LOW ADHESION MECHANISM</i></p> <p>Alexander Meierhofer, Gerald Trummer, Christof Bernsteiner and Klaus Six. <i>HOW THE WEATHER IN AUTUMN INFLUENCED THE WHEEL-RAIL TRACTION CHARACTERISTIC DURING VEHICLE TESTS</i></p> <p>Xiaogang Liu and Paul Meehan. <i>INVESTIGATION OF LATERAL ADHESION AT WHEEL/RAIL INTERFACE UNDER WET CONDITION</i></p> </div>	<div style="background-color: #4F81BD; color: white; padding: 5px; font-size: 0.8em;">1.1c RCF squats Chair: Wakoto Ishida</div> <div style="padding: 5px;"> <p>Christof Bernsteiner, Alexander Meierhofer, Gerald Trummer, Christof Marte, Stephan Scheriau, Klaus Six and Peter Dietmaier. <i>SIMULATION AND EXPERIMENT BASED INVESTIGATIONS OF SQUAT FORMATION MECHANISMS</i></p> <p>Shaun Earl, Kathryn E. Rankin, Roger Lewis, Lindsey Smith and W. Mark Rainforth. <i>COMPARISON OF SQUATS AND STUDS FROM DIFFERENT TRAFFIC ENVIRONMENTS</i></p> <p>Hongtao Zhu, Huijun Li, Ali Al-Juboori, David Wexler, Cheng Lu, Andrew McCusker, John McLeod, Shamal Pannila and Jonathan Barnes. <i>A COMPREHENSIVE APPROACH TO CONTROL AND MINIMIZE SQUAT DEFECTS IN A RAIL NETWORK</i></p> <p>Richard Stock, Wilhelm Kubin, Werner Daves and Klaus Six. <i>ADVANCED MAINTENANCE STRATEGIES FOR IMPROVED SQUAT MITIGATION</i></p> </div>

12:30 - 13:30 Lunch break

1.2a - 13:30 - 14:45	1.2b - 13:30 - 14:45	1.2c - 13:30 - 14:45
<div style="background-color: #4F81BD; color: white; padding: 5px; font-size: 0.8em;">1.2a Contact behavior at switches and crossings Chair: Valeri Mankine</div> <div style="padding: 5px;"> <p>Xiaochuan Ma, Ping Wang, Jingmang Xu, Rong Chen and Jian Wang. <i>COMPARISON OF WHEEL-RAIL NON-HERTZIAN CONTACT MODELS FOR NUMERICAL SIMULATION OF RAIL DAMAGES IN SWITCH PANEL OF RAILWAY TURNOUT</i></p> <p>Rostyslav Skrypnyk, Magnus Ekh, Jens C.O. Nielsen and Björn Pålsson. <i>SIMULATION OF DAMAGE IN RAILWAY CROSSINGS - A COMPARISON OF RAIL STEEL GRADES R350HT AND ROLLED MN13</i></p> <p>Rong Chen, Jiayin Chen, Ping Wang, Jiasheng Fang and Jingmang Xu. <i>NUMERICAL INVESTIGATION ON WHEEL-TURNOUT RAIL DYNAMIC INTERACTION AND CONTACT DAMAGE MECHANISM WITH WHEEL PROFILE EVOLUTION</i></p> <p>Shihpin Lin and Yoshihiro Suda. <i>CHIBA TEST TRACK 2.0 WITH SPECIAL TURNOUT</i></p> </div>	<div style="background-color: #4F81BD; color: white; padding: 5px; font-size: 0.8em;">1.2b Rail-wheel interface management 1 Chair: Wolfgang Schoech</div> <div style="padding: 5px;"> <p>Stuart Grassie. <i>A PRACTICAL METHODOLOGY TO PRIORITISE REPROFILING SITES FOR CORRUGATION REMOVAL</i></p> <p>Junping Wang, Gang Shen, Zhiguo Li, Deli Ma and Junjun Ding. <i>RESEARCH ON OPTIMIZATION DESIGN METHOD OF CURVE RAIL GRINDING TARGET PROFILE</i></p> <p>Andy Vickerstaff and Adam Bevan. <i>PREDICTIVE WHEEL-RAIL MANAGEMENT IN LONDON UNDERGROUND: VALIDATION AND VERIFICATION</i></p> <p>Michael Steenberg. <i>RAIL SURFACE CONDITIONING AND RAIL DURABILITY</i></p> </div>	<div style="background-color: #4F81BD; color: white; padding: 5px; font-size: 0.8em;">1.2c RCF in heavy haul lines Chair: Maksym Spiryagin</div> <div style="padding: 5px;"> <p>Hang Su, Chung Lun Pun, Peter Mutton, Qianhua Kang and Wenyi Yan. <i>NUMERICAL STUDY ON THE RATCHETING PERFORMANCE OF HEAVY HAUL RAILS IN CURVED TRACKS</i></p> <p>Takanori Kato, Takashi Fujimura, Yuichiro Yamamoto, Steve Dedmon, Shinichiro Hiramatsu, Hisato Kato, Yukihiko Kimura and James Pilch. <i>CRITICAL INTERNAL DEFECT SIZE FOR SUBSURFACE CRACK INITIATION IN HEAVY HAUL CAR WHEELS</i></p> <p>Kaikai Lv, Kaiyun Wang, Pengfei Liu, Yu Sun and Wanming Zhai. <i>INVESTIGATION INTO THE CAUSES OF WHEEL TREAD SPALLING ON HEAVY HAUL LOCOMOTIVE: MEASUREMENT AND SIMULATION</i></p> <p>Lindsey Smith. <i>HYPEREUCLEPTOID NON HEAT TREATED RAIL PERFORMANCE IN HEAVY HAUL</i></p> </div>
1.3a - 15:00 - 16:15	1.3b - 15:00 - 16:15	1.3c - 15:00 - 16:15
<div style="background-color: #4F81BD; color: white; padding: 5px; font-size: 0.8em;">1.3a Wheel polygonisation 1 Chair: Robert Fröhling</div> <div style="padding: 5px;"> <p>Mei Chen, Wanming Zhai and Yu Sun. <i>INVESTIGATION ON EFFECT OF WHEEL POLYGONAL WEAR ON HIGH-SPEED VEHICLE-TRACK-SUBGRADE INTERACTION BASED ON THE GREEN FUNCTION METHOD</i></p> <p>Bo Peng, Simon Iwnicki, Philip Shackleton, David Crosbee and Yunshi Zhao. <i>THE INFLUENCE OF WHEELSET FLEXIBILITY ON THE DEVELOPMENT OF RAILWAY WHEEL POLYGONALIZATION</i></p> <p>Meiyang Shi, Wei Li, Mingyang Wu and Gang Shen. <i>ANALYSIS OF OUT-OF-ROUND WHEELS AND THE EFFECT OF WHEEL POLYGONALIZATION ON VEHICLE VIBRATION</i></p> <p>Huanyun Dai, Dadi Li, Jianbin Wang and Sheng Qu. <i>STUDY ON THE MECHANISM OF HIGH ORDER OUT OF ROUND ROUGHNESS OF HIGH-SPEED RAILWAY TRAIN'S WHEEL</i></p> </div>	<div style="background-color: #4F81BD; color: white; padding: 5px; font-size: 0.8em;">1.3b Rail wheel materials 1 Chair: Hongtao Zhu</div> <div style="padding: 5px;"> <p>Chung Lun Pun, Darrien Welsby and Peter Mutton. <i>SHAKEDOWN ANALYSIS OF THREE PREMIUM RAIL STEELS SUBJECTED TO MULTIAXIAL CYCLIC LOADING CONDITIONS</i></p> <p>Kerry Jones, Gary Fry and Tao Cong. <i>NEXT GENERATION HIGH PERFORMANCE WHEEL STEELS</i></p> <p>Peter Christoforou, Stephen Lewis, David Fletcher and Roger Lewis. <i>BENCHMARKING OF PREMIUM RAIL MATERIAL WEAR</i></p> <p>Knut Andreas Meyer, Johan Ahlström and Magnus Ekh. <i>CHARACTERIZATION OF YIELD SURFACE EVOLUTION DUE TO LARGE PLASTIC SHEAR STRAINS IN PEARLITIC RAIL STEEL</i></p> </div>	<div style="background-color: #4F81BD; color: white; padding: 5px; font-size: 0.8em;">1.3c Corrugation Chair: Rong Chen</div> <div style="padding: 5px;"> <p>Wei Li, Qiangqiang Zhu, Zefeng Wen and Xuesong Jin. <i>STUDY ON SHORT-PITCH RAIL CORRUGATION IN METRO TRACKS WITH A RESILIENT FASTENER</i></p> <p>Omar El Beshbichi, Chang Wan, Stefano Bruni and Elias Kassa. <i>COMPLEX EIGENVALUE ANALYSIS AND PARAMETERS ANALYSIS TOWARDS THE INVESTIGATION OF RAIL CORRUGATION DEVELOPMENT</i></p> <p>Yurong Wang and Tx Wu. <i>NUMERICAL VERIFICATION OF SHORT PITCH RAIL CORRUGATION INDUCED BY STANDING WAVE BETWEEN THE WHEELS AND THE RESILIENT TRACKS</i></p> <p>Guangxiang Chen, Sheng Zhang, Bowen Wu, Xiaonan Zhao, Zefeng Wen, Huajiang Ouyang and Minhao Zhu. <i>A COMPARATIVE STUDY BETWEEN THE FIELD MEASUREMENT AND PREDICTION OF RAIL CORRUGATION</i></p> </div>

16:15 - 16:45 Coffee break

1.4a - 16:45 - 18:00		1.4b - 16:45 - 18:00		1.4c - 16:45 - 18:00	
1.4a Wheel-rail wear Chair: Gang Shen	Yu Sun, Yu Guo, Kaikai Lv, Mei Chen and Wanming Zhai. <i>EFFECT OF HOLLOW-WORN WHEELS ON THE EVOLUTION OF RAIL WEAR</i>	1.4b Friction and adhesion 2 Chair: Klaus Six	Chongyi Chang, Bo Chen, Yuanwu Cai and Junbiao Wang. <i>AN EXPERIMENTAL STUDY OF HIGH SPEED WHEEL-RAIL ADHESION CHARACTERISTICS IN WET CONDITION ON FULL SCALE ROLLER RIG</i>	1.4c RCF under microscope Chair: Anders Ekberg	Ali Al-Juboori, Hongtao Zhu, David Wexler, Huijun Li, Cheng Lu, Andrew McCusker, John Mcleod, Shamal Pannila and Jonathan Barnes. <i>STRUCTURAL AND MICROSTRUCTURAL INVESTIGATION OF TWO DISTINCT CLASSES OF WHITE ETCHING LAYER FORMATION ON THE RAIL SURFACE</i>
	Asier Alonso, Carlos Casanueva, Javier Perez and Sebastian Stichel. <i>PHYSICAL DAMAGE MECHANISMS FOR UNIFORM WEAR CALCULATION</i>		Matthew Harmon, Juan Felipe Santa, Jaime A Jaramillo, Alejandro Toro, Adam Beagles, Roger Lewis and Luke Buckley-Johnstone. <i>EVALUATION OF THE COEFFICIENT OF FRICTION OF RAILS IN THE FIELD AND LABORATORY USING SEVERAL DEVICES</i>		Xiang-Ji Zhao, Jun Guo, Wen-Jian Wang, Qi-Yue Liu, Elisa Butini, Lorenzo Marini, Enrico Meli and Andrea Rindi. <i>EFFECT OF DENTS ON ROLLING CONTACT FATIGUE OF RAIL MATERIALS</i>
	Gongquan Tao, Zefeng Wen, Qinghua Guan, Xin Zhao, Yun Luo and Xuesong Jin. <i>LOCOMOTIVE WHEEL WEAR SIMULATION IN COMPLEX ENVIRONMENT OF WHEEL-RAIL INTERFACE</i>		Kewei Lyu, Wendong Shao, Xin Liu, Lei Han, Shuang Liu and Yongjian Cao. <i>RESEACH ON TESTING AND ANALYZING WHEEL/RAIL FORCE ON FULLSCALE ROLLER RIG</i>		Somrita Dhar, Hilmar Kjartansson Danielsen, Søren Fæster, Carsten Rasmussen and Dorte Juul Jensen. <i>2D AND 3D CHARACTERIZATION OF ROLLING CONTACT FATIGUE CRACKS IN A MANGANESE STEEL CROSSING WING RAIL</i>
	Guodong Li, Xiaofeng Li, Chunyuan Song, Huailong Shi, Litong Cui, Liang Duan and Sheng Qu. <i>INFLUENCE OF SERVICE ENVIRONMENT ON THE WHEEL WEAR OF HIGH SPEED TRAINS</i>		Stephen Lewis, David Fletcher, Adam Beagles, Kei Ishizaka, Luke Buckley-Johnstone, Ben White, Matt Harmon, Chris Grigson, Henry Brunskill, Lou Zhou, Reuben Kempka and Roger Lewis. <i>A RE-COMMISSIONED FLEXIBLE FULL-SCALE WHEEL/RAIL TEST FACILITY</i>		Chih-Ling Lin and Paul Meehan. <i>STUDY OF WEAR DEBRIS IN GREASE-LUBRICATED AXLE BEARINGS USING SEM/EDX ANALYTICAL TECHNIQUE</i>
<b>ROOM 1</b>		<b>ROOM 2</b>		<b>ROOM 3</b>	

18:00 - 18:15 Group photo

18:30 - 21:00 Dinner at Conference Location

**TUESDAY 25 SEPTEMBER**

08:45 - 09:15 Introduction to the special session in memory of K.L. Johnson. Session Chair: Stuart Grassie

09:15 - 9:45 Anders Ekberg and Björn Pålsson. THE ROLE OF CONTACT MECHANICS IN MULTISCALE MODELLING OF TRAIN-TRACK INTERACTION PHENOMENA

9:45 - 10:15 Robert Fröhling, Ulrich Spangenberg and Eduard Reitmam. LOCOMOTIVE WHEEL TREAD POLYGONISATION CAUSED BY TORSIONAL AXLE SHAFT VIBRATION

10:15 - 10:45 Coffee break

10:45 - 11:00 Introduction to the special session in memory of J.J. Kalker. Session Chair: Zili Li

11:00 - 11:30 Irina Goryacheva and Almira Miftakhova. MODELLING OF THE VISCOELASTIC LAYER EFFECT IN ROLLING CONTACT

11:30 - 12:00 Sebastian Stichel, Carlos Casanueva, Mats Berg, Saeed Hossein Nia. WEAR AND RCF PREDICTION BASED ON IMPROVED CONTACT MECHANICS MODELLING

**POSTER SESSION**

12:00 - 14:45		12:00 - 14:45		12:00 - 14:45	
Category 1: Wear, Polygonisation and grinding	Shaoguang Zhu, Jianqiu Huang and Baochen Liu. <i>STUDY ON THE HIGH FREQUENCY ABNORMAL VIBRATION AND MITIGATION MEASURES OF SERVICE EMU</i>	Category 2: Wheel-rail contact and Dynamics	Xiaodi Xu, Weidong Wang, Xing Fang, Jinzhao Liu and Shanchao Sun. <i>A SYNCHROSQUEEZED STFT METHOD FOR CORRUGATION CHARACTERISTIC EXTRACTION OF AXLE BOX ACCELERATION</i>	Category 3: Friction, RCF and measurement	Angelo Mazzù, Andrea Ghidini, Nicola Zani and Michela Faccoli. <i>STUDY OF WHEEL/RAIL MATERIAL COUPLING IN PRESENCE OF SOLID CONTAMINANTS</i>
	Dilai Chen, Gang Shen and Buchen Chen. <i>OPTIMIZATION OF RAIL GRINDING PROFILES IN SWITCH PANEL OF TURNOUT BASED ON CONTACT STRESS ANALYSIS</i>		Maorui Hou, Xiaoyi Hu and Di Cheng. <i>OPTIMAL DESIGN OF WHEELSET GUIDANCE STIFFNESS FOR HIGH-SPEED PASSENGER CAR</i>		Jinzhao Liu, Xing Fang, Maoxuan Zhang, Shanchao Sun and Xiaodi Xu. <i>DYNAMIC INSPECTION METHOD FOR HIGH SPEED TRACK SHORT-WAVE STATUS ON BASIS OF VEHICLE DYNAMIC RESPONSE</i>
	Huafeng Hu, Maorui Hou, Zhongwei Feng and Xing Fang. <i>A STUDY OF THE RAIL WEAR ON SHARP CURVES IN EMU MAINTENANCE DEPOT</i>		Bowen Wu, Guangxiang Chen, Xiaonan Zhao, Jingzhou Lv, Qi Zhu, Xi Kang and Huajiang Ouyang. <i>FORMATION MECHANISM AND COUNTERMEASURES OF RAIL CORRUGATION AT A TIGHT CURVED METRO TRACK WITH VANGUARD FASTENERS</i>		Shinya Fukagai, Henry Brunskill, Andrew Hunter, Rob Dwyer-Joyce and Roger Lewis. <i>MEASUREMENT OF ROLLING-SLIDING WHEEL/RAIL CONTACT CONDITION USING FULL-SCALE RIG WITH ULTRASOUND</i>
	Ku Zhou, Wen-Jian Wang, Rui-Xiang Wang, Jun Guo and Qi-Yue Liu. <i>INFLUENCE OF THE GRINDING PRESSURE ON THE REMOVAL BEHAVIOURS OF RAIL MATERIAL</i>		Andrea Bracciali and Gianluca Megna. <i>TRACK FRIENDLINESS OF AN INNOVATIVE FREIGHT BOGIE</i>		Ben White and Roger Lewis. <i>THE DEVELOPMENT OF A TRACTION GEL ASSESSMENT METHOD</i>
	Junjun Ding, Yunhua Huang and Junping Wang. <i>EFFECT OF WHEEL HOLLOW WEAR ON FREIGHT VEHICLE'S DYNAMICAL PERFORMANCE AND RAIL RCF</i>		Yan Sun, Qing Wu, Maksym Spiryagin and Colin Cole. <i>INVESTIGATION ON WHEEL-RAIL CONTACT BEHAVIORS AND TRACK DAMAGE DUE TO TRACK COMPONENT DEFECTS</i>		Martina Meacci, Zhiyong Shi, Elisa Butini, Lorenzo Marini, Enrico Meli and Andrea Rindi. <i>A NEW LOCAL DEGRADED ADHESION MODEL FOR RAILWAY APPLICATIONS INCLUDING ENERGY DISSIPATION AND ADHESION</i>
	Elisa Butini, Lorenzo Marini, Martina Meacci, Enrico Meli and Andrea Rindi. <i>DEVELOPMENT OF AN INNOVATIVE TOOL FOR SIMULTANEOUS WHEEL AND RAIL WEAR AND RCF DAMAGE EVALUATION</i>		Han Leng, Huijie Wang and Lihui Ren. <i>DYNAMIC PERFORMANCE STUDY OF TRANSVERSE FRICTION-COUPLED WHEELSET</i>		Daisuke Yamamoto. <i>CHARACTERISTICS OF TANGENTIAL FORCE AT THE WHEEL/RAIL INTERFACE UNDER NON-STEADY SLIP RATIO</i>
	Yao Qian, Ping Wang, Jingmang Xu, Rong Chen and Li Wang. <i>WEAR ASSESSMENT OF TURNOUT SWITCH PANEL IN HIGH-SPEED RAILWAY CONSIDERING CREEP CHARACTERISTICS</i>		Ping Wang, Yuan Gao, Jingmang Xu, Boyang An, Rong Chen and Jiayin Chen. <i>EXPLICIT FINITE ELEMENT METHOD FOR EVALUATING THE INFLUENCE OF FLANGE BEARING FROG CROSSING ON WHEEL DEGRADATION</i>		Donald Eadie, Harold Harrison, Rueben Kempka, Roger Lewis, Alexander Keylin and Nicholas Wilson. <i>FIELD ASSESSMENT OF FRICTION AND CREEPAGE WITH A NEW TRIBOMETER</i>
	Hirofumi Tanaka and Masashi Miwa. <i>MODELING OF RAIL SURFACE ROUGHNESS GROWTH AND ECONOMICAL GRINDING METHOD FOR RAIL CORRUGATION</i>		Samuel Hawksbee, Gareth Tucker and Mark Burstow. <i>PRACTICAL TOOL FOR THE PREDICTION OF PLASTIC FLOW IN RAILWAY CURVES</i>		Joseph Lanigan, Peter Krier, Luke Buckley-Johnstone, Ben White, Kei Ishizaka, John Cooke, Simon Barnard, Paul Ferriday, Adam Beagles and Roger Lewis. <i>TOWARDS A FIELD TEST METHODOLOGY FOR LOCOMOTIVE BRAKE TESTING USING A REPRESENTATIVE LOW ADHESION SIMULATION</i>
Pu Wang, Shuguo Wang, Wei Li and Daolin Si. <i>STUDY ON RAIL WEAR PREDICTION AND FRICTION CONTROL FOR HEAVY HAUL RAILWAY</i>	Lai Wei, Jing Zeng, Feng Gan and Sheng Qu. <i>ACCEPTANCE OF WHEEL-RAIL CONTACT NONLINEARITY WITH RESPECT TO HUNTING STABILITY FOR RAILWAY VEHICLES</i>	Jianbin Wang, Chunyuan Song, Sheng Qu, Dadi Li, Huanyun Dai, Pingbo Wu and Jing Zeng. <i>A NONDESTRUCTIVE INSTRUMENTED WHEELSET SYSTEM FOR CONTACT FORCES MEASUREMENTS</i>			

Category 1: Wear, Polygonisation and grinding	Jincheng Li, Junjun Ding, Yuecheng Niu and Fu Li. ANALYSIS OF WHEEL WEAR OF LOW FLOOR VEHICLE BASED ON DIFFERENT PATTERNS	Category 2: Wheel-rail contact and Dynamics	Gang Shen, Huiming Yao and Meng Wu. INVESTIGATION ON THE MECHANISM OF RAIL CORRUGATIONS BY RATIONAL CONJECTURE AND TEST RIG	Category 3: Friction, RCF and measurement	Hamid Alturbeh, Roger Lewis, Klaus Six, Gerald Trummer and Julian Stow. IMPLEMENTATION OF THE WATER INDUCED LOW ADHESION CREEP FORCE MODEL (WILAC) INTO THE LOW ADHESION BRAKING DYNAMIC OPTIMISATION FOR ROLLING STOCK MODEL (LABRADOR)
	Fengshou Liu, Guang Yang, Chuang Li, Shaobo Zhou and Yinhua Zhang. WEAR RULES AND PROFILE CHANGES OF HIGH-SPEED RAILWAY RAIL IN CHINA		Sebastian Skorsetz, Timo Strobel, David Camacho Alcocer and Corinna Salander. INFLUENCE OF RAIL CORRUGATION ON LIGHT RAIL VEHICLES IN TERMS OF RIDE QUALITY AND SAFETY		Shinya Fukagai, Le Ma and Roger Lewis. TRIBOLOGICAL APPROACH TO OPTIMIZE TRACTION COEFFICIENT DURING RUNNING-IN PERIOD USING SURFACE TEXTURE
	Xiaoyi Hu. STUDY ON INFLUENCE OF HIGH-ORDER WHEEL POLYGON WEAR ON DYNAMIC PERFORMANCE OF HIGH SPEED EMU VEHICLE		Itsuro Arai, Yousuke Kawano, Shinichi Watanabe, Naoki Kemmotsu and Naomi Kubo. OBSERVATION OF INNER RAIL CHARACTERISTICS IN TERMS OF CORRUGATION FOCUSED ON RAIL FASTENING DEVICE OF THE TRACK STRUCTURE		Yosuke Ichiyanagi, Yohei Michtsujii, Akira Matsumoto, Yasuhiro Sato, Hiroyuki Ohno, Masuhisa Tanimoto, Atsushi Iwamoto, Tomoki Fukushima and Takuji Nakai. CONDITION MONITORING SYSTEM BASED ON WHEEL-RAIL CONTACT FORCES
	Alireza Alemi, Yusong Pang and Gabriel Lodewijks. IN-SERVICE DETECTION OF DEFECTIVE RAILWAY WHEELS WITH PERIODIC OUT-OF-ROUNDNESS		Hirotaaka Sakai, Masakazu Takagaki, Takuya Karatsu, Akira Aikawa, Jun Yin, Hiroshi Okuda and Masae Hayashi. DYNAMIC ROLLING CONTACT ANALYSIS FOR IMPACT BEHAVIOR INDUCED BY A WHEEL FLAT		Tomoki Fukushima, Ryota Ozawa, Masuhisa Tanimoto, Tomohisa Ogino, Makoto Kitajima, Takanori Matsumi, Yoshifumi Komura, Yuuki Kurimoto, Yasuhiro Sato and Hiroyuki Ohno. METHOD OF MEASURING CONTACT POINT
	Ping Lu, Stephen Lewis, Sandra Fretwell-Smith, David Fletcher and Roger Lewis. LASER CLADDING OF RAIL; THE EFFECTS OF DEPOSITING MATERIAL ON LOWER RAIL GRADES		Feng Gan, Huanyun Dai, Hao Gao and Lai Wei. AN IMPROVED METHOD OF WHEEL-RAIL CONTACT RELATIONSHIP FOR RAILWAY VEHICLES		Martin Heller, Jörg Koch, Stefan Schneider and Thomas Rasel. THE ROLLER RIG ATLAS - AN INSTRUMENT TO DEVELOP BRAKE SYSTEMS OF A NEW GENERATION
Andrzej Myslinski and Andrzej Chudzikiewicz. WEAR EVOLUTION IN WHEEL-RAIL CONTACT PROBLEMS USING DISSIPATED ENERGY APPROACH	Jie Kou, Jiming Zhang and Pingtao Ni. STUDY ON WHEEL-RAIL MULTI-POINT CONTACT GEOMETRY CALCULATION	Radim Halama, Jiří Šmach, Petr Matušek and Tatsuya Sakaino. RATCHETING PREDICTION BASED DEVELOPMENT OF ROLLING CONTACT FATIGUE TEST FOR HIGH PRESSURES			
	Si Hai Mai. EXPLICIT FINITE ELEMENT APPROACH FOR STUDYING THE IMPACT OF A WHEELSET ON A SWITCH	Maha Messaadi and Michael Steenbergen. SUSCEPTIBILITY OF PEARLITIC RAIL GRADES TO THERMAL WHITE ETCHING LAYER FORMATION			
	Van Vuong Lai, Olivier Chiello, Jean-François Brunel and Philippe Dufrénoy. FEM MODELING OF WHEEL-RAIL ROLLING CONTACT WITH FRICTION IN AN EULERIAN FRAME: RESULTS AND VALIDATION				

ROOM 1		ROOM 2		ROOM 3	
2.1a Wheel rail thermal contact Chair: Paul Meehan	2.1a - 15:00 - 16:00	2.1b Contact and vehicle dynamics Chair: Xinggao Shu	2.1b - 15:00 - 16:00	2.1c RCF 1 Chair: Richard Stock	2.1c - 15:00 - 16:00
	Mandeep Singh Walia, Tore Vernersson, Roger Lundén, Fredrik Blennow and Markus Meinel. TEMPERATURES AND WEAR AT RAILWAY TREAD BRAKING: FIELD EXPERIMENTS AND SIMULATIONS		Andrea Bracciali and Gianluca Megna. TRACTION AND CURVING OF VEHICLES EQUIPPED WITH GUIDED INDEPENDENTLY ROTATING WHEELS		Ali Esmaeili, Johan Ahlström and Magnus Ekh. MODELLING OF CYCLIC PLASTICITY AND PHASE TRANSFORMATIONS DURING REPEATED LOCAL HEATING EVENTS IN RAIL AND WHEEL STEELS
	Chris Bosomworth, Maksym Spiryagin, Sanath Alahakoon and Colin Cole. INFLUENCE OF FRICTIONAL PROCESSES AT THE WHEEL-RAIL INTERFACE ON THE GENERATION OF HEAT FLOW IN THE RAIL		Yuanjin Ji, Lihui Ren, Adam Beagles and Huijie Wang. MECHANISM RESEARCH AND DERAILMENT ANALYSIS OF WHEEL/RAIL CONTACT RELATIONSHIP OF DOUBLE FLANGE		Alfonso Panunzio, Régis Cottereau, Guillaume Puel, Samuel Simon and Xavier Quost. INFLUENCE OF THE TRACK IRREGULARITIES ON THE RAIL FATIGUE
	Shuai Chen, Guotang Zhao, Hengyu Wang, Gongquan Tao, Zefeng Wen and Lei Wu. STUDY OF WHEEL WEAR INFLUENCED BY TREAD TEMPERATURE RISING DURING TREAD BRAKING		Akira Matsumoto, Yasuhiro Sato, Hiroyuki Ohno, Yohei Michtsujii, Yosuke Ichiyanagi, Masuhisa Tanimoto, Atsushi Iwamoto and Takuji Nakai. SAFETY MEASURES AGAINST FLANGE-CLIMB DERAILMENT IN SHARP CURVE - considering friction coefficient between wheel and rail -		Gerald Trummer, Florian Kupelwieser, Christof Marte, Stephan Scheriau, Peter Dietmaier and Klaus Six. REPRODUCING ROLLING CONTACT FATIGUE RELEVANT LOADING CONDITIONS OF RAILWAY OPERATION ON A TEST RIG
2.2a Welds and joints Chair: Peter Mutton	2.2a - 16:15 - 17:15	2.2b Noise and vibration Chair: Andrea Bracciali	2.2b - 16:15 - 17:15	2.2c RCF 2 Chair: Werner Daves	2.2c - 16:15 - 17:15
	Boyang An, Ping Wang, Daolin Ma, Jingmang Xu, Rong Chen, Bing Wu and Hongqin Liang. ELASTIC-PLASTIC WHEEL/RAIL ROLLING CONTACT SOLUTION AT RAIL WELD USING A DYNAMIC FINITE ELEMENT MODEL		Xiaoping Wu, Peidi Wen, Chengcheng Gao, Xianwei Duan and Keyou Shi. RESEARCH ON MECHANISM AND CONTROL METHOD OF WHEEL/RAIL NOISE		Elena Kabo, Anders Ekberg and Michele Maglio. ROLLING CONTACT FATIGUE ASSESSMENT OF REPAIR RAIL WELDS
	Brice Nelain, Nicolas Vincent, Stephane Teppe, Emanuel Reynaud, Achraf Ez Zejjari and Emmanuel Laurans. RAIL JOINT DYNAMIC FORCES COMPUTATION		Paul Meehan and Xiaogang Liu. PREDICTION OF WHEEL SQUEAL NOISE UNDER WATER-BASED FRICTION MODIFIERS BASED ON INSTANTANEOUS ROLLING CONTACT MECHANICS		Yongfeng Liu, Tao Jiang, Xin Zhao, Zefeng Wen and Shulin Liang. ON THE WHEEL ROLLING CONTACT FATIGUE OF HIGH POWER AC LOCOMOTIVES RUNNING IN COMPLICATED ENVIRONMENTS
	Nirmal Kumar Mandal. STRESS ANALYSIS OF JOINT BARS OF INSULATED RAIL JOINTS DUE TO WHEEL/RAIL CONTACT LOADINGS		Xin Zhou, Xin Zhao, Bing Wu, Yue Zhao and Xuesong Jin. INFLUENCE OF RESILIENT WHEEL ON DYNAMIC CHARACTERISTICS OF METRO WHEEL/RAIL SYSTEM UNDER RAIL CORRUGATION EXCITATION		Martin Hiensch and Nico Burgelman. ROLLING CONTACT FATIGUE: DAMAGE FUNCTION DEVELOPMENT FROM TWO-DISK TEST DATA

17:15 - 18:15 Transport to Banquet
18:15 - 22:30 Cruise Rotterdam
22:30 - 23:30 Return to Delft

## WEDNESDAY 26 SEPTEMBER

8:45 - 9:45 Prof. Rolf Dollevoet and Special Guest
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ROOM 1		ROOM 2		ROOM 3	
3.1a Contact mechanics 2 Chair: Wenyi Yan	3.1a - 10:00 - 11:15	3.1b Friction and adhesion 3 Chair: Sebastian Stichel	3.1b - 10:00 - 11:15	3.1c RCF 3 Chair: Elena Kabo	3.1c - 10:00 - 11:15
	Martin Pletz, Werner Daves, David Künstner and Stephan Scheriau. CALCULATION OF CYCLIC PLASTIC SURFACE DEFORMATIONS IN RAILS - QUASISTATIC FE MODELS		Ben White, Peter Laity, Chris Holland, Klaus Six, Gerald Trummer and Roger Lewis. IRON OXIDE AND WATER PASTE RHEOLOGY AND ITS EFFECT ON LOW ADHESION IN THE WHEEL/RAIL INTERFACE		Toshihiko Sasaki. TRI-AXIAL RESIDUAL STRESS ANALYSIS OF RAILWAY RAIL USING TWO-DIMENSIONAL X-RAY DIFFRACTION METHOD

3.1a Contact mechanics 2 Chair: Wenyi Yan	Filipe Marques, Hugo Magalhães, Binbin Liu, João Pombo, Paulo Flores, Jorge Ambrósio, Jerzy Piotrowski and Stefano Bruni. <i>ON THE GENERATION OF AN ENHANCED LOOKUP TABLE FOR WHEEL-RAIL CONTACT MODELS</i>	3.1b Friction and adhesion 3 Chair: Sebastian Stichel	Bing Wu, Ming Chen, Zefeng Wen, Xuesong Jin and Boyang An. <i>NUMERICAL MODEL ON THE HIGH-SPEED WHEEL/RAIL ADHESION UNDER STARVED INTERFACIAL CONTAMINATIONS WITH SURFACE ROUGHNESS</i>	3.1c RCF 3 Chair: Elena Kabo	Mitsuru Hosoda, Jun Mizutani and Ryuichi Yamamoto. <i>STUDY ON PREDICTION METHOD AND TENDENCY OF TRANSVERSE CRACK PROPAGATION OF HEAT TREATED RAIL BASED ON RAIL BENDING TEST AND COMPACT TENSION TEST RESULTS</i>
	Cornelis David Van der Wekken and Edwin A.H. Vollebregt. <i>LOCAL PLASTICITY MODELLING AND ITS INFLUENCE ON WHEEL-RAIL FRICTION</i>		Casey Jessop and Johan Ahlström. <i>FRICTION BETWEEN PEARLITIC STEEL SURFACES</i>		Masahiro Tsujie, Megu Miura, Shigekatsu Kimura, Hua Chen and Yoshiaki Terunichi. <i>A STUDY ON THE INITIATION OF HEAD CHECK IN LOW RAIL USING MULTIBODY DYNAMICS</i>
	Xin Zhao, Peng Zhang and Zefeng Wen. <i>ON THE COUPLING OF THE VERTICAL, LATERAL AND LONGITUDINAL WHEEL-RAIL INTERACTIONS AT HIGH FREQUENCIES AND THE RESULTING IRREGULAR WEAR</i>		Matthew Harmon, Bryan Powell, Ingrid Barlebo-Larsen and Roger Lewis. <i>DEVELOPMENT OF GREASE TACKINESS TEST</i>		Daniel Szablewski and Alok Jahagirdar. <i>QUANTIFYING ROLLING CONTACT FATIGUE IN RAILS</i>

11:15 - 11:45 Coffee break

3.2a Wheel-rail tests Chair: Hua Chen	3.2a - 11:45 - 13:00	3.2b Rail-wheel interface management 2 Chair: Roger Lundén	3.2b - 11:45 - 13:00	3.2c Wheel-rail interaction and evaluation Chair: Jens C.O. Nielsen	3.2c - 11:45 - 13:00
	Dmitry Gutsulyak, Louisa Stanlake and Hao Qi. <i>TWIN DISC EVALUATION OF THIRD BODY MATERIALS IN THE WHEEL/RAIL INTERFACE</i>		Eric Magel and Kevin Oldknow. <i>QUALITY INDICES FOR MANAGING RAIL THROUGH GRINDING</i>		Xinggao Shu, Yuqing Zeng, Harry Tourmay, Daniel Thielemier, Ali Tajaddini and Brian Marquis. <i>WHEEL/RAIL CONTACT MODELING AND EXPERIMENTAL VALIDATION USING RCFS</i>
	Yosuke Yamazaki, Takanori Kato, Takahiro Fujimoto, Osamu Kondo, Christofer Feldmeier and Hiroyuki Sugiyama. <i>EVALUATION OF WHEEL WEAR PROPERTY WITH SCALED ROLLER TEST RIG</i>		Wilhelm Kubin, Werner Daves and Richard Stock. <i>ANALYSIS OF RAIL MILLING AS A RAIL MAINTENANCE PROCESS: SIMULATIONS AND EXPERIMENTS</i>		Sundar Shrestha, Qing Wu and Maksym Spiryagin. <i>WHEEL-RAIL CONTACT MODELLING FOR REAL-TIME ADHESION ESTIMATION SYSTEMS WITH CONSIDERATION OF BOGIE DYNAMICS</i>
	Shaobo Zhou, Yinhua Zhang, Guanzhen Zhang, Lubing Shi and Wenjing Wang. <i>ROLLING FRICTION AND WEAR TESTING OF HIGH SPEED WHEEL/RAIL MATERIALS WITH VARIOUS HARDNESS RATIO</i>		Mathias Luther, Katrin Mädler and René Heyder. <i>PREVENTION OF MULTIPLE SQUATS AND RAIL MAINTENANCE MEASURES</i>		Shanchao Sun and Jinzhao Liu. <i>WHEEL/RAIL CONTACT FORCE IDENTIFICATION MODEL AND ITS APPLICATION</i>
Paula Cuervo Velasquez, Petros Christoforou, Roger Lewis, Adam Beagles, Juan Felipe Santa Marin and Alejandro Toro. <i>TWIN DISC ASSESSMENT OF WEAR REGIME TRANSITIONS IN R400HT - E8 PAIRS</i>	Maoxuan Zhang, Gang Zhao, Xing Fang, Hangyuan Qin, Jinzhao Liu and Shanchao Sun. <i>WHEEL AND RAIL PROFILE MATCH METHOD ON BASIS OF DYNAMIC EQUIVALENT CONICITY</i>	Maria Cristina Valigi, Silvia Logozzo, Elisa Butini, Enrico Meli, Lorenzo Marini and Andrea Rindi. <i>EXPERIMENTAL EVALUATION OF TRAMWAY TRACK WEAR BY MEANS OF 3D METROLOGICAL OPTICAL SCANNERS</i>			

13:00 - 14:00 Lunch break

3.3a Wheel polygonisation 2 Chair: Wanning Zhai	3.3a - 14:00 - 15:15	3.3b Rail wheel materials 2 Chair: David Fletcher	3.3b - 14:00 - 15:15	3.3c Measurement and monitoring Chair: Alfredo Núñez	3.3c - 14:00 - 15:15
	Sheng Qu, Jianbin Wang, Dafu Zhang, Huailong Shi, Pingbo Wu and Huanyun Dai. <i>FIELD INVESTIGATION ON THE HIGHER-ORDER POLYGON WEAR ON WHEEL OF HIGH SPEED TRAINS</i>		Roger Lewis, Peter Christoforou, Wen-Jian Wang, Adam Beagles, Mark Burstow and Stephen Lewis. <i>INVESTIGATION OF THE INFLUENCE OF RAIL HARDNESS ON THE WEAR OF RAIL AND WHEEL MATERIALS UNDER DRY CONDITIONS (ICRI WEAR MAPPING PROJECT)</i>		Jingmang Xu, Ping Wang, Xiaochuan Ma, Boyang An, Yao Qian and Rong Chen. <i>WEAR MONITORING OF RAILROAD SWITCH RAIL USING ACOUSTIC EMISSION AND DATA MINING TECHNIQUES</i>
	Bin Fu, Stefano Bruni and Shihui Luo. <i>NUMERICAL SIMULATION FOR POLYGONAL WEAR OF RAILWAY WHEELS</i>		Chung Lun Pun, Peter Mutton, Darrien Welsby and Wenyi Yan. <i>RATCHETING PERFORMANCE OF FLASHBUTT WELDS IN PREMIUM RAIL STEELS</i>		Maksym Spiryagin, Ingemar Person, Mark Hayman, Qing Wu, Yan Sun, Dwayne Nielsen, Chris Bosomworth and Colin Cole. <i>FRICTION MEASUREMENT AND CREEP FORCE MODELLING METHODOLOGY FOR LOCOMOTIVE TRACK DAMAGE STUDIES</i>
	Wubin Cai, Maoru Chi, Xingwen Wu, Xuesong Jin, Zefeng Wen, Shulin Liang and Xiaohan Han. <i>A STUDY OF THE MECHANISM OF HIGH ORDER WHEEL POLYGONAL WEAR</i>		Yunlei Lin, Qingyue Zhou, Yinhua Zhang and Fengshou Liu. <i>PERFORMANCE INVESTIGATIONS OF ON-LINE HEAT TREATED BAINITIC RAILS</i>		Ileana Bodini, Candida Petrogalli, Angelo Mazzù, Giovanna Sansoni, Takanori Kato and Taizo Makino. <i>A VISION-BASED APPROACH FOR ROLLING CONTACT FATIGUE EVALUATION ON A WHEEL MATERIAL</i>
Dadi Li, Huanyun Dai, Xiaoping Jia and Binbin He. <i>OUT-OF-ROUND OF SUBWAY WHEEL CAUSED BY RAIL FLEXIBILITY</i>	Taposh Roy, Ralph Abrahams, Anna Paradowska, Quan Lai, Peter Mutton, Mehdi Soodi and Wenyi Yan. <i>EVALUATION OF THE MECHANICAL PROPERTIES OF LASER CLADDED HYPEREUTECTOID STEEL RAILS</i>	Jianfeng Guo, Weidong Wang, Weiguo Fan, Guihong Xu, Jinzhao Liu, Xuan Zhang and Yu Wang. <i>VIRTUAL MEASUREMENT OF WHEEL RAIL FORCE BY AXLE BOX ACCELERATION</i>			

3.4a Wheel-rail dynamics Chair: Xin Zhao	3.4a - 15:30 - 16:30	3.4b Friction and adhesion 4 Chair: Stefano Bruni	3.4b - 15:30 - 16:45	3.4c RCF 4 Chair: Eric Magel	3.4c - 15:30 - 16:30
	Emil Aggestam, Jens C O Nielsen, Andreas Andersson and Martin Li. <i>MULTI-OBJECTIVE DESIGN OPTIMISATION OF TRANSITION ZONES BETWEEN DIFFERENT RAILWAY TRACK FORMS</i>		William Skipper, Anup Chalisey and Roger Lewis. <i>PARTICLE CHARACTERISATION OF RAIL SAND FOR UNDERSTANDING TRIBOLOGICAL BEHAVIOUR</i>		Makoto Akama and Takafumi Kimata. <i>NUMERICAL SIMULATION MODEL FOR THE COMPETITION BETWEEN SHORT CRACK PROPAGATION AND WEAR IN THE WHEEL TREAD</i>
	Junheng Xiao, Huafeng Hu, Ziquan Yan, Wei Li, Yinghui Tu and Hangwei Fang. <i>THE INFLUENCE OF WHEEL/RAIL VIBRATION ON THE DAMAGE OF RAIL FASTENING SYSTEM OF HIGH SPEED RAILWAY IN CHINA</i>		Takuya Matsuda, Fujio Masuzawa, Takashi Maeda, Atsushi Iwamoto, Kosuke Matsumoto, Masuhisa Tanimoto, Akira Matsumoto, Yohei Michitsuji, Yosuke Ichiyanagi, Yasuhiro Sato, Hiroyuki Ohno and Takuji Nakai. <i>ESTIMATION OF FRICTION COEFFICIENT BETWEEN OUTSIDE FLANGE AND RAIL SURFACE</i>		Dimosthenis Floros, Anders Ekberg and Fredrik Larsson. <i>EVALUATION OF MIXED-MODE CRACK GROWTH CRITERIA UNDER ROLLING CONTACT CONDITIONS</i>
Ziquan Yan, Huafeng Hu, Yousheng Hao, Junheng Xiao, Yinghui Tu and Xiaoyi Hu. <i>THE INFLUENCE OF DOPPLER EFFECT ON THE WHEEL/RAIL DYNAMIC TEST IN HIGH SPEED RAILWAY LINES</i>	Qian Xiao and Wuxi Jiang. <i>STUDY ON FUNCTIONAL ADHESION COEFFICIENT OF HIGH-SPEED WHEEL-RAIL ROLLING CONTACT</i>	Juan Santa, Peter Christoforou, Paula Cuervo, Alejandro Toro, Adam Beagles and Roger Lewis. <i>EVALUATION OF ROLLING CONTACT FATIGUE OF RAIL MATERIALS IN TWIN DISC TESTS</i>			
	Reuben Kempka, Robert Falconer, Dmitry Gutsulyak and Roger Lewis. <i>EFFECTS OF OXIDE AND WATER ON FRICTION OF RAIL STEEL - NEW TEST METHOD AND FRICTION MAPPING</i>				

17:00 - 18:00 Closing Ceremony by Prof. Zili Li and Prof. Rolf Dollevoet

18:00 - 19:30 Network drinks

## THURSDAY 27 SEPTEMBER

09:00 - 12:30 Technical tours TUDelft Campus

12:30 - 14:00 Lunch