TECHNICAL PROGRAM

PLENARY, ORGANIZED,
ORAL AND INTERACTIVE
POSTER SESSIONS
Tuesday, October 29, 2019

**Hall C**  9:00 - 9:45

**Opening Ceremony**

**Hall C**  9:45 - 11:00

**Plenary Session 1**

**The Role of Railway Operators in Enhancing the Customer Experience**

Moderator: **Anson JACK**, International Director, Birmingham Centre for Railway Research and Education, and Professor, International Railway Benchmarking, University of Birmingham

- **Masaki OGATA**, Vice Chairman, East Japan Railway Company (JR East), Japan
- **Shun-ichi KOSUGE**, Executive Vice President, Central Japan Railway Company (JR Central), Japan
- **Guillaume PEPY**, Chairman of SNCF Executive Board, and CEO of SNCF Mobilités, France
- **Rolf HÄRDI**, Chief Technology Innovation Officer, Deutsche Bahn (DB), Germany
- **Marco CAPOSCIUTTI**, Chief Technology Officer, Trenitalia, Italy
- **Lisa STABLER**, President, TTCI - a wholly-owned subsidiary of the American Association of Railroads (AAR), USA

**Organized Session 1**

**OS_01: Horizon Scanning for the Railways: An International Collaboration Perspective**

Organizer/Chair: **Olivier MARTEAUX** (RSSB, UK)

<table>
<thead>
<tr>
<th>Time</th>
<th>Title</th>
<th>Speakers</th>
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<tbody>
<tr>
<td>11:30</td>
<td>A methodology for prioritizing RTS enabling technologies</td>
<td>Olivier MARTEAUX, Luisa MOISIO (RSSB, London, UK)</td>
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<td>11:45</td>
<td>Exploring the Future of Japan’s Railway Industry through Scanning-Based Foresight Method</td>
<td>Nanami FURUE[1], Yuichi WASHIDA[2], Yasunori TANAKA[3], Akihisa YAHATA[4], Motoki KOBAYASHI[5], Naoaki KITTA[6], ([1]Tokyo University of Science, Tokyo, Japan, [2]Hitotsubashi University, Tokyo, Japan, [3]The Japan Research Institute, Tokyo, Japan)</td>
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<td>12:00</td>
<td>Enabling a global community for rail horizon scanning</td>
<td>Andrew MEIER (Australasian Centre for Rail Innovation (ACRI), Canberra, Australia)</td>
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<td>12:15</td>
<td>Future by design: the next frontier for radical change in railway systems</td>
<td>Marcelo BLUMENFELD, Holly FOSS, Clive ROBERTS (University of Birmingham, Birmingham, UK)</td>
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Tuesday, October 29, 2019

D7 11:30 - 13:10

OP_01: Condition-Based Maintenance of Infrastructure, I
Chair: Andy DOHERTY (Network Rail, UK)

11:30  FOSphAT - Fiber optic sensing for permanent and holistic assessment of track
       Ivan VIDOVIĆ, Stefan MARSCHNIG (Graz University of Technology, Graz, Austria)

11:50  Detecting singular track defects by time-frequency signal separation of axle-box acceleration data
       Benjamin BAASCH[1], Michael ROTH[2], Patrik HAVRLA[2], Jörn C. GROOS[2]
       ([1]German Aerospace Center (DLR), Berlin, Germany, [2]German Aerospace Center (DLR), Braunschweig, Germany)

12:10  Development of decision making support system using track facility monitoring data
       Shuhei YAMAMOTO, Ryouhei KASAI, Hisashi YOSHIDA, Shigeru MOTOYOSHI, Takaki KUBO
       (East Japan Railway Company [JR East], Saitama, Japan)

12:30  Improved Switch Maintenance based on Automated Measuring Systems and Data Analysis
       Johan VEKEMANS (Infrabel, Brussels, Belgium)

12:50  Damage detection in railway bridges by means of train on-board sensors:
       Claudio SOMASCHINI[1], Marco CARNEVALE[1], Kodai MATSUOKA[2], Andrea COLLINA[1]
       ([1]Politecnico di Milano, Milano, Italy, [2]Railway Technical Research Institute, Tokyo, Japan)

D5 11:30 - 13:10

OP_02: Attracting Customers by Understanding Their Needs and Behaviors
Chair: Simone MORGAGNI (SNCF, France)

11:30  Development of Core Technology for Smart Pass System (Seamless Passenger Flow Technology) in Metropolitan Subway
       Sung-pil CHOI (KORAIL Research Institute, Daejeon, Korea)

11:50  A Methodology to Assess the Impact of End-User Centric Innovations on Railway Transportation Attractiveness
       Yves PERREAI[1], Svenja HAINZ[2], EloiDE VANNIER[3], Ida KROSTOFFERSSON[4], Michael MEYER ZU HÖRSTE[2]
       ([1]Thales Ground Transportation Systems, Paris, France, [2]German Aerospace Center (DLR), Braunschweig, Germany,

12:10  Text-based Analysis of High-speed Railway Passenger Interest, Involvement and Satisfaction
       Rui XUE, Xiaoning MA, Siqi SUN (China Academy of Railway Sciences, Beijing, China)

12:30  Study on Evaluation Approaches for Service Quality of Experience-Oriented Railway Passenger Transport
       Xiang XU[1], Yaqun WANG[2], Nan XIAO[1], Zhimei WANG[3]
       ([1]China Railway Economic and Planning Research Institute, Beijing, China, [2]China Academy of Railway Sciences, Beijing, China,
       [3]Beijing Jiaotong University, Beijing, China)

12:50  High speed fault tolerant Ethernet train networks and passenger information systems services with on board Internet access
       Antonio GHELARDINI, Alessandro VALENTINI, Paolo MASINI (Trenitalia, Florence, Italy)
Tuesday, October 29, 2019

D1  11:30 - 13:10

**OP_03: Natural Hazard Management**

Chair: Naoyasu IWATA (Railway Technical Research Institute (RTRI), Japan)

11:30  **Study on Seismic Strengthening of Masonry Retaining Wall for Railway under Several Limiting Conditions**
Masahiro HORI, Takenori MIURA, Shinji KONISHI (Tokyo Metro, Tokyo, Japan)

11:50  **An overview on the countermeasures under development for mitigating the consequences of earthquakes on the Italian Railway Network**
Paola FIRMI, Franco IACOBINI, Marco TISALVI, Andrea VECCHI, Alberto MAURO (Rete Ferroviaria Italiana, Rome, Italy)

12:10  **New Approaches to Improving the Immediacy and the Accuracy of an Earthquake Early Warning for Railways**
Masahiro KORENAGA[1], Shunroku YAMAMOTO[1], Naoyasu IWATA[1], Shunta NODA[1], Shin AOI[2]

12:30  **Research on the layout technology of high-speed railway wind monitoring stations based on data fusion analysis**
Rui WANG[1], Yun BAO[1], Hailan SHEN[1], Lingyun MENG[2], Jiaojiao WANG[1], Chengwei XU[1]
[1]China Academy of Railway Sciences, Beijing, China, [2]Beijing Jiaotong University, Beijing, China

12:50  **Development of Train Operation Control Method Against Localized Heavy Rainfall Using Weather Radar Data**
Hiroto SUZUKI[1], Eichi NAKAKITA[2, 3], Hideo TAKAHASHI[1]
[1]East Japan Railway Company (JR East), Saitama, Japan, [2, 3]Kyoto University, Kyoto, Japan, [3]Tokyo Metropolitan University, Tokyo, Japan

G409  11:30 - 13:10

**OP_04: Demand Forecasting and Capacity Management**

Chair: Richard WALKER (RSSB, UK)

11:30  **Forecasting passenger load in a transit network using data driven models**
Kevin PASINI[1, 2], Mostepha KOUIDJIA[2], Fabrice GANANSIA[3], Latifa OUKHELLOU[4]

11:50  **Regional Spatial Interaction Rail Commuter Demand Model**
John STAFFORD (University of Birmingham, Birmingham, UK)

12:10  **A Deep Approach of Affluence Forecasting in Subway Networks**
Nicolas BASIKIOTIS[1, 2], Lucas BECIRSPAHIC[1, 2], Romain BRAULT[1, 2], Stephane DUGUET[1, 2], Vincent GIGUE[2]

12:30  **Integrating train unit shunting problem, train maintenance and routing**
Franck KAMENG[1, 2], Paola PELLEGIRINI[1, 2], Joaquin RODRIGUEZ[1, 2], Boubakeur MERABET[1, 2], Bertrand HOUZEL[1, 2]

12:50  **Influence of Traffic Complexity on Railway Gravity Hump Classification Yard Capacity**
Tyler DICK, Nao NISHIO (University of Illinois, Urbana-Champaign, USA)
Tuesday, October 29, 2019

Seminar Room 1  11:30 - 13:10

IP_01: Vehicle and Track Interaction
Chair: Masahito ADACHI (Central Japan Railway Company (JR Central), Japan)

Implementation of wheel/rail friction moderating system
Yuki IJICHI[1], Tsuyoshi MORIMITSU[1], Yuichi MIMURA[2], Soichiro WATANABE[2]

Classifying the Generation Form of Rail Corrugation
Hirofumi TANAKA, Kazuhiro KAJIHARA, Mitsuo ABOSHI (Railway Technical Research Institute [RTRI], Tokyo, Japan)

Survey on Occurrence of Wheel Slip/Slide in Mountain Service Line
Hua CHEN, Takemasa FURUYA, Shinya FUKAGAI, Shinichi SAGA
(Railway Technical Research Institute [RTRI], Tokyo, Japan)

Investigation of dynamic wheel/rail contact forces at a crossing
Thi Mac-Lan NGUYEN-TAJAN[1], Si Hai MA[1, 2], Vincent PEYRONNET[2], Olivier VO VAN[3]

Development of new wheel tread for improving curving performance and reducing contact pressure
Tomoki FUKUSHIMA[1], Masuhisa TANIMOTO[1], Tomohisa OGINO[1], Daiki NAKAMURA[1], Takanori MATSUMI[1]
Yoshifumi KOMURA[1], Yasuhiro SATO[1], Hiroyuki OHNO[1] (SNCF Réseau, Saint-Denis, France)

Load Characteristic Analysis and Load Spectrum Study of High Speed Train Bogie Frame
Wenjing WANG[1], Ruiguo YAN[1], Ying ZHANG[1], Guangxue YANG[1], Guangquan Lu[1]
[1]Beijing Jiaotong University, Beijing, China, [2]CRRC Qingdao Sifang, Qingdao, China

Numerical Analysis of Snow Accretion by Airflow Simulator and Particle Simulator
Kohei MUROTANI, Koji NAKADE, Yasushi KAMATA, Daisuke TAKAHASHI
(Railway Technical Research Institute [RTRI], Tokyo, Japan)

A railway simulator to reproduce train dynamics and European signaling environment
Carmine ZAPPACOSTA, Giampaolo MANCINI, Salvatore VETRUCCIO, Luigi CACCAMO, Luca BOCCIOLINI
(Italcertifier, Florence, Italy)

San Donato Test Circuit site in Bologna
Eugenio FEDELI[1], Vincenzo CALA[1], Francesco GIULIANO[2], Mirko ERMINI[2], Alessandro FIORE[2]

Seminar Room 2  11:30 - 13:10

IP_02: Maglev & Rolling Stock
Chair: Takahiro TOMIOKA (Akita Prefectural University, Japan)

Development of air suspension system for raising and lowering cars
Tsuyoshi MORIMITSU[1], Kazuya KIDO[1], Takashi OKAMOTO[2], Yuki IJICHI[1], Soichiro WATANABE[2]
Research on Integral Transportation Scheme on the Railway for the weight 408t of 1000MW Turbo-generator Stator

Baoshuan TIAN[1], Hongtao LIANG[2], Hongliang WEF[3], Wei ZHOU[4], Ting XIAO[5], Xi WANG[6]


Development of a Bogie for Tilt Control with an Electric Rotary Actuator and an Anti-Roll Bar

Takashi KOJIMA, Akihito KAZATO, Kohei MIYAHARA, Nobuyuki WATANABE

(Railway Technical Research Institute [RTRI], Tokyo, Japan)

Development of AC-fed and battery-powered train “DENCHA” with high-capacity battery


First ECN/ETB Conformance Test Implementation

Mikel COLERA, Iker ZABALA, Mikel KORTA (CAF Power & Automation, San Sebastian, Spain)

Contactless electrical coupler providing large capacity transmission by visible light communication technology

Masahiro NOGAMI, Nobuhiyo NAKAMURA, Kouji SAITO (East Japan Railway Company [JR East], Saitama, Japan)

Field tests of Wireless Train Backbone for Train Control and Monitoring System

Igor LOPEZ[1], Javier GOIKOETXEA[1], Armin HEINDEL[2] (CAF, Beasain, Spain, [2]Siemens Mobility, Erlangen, Germany)

Study on aerodynamics of ultra-high-speed train for tube transportation

Hongmei LI, Yan XUAN, Xing FANG, Lixia SUN (China Academy of Railway Sciences, Beijing, China)

The Heat Generation Condition of High Temperature Superconducting Maglev in the Evacuated Tube

Yu TAO, Jiali LIU (CRRC Qingdao Sifang, Qingdao, China)

Development of High Temperature Superconducting Magnet Using REBCO Coated Conductor for the Maglev

Katsutoshi MIZUNO, Minoru TANAKA, Masafumi OGATA (Railway Technical Research Institute [RTRI], Tokyo, Japan)
Tuesday, October 29, 2019

Organized Session 2
Hall C 14:30 - 15:50

OS_02: Decision-Aid for Real-Time Railway Operation Control
Organizer/Chair: David DE ALMEIDA (SNCF, France)

14:30 Timetable rescheduling from passengers’ point of view - Are we pursuing the holy grail? -
Norio TOMII (Nihon University, Chiba, Japan)

14:45 An enhanced constraint programming approach for the real-time railway traffic management
problem
Joaquin RODRIGUEZ, Grégory MARLIÈRE, Sonia SOBIERAJ RICHARD, Paola PELLEGRINI
(Univ. Lille Nord de France, IFSTTAR, Lille, France)

15:00 Multicriteria Decision Support for Real Time Railway Rescheduling in Rapid Transit Systems
Stéphane DAUZERE-PERES[1], Estelle ALTAZIN[2], Mathieu GAGNON[3], François RAMOND[2], Sabine TREFOND[2]

15:15 Reduced (winter) timetable in the Netherlands: Process, Mathematical Models and Algorithms
Pieter-Jan FIOOLE[1], Dennis HUISMAN[1, 2], Gábor MARÓTI[1, 3], Ricardo L. SALDANHA[4]
([1]Netherlands Railways, Utrecht, The Netherlands, [2]Erasmus University Rotterdam, Rotterdam, The Netherlands,

OP_05: Rolling Stock, Subsystems and Components
Chair: Aaron BARRETT (RSSB, UK)

14:30 Freight Locomotive Wheel Wear Simulation in Train Operational Environment
Qing WU[1, 2], Maksym SPIRYAGIN[1, 2], Yan SUN[1, 2], Colin COLE[1, 2]
([1]Central Queensland University, Rockhampton, Australia, [2]Australasian Centre for Rail Innovation, Canberra, Australia)

14:50 An Independent Interior Structure for Reducing the Interior Noise of Railway Vehicles
Katsuya YAMAMOTO[1], Tonomori GOTO[1], Mineyuki ASAHI[1], Norihiko IMAOKA[2]

15:10 Technologies for achieving both reliability improvement and weight reduction of Shinkansen bogie
Seiji KANAMORI, Tomohiro OTSUKA, Masahito ADACHI, Kei SAKANOUE
(Central Japan Railway Company [JR Central], Aichi, Japan)

15:30 Battery with Integrated Power Supply (BALIN)
Matteo NOBILI, Lorenzo FLACCOCOMIO, David RUSSO, Giuseppe GRANDE, Alfredo BIANCUCCI
(Trenitalia, Florence, Italy)

OP_06: Safety and Security Awareness
Chair: Pasquale SAIENNI (Italian National Safety Authority, Italy)

14:30 A practical report of CBTC security analysis
Shunsuke YATABE, Masaki OTA (West Japan Railway Company [JR West], Osaka, Japan)
Tuesday, October 29, 2019

14:50 Cyber Security for Rail during the Life-Cycle: Challenges and Approaches  
Christian REICHMANN[1], Swantje WEISS[1], Michael DIETZ[1] (Siemens Mobility, Erlangen, Germany, Siemens Mobility, Braunschweig, Germany)

15:10 Improving Public Safety through Interorganizational Information Management at Public Transportation Hubs during Mass Events or Critical Events  
Andreas LOTTER[1], Alexander GABRIEL[1], Florian BRAUNER[2], Frank FIEDRICH[1], Philipp JOHN[1] (University of Wuppertal, Wuppertal, Germany, Kölner Verkehrs-Betriebe, Cologne, Germany)

15:30 Towards the European Railway Safety Culture Model  
Grégory ROLINA, Bart ACCOU (European Union Agency for Railways, Valenciennes, France)

**D1** 14:30 - 15:50

**OP_07: Passenger Comfort**
Chair: Simon FLETCHER (International Union of Railways (UIC), Belgium)

14:30 Impact of Local Comfort Zones in Long-Distance Rolling Stock on Objective and Subjective Thermal Comfort Rating  
Daniel SCHMELING[1], Hans-Jürgen HÖRMANN[2], André VOLKMAN[1], Panja GOERKE[2] (German Aerospace Center (DLR), Göttingen, Germany, German Aerospace Center (DLR), Hamburg, Germany)

14:50 Indoor air quality and olfactory performances on high-speed trains  
Fayes GHOOZI[1], Walter EUSTACCHIO[2], Sandrine SEGRETAIN[2], Laurent DUPONT[1], Vincent ARRIGONI[2], Heidi CARRILHO[1], Nicolas GOURNET[1] (SNCF Mobilités, Vitry/Seine, France, SNCF Mobilités, Saint-Denis, France)

15:10 A Semi-active Multi-mode Vibration Damping Technique to Study the Impact of Vertical Flexural Vibration Damping of a Railway Car-body Floor on Ride Comfort  
Silabhadra DAS[1], Ashish GUPTA[1], Shuntaro ONO[2], Yukinori KOBAYASHI[2], Takanori EMARU[2], Ankit RAVANKAR[2] (Graduate School of Engineering Hokkaido University, Sapporo, Japan, Faculty of Engineering Hokkaido University, Sapporo, Japan)

15:30 Efforts to improve riding comfort of the Tokaido Shinkansen  
Yosuke OKADA[1], Masahito ADACHI[1], Hirokazu KATO[1], Tomoaki AOYA[1], Nobuyuki OKADA[2] (Central Japan Railway Company [JR Central], Aichi, Japan, Nippon Sharyo, Aichi, Japan)

**G409** 14:30 - 15:50

**OP_08: Modelling, Testing and Acceptance**
Chair: Giampaolo MANCINI (Italcertifer, Italy)

14:30 “Building Management System in the Loop” Simulation for developing the Railway Smart Grid  
Clément DÉPATURE, Tony LETROUVÉ (SNCF, Paris, France)

14:50 Integration of TDD (Test Driven Development) and CI (Continuous Integration) techniques in ISO/IEC 17025 accredited laboratories  
Riccardo ASCENZI[2], Luigi CACCAMO[2], Giampaolo MANCINI[1], Paolo SERENO[1], Salvatore VETRUCCIO[2], Carmine ZAPPACOSTA[1] (Italcertifer, Firenze, Italy, Italcertifer, Roma, Italy)

15:10 Testing and assessment of running characteristics of a High speed prototype  
Thomas KOLBE (DB Systemtechnik, Minden, Germany)
Tuesday, October 29, 2019

15:30 Development of a High-Speed Adjustable Perturbation Slab Track
Dingqing LI\textsuperscript{1}, Nicholas WILSON\textsuperscript{1}, Brian MARQUIS\textsuperscript{2}, Ali TAJADDINI\textsuperscript{2}
\textsuperscript{1}(Transportation Technology Center, Inc. (TTCI), Pueblo, USA, \textsuperscript{2}Volpe Center, Boston, USA, \textsuperscript{3}Federal Railroad Administration, Washington DC, USA)

Seminar Room 1 14:30 - 15:50

IP _03: Condition-Based Maintenance of Infrastructure, I
Chair: Fumiaki UEHAN (Railway Technical Research Institute (RTRI), Japan)

Development study of Condition-based maintenance System by cloud computing and mobile phone network
Buntaroh HORIGOME, Katsuhiko ISHIKAWA, Katsuya KATOU, Koji SUGIURA, Takashi KAWANO
(East Japan Railway Company [JR East], Tokyo, Japan)

Using Big Data Technologies to Process Operational Events from Field Units as Well as Large Scale Railway Network Simulations
Lucas Andreas SCHUBERT, Jakob ERDMANN, Akhil Jayant PATIL, Eric MELDE
(German Aerospace Center (DLR), Brunswick, Germany)

Feasibility study on Machine Learning techniques applied to predict train incidents: a catenary occurrence log case study
Haritz LABOA, M AGUADO (I2T Research Group, Bilbao, Spain)

Asset Digitalization and condition based data integration
Fabio RUSSO, Cosima DIPALMA, Ruggero PALUMBO, Fabrizio CARAMIA (MER MEC S.p.A., Monopoli, Italy)

Ultra-Light vehicle for autonomous inspection of loading gauge on railway lines after maintenance works
Eugenio FEDELI\textsuperscript{1}, Vincenzo CALA\textsuperscript{2}, Mirko ERMINI\textsuperscript{2}, Mirco GONNELLI\textsuperscript{2}, Giovanniluca DE VITA\textsuperscript{2}, Luca TISENI\textsuperscript{3}, Daniele LEONARDIS\textsuperscript{3}, Massimo SATLER\textsuperscript{3}, Federica FIORETTI\textsuperscript{3}, Massimiliano SOLAZZI\textsuperscript{3}, Antonio FRISOLI\textsuperscript{3}, Carlo Alberto AVIZZANO\textsuperscript{3}, Rete Ferroviaria Italiana, Roma, Italy, Rete Ferroviaria Italiana, Firenze, Italy, Scuola Superiore Sant’Anna, Telecommunication Institute, Pisa, Italy)

Track Geometry modelling - an approach for integrating WTMS data within Asset Management modelling framework
Benoit GUYOT\textsuperscript{1}, Olivier DUBRULLE\textsuperscript{1}, Christine FUNFSCHILLING\textsuperscript{2,3} (SNCF Réseau, Saint Denis, France, \textsuperscript{2}SNCF Group, Saint Denis, France)

Seminar Room 2 14:30 - 15:50

IP _04: Infrastructure
Chair: Ananyo BANDYOPADHYAY (Transportation Technology Center, Inc. (TTCI), USA)

Quantitative estimation of operational safety level for track circuits in the French railway network using feedback: Risk management versus economic optimization
Nadia AMMAD, Gildas MABIT (SNCF Réseau, Saint Denis, France)

Research on Recognition Model for Catenary Equipment in Measurement Data
Haiying WANG\textsuperscript{1}, Wei ZHOU\textsuperscript{1}, Wenfeng WANG\textsuperscript{1}, Wenxuan ZHANG\textsuperscript{2}, Xiangdong Li\textsuperscript{3}
\textsuperscript{1}(China Academy of Railway Sciences, Beijing, China, \textsuperscript{2}Jinan Railway Administration, Qingdao, China)
Tuesday, October 29, 2019

Verification concerning deviceization of track patrol by camera mounted on a vehicle  
Tatsuro WATANABE, Kensuke NAGAO, Takemi FUJIHARA, Eiichi OKETANI  
(West Japan Railway Company [JR West], Osaka, Japan)

Validating Feeling of Agreement with Discriminant Analysis Results on Likelihood of Subway Tunnel Ceiling Delamination and Spalling  
Masami OSHIMATANI[1], Yuki WAKUDA[2], Yusho ISHIKAWA[3], Shinji KONISHI[4], Yuki ENOKIDANI[5], Daiki OGAWA[4], Naoya IMAIZUMI[1], Hideaki SHINOHARA[3]  

System for Preventing Flaking of Lining Concrete in Subway Tunnel Using Four Methods  
Hirotake NOGUCHI[1], Shinji KONISHI[1], Daisuke TANAKA[1], Yuki ENOKIDANI[1], Naoya IMAIZUMI[1], Saki NEMOTO[2]  

Toward the optimization of the ballast gluing process for track lateral resistance enhancement  
Félix LABOUP[1, 2], Mathieu RENOUF[1], Jean-François FERELLEC[2], Michel WONE[2]  
[1]LMGC, Montpellier, France, [2]SNCF, Saint-Denis, France

A Monitoring Method for Mechanical Condition of Track Using Rail Lateral Displacement Data Obtained with Commercial Trains  
Kazuhisa ABE[1], Takuro SATO[1], Akihisa SHIMIZU[2], Kazuhiro KORO[1]  

Organized Session 3

Hall C 16:20 - 18:00

OS_03: Autonomous Trains on Main Lines
Organizers/Chairs: Rolf HÄRDI (Deutsche Bahn (DB), Germany)  
Ralf MARXEN (Deutsche Bahn (DB), Germany)

16:20 Virtual Coupling of Trains: First Implementation and Tests  
Javier GOIKOETXEA[1], Igor LOPEZ[1], Pedro Alexi PEREZ[2], Ignacio CELAYA[2], Oscar SANCHEZ[2]  
[1]Construcciones y Auxiliar de Ferrocarriles (CAF), Beasain, Spain, [2]Construcciones y Auxiliar de Ferrocarriles (CAF), Zaragoza, Spain

16:40 TC-Rail: Railways Remote Driving  
Émilie MASSON[1], Philippe RICHARD[1], Santiago GARCIA-GUILLEN[2], Gemma MORRAL ADELL[2]  

17:00 A New Automatic Train Operation System over European Train Control System for High-Speed Line Infrastructure Monitoring  
Arturo AMENDOLA[2], Marco BOZZANO[3], Alessandro CIMATI[3], Stefano DE MURO[1], Salvatore DE SIMONE[3], Eugenio FEDELI[3], Franco FIUMARA[3], Alberto PETRILLO[3], Stefania SANGINEI[3], Diana SERRA[2], Marco TESI[1]  

17:20 Autonomous train or autonomy solutions?  
Rémy LAGAY (SNCF, Paris, France)

17:40 Future of multi-modal mobility  
Jürgen SCHLAHT (Siemens Mobility, Erlangen, Germany)
Tuesday, October 29, 2019

**OP_09: Condition-Based Maintenance of Infrastructure, II**
Chair: Mitsuru IKEDA (Railway Technical Research Institute (RTRI), Japan)

16:20 Condition Monitoring of Track from In-service Vehicles for Regional Railways
Hitoshi TSUNASHIMA[1], Hirotaka MORI[2], Tetsuya TAKATA[3] (1)Nihon University, Chiba, Japan, 2)National Traffic Safety and Environment Laboratory, Tokyo, Japan, 3)Kyosan Electric Mfg., Kanagawa, Japan

16:40 Ultrasonic phased array measurement of near-surface cracks in the railhead
Rayendra ANANDIKA, Jan LUNDBERG, Christer STENSTRÖM (Luleå University of Technology, Luleå, Sweden)

17:00 Compaction energy as an indicator for ballast quality
Olja BARBIR[1], Bernhard ANTONY[2], Fritz KOPF[2], Johannes PISTROL[1], Dietmar ADAM[3] (1)TU Wien, Institut für Geotechnik, Vienna, Austria, 2)Plässer & Theurer, Vienna, Austria, 3)FCP - Fritsch, Chiar & Partner ZT, Vienna, Austria

17:20 Implementation of advanced diagnostic algorithms for Network Rail’s Enhanced Point Condition Monitoring project
Louis SAADÉ[1, 2], Fiona LYNCH[3] (1)University of Birmingham, Birmingham, UK, 2)Deutsche Bahn Engineering & Consulting, Birmingham, UK, 3)Network Rail, Milton Keynes, UK

17:40 Research on Inspection Criterion for Dynamic Angle of Steady Arm on High-speed Railways
Yan-guo WANG[1], Dongsheng CHEN[1], Kai TAO[1], Chunhao LIU[1], Ding LI[2], Jincal LI[2], Kexin XIAO[2], Qiang FU[2] (1)China Academy of Railway Sciences, Beijing, China, 2)INMAI Railway Technology, Beijing, China

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**OP_10: Bridges and Tunnels**
Chair: Andy DOHERTY (Network Rail, UK)

16:20 Earthquake-Resistance Examination of Crossing Direction of Tunnel Cross Sections with Non-uniform Heights
Hiroki NITTA[1], Tsutomu OTSUKA[1], Shinji KONISHI[1], Takeshi SETO[1], Kiwamu TSUNO[2], Satoshi TSUCHIYA[2], Koichi MAEKAWA[4] (1)Tokyo Metro, Tokyo, Japan, 2)Railway Technical Research Institute, Tokyo, Japan, 3)Coms Engineering Corporation, Tokyo, Japan, 4)Yokohama National University, Tokyo, Japan

16:40 Influence of the Size and Geometry of Cavities Inside of Railway Tunnels on the Pressure Loads on Safety Doors
Daniela HEINE[1], Helmut KUEHNELT[2], Michael RUDOLPH[3], Alois VORWAGNER[3], Stefan LACHINGER[3], Florian SALIGER[1], Gerrit HEINE[1], Klaus EHRENFRIED[1] (1)German Aerospace Center (DLR), Göttingen, Germany; 2)Austrian Institute of Technology, Vienna, Austria; 3)ÖBB-Infrastruktur, Vienna, Austria

17:00 Experimental and Numerical Studies on the Effect of the Movement Restraining Devices for the Construction Joint on the Seismic Response of Plain Concrete Piers
Kazuhiro SAKAOKA[1], Masayuki OOTSURO[1], Kazunori WADA[2], Ryota HASHIMOTO[3], Tomofumi KOYAMA[6] (1)West Japan Railway Company [JR West], Osaka, Japan, 2)Railway Technical Research Institute, Tokyo, Japan, 3)Hiroshima University, Hiroshima, Japan, 4)Kansai University, Osaka, Japan

17:20 Advanced solution to retrofit steel railway truss bridges through a synergetic suspended system
Marco MEZZI[1], Paolo PETRELLA[2], Vincenzo CEFALIELLO[3], Gianluca NESTOVITO[2] (1)University of Perugia, Perugia, Italy, 2)Ing. Paolo Petrella srl, Milano, Italy, 3)Rete Ferriero Italiana Bologna, Bologna, Italy
Tuesday, October 29, 2019

17:40 Prediction for Long-term Behavior of Railway PC Girders Affected by Creep and Shrinkage of Concrete
Ken WATANABE, Yuto OHNO, Mami NAKAMURA (Railway Technical Research Institute [RTRI], Tokyo, Japan)

**OP_11: Passenger Safety**
Chair: Stefano GUIDI (Railway Consultancy Services, Italy)

16:20 Improving the Safety Performance of Passenger Rail Car Glazing Systems
Jeffrey GORDON[1], Patricia LLANA[2], Kristine SEVERSON[3], Anand PRABHAKARAN[3], Florentina M. GANTOI[3], Andrew ROBITAILLE[4], Matt RADOVICH[5], (1)USDOT/Federal Railroad Administration, Washington D.C., USA, (2)USDOT/Volpe Center, Cambridge, USA, (3)Sharma and Associates, Countryside, USA

16:40 Impact of an onboard fire for the evacuation of a rolling stock
Guillaume CRAVEUR, Thierry DUFRE (SNCF, Le Mans, France)

17:00 Modelling an approaching method for station staff to prevent suicide and development of a gatekeeper training program
Masato KURATANI[1], Ken KUSUKAMI[2], Mitsuko AKAHIRA[2], Kotaro OTSUKA[2]
(1)East Japan Railway Company (JR East), Saitama, Japan, (2)Iwate Medical University, Iwate, Japan

17:20 Coherent Radar System for Platform Monitoring at Railway Station
Eugenio FEDELI[1], Vincenzo CALA[1], Mirco ERMINI[2], Mirco GONNELLI[2], Antonio ROSSETTI[2]
(1)Rete Ferroviaria Italiana, Roma, Italy, (2)Rete Ferroviaria Italiana, Firenze, Italy

17:40 Developing the new automatic opening and closing system of the platform screen door on non-interlocking lines
Shinya HAKATA (Tokyo Metro, Tokyo, Japan)

**OP_12: Freight Rail**
Chair: Ulrich MEUSER (Deutsche Bahn (DB), Germany)

16:20 FR8RAIL: Development of Functional Requirements for Sustainable and Attractive European Rail Freight
Jazki MENDIZABAL[1], Jon GOYA[1], Unai ALVARADO[1], Jan BERGSTRAND[2], Anders EKMARK[2]
(1)CEIT and Tecnun (University of Navarra), Donostia, Spain, (2)Trafikverket, Göteborg, Sweden

16:40 Experimental Study of Wireless Communication Technologies for a Novel Freight Monitoring, Tracking and Tracing System
Mihai MARIN-PERIANU[1], Cristian ULIANOV[2], Adi Mahmud Jaya MARINDRA[1], Raluca MARIN-PERIANU[1]
(1)Inertia Technology, Enschede, The Netherlands, (2)Newcastle University, Newcastle upon Tyne, UK

17:00 Application of new UIC Leaflet 421 methodology to new freight train compositions with up to four traction units in distributed traction/braking
Luciano CANTONE[1], Thierry DURAND[2], Robert KARBSTEIN[3], Andrea OTTATI[4]
(1)University of Rome “Tor Vergata”, Rome, Italy, (2)SNCF, Le Mans, France, (3)DB Systemtechnik, Minden, Germany, (4)Trenitalia, Florence, Italy
Tuesday, October 29, 2019

17:20 Development of Diesel Electric Locomotive DD200 - Powerful and Light weight Diesel Electric Locomotive
Yoshikazu SUGIYAMA[1], Koichi YANAGAWA[1], Tetsuya KAWAHIGASHI[2], Masamitsu HORII[3]

17:40 Railroad Freight Car Remote Controlled Electrically Driven Set & Release Hand Brake (EDHB) - Optimization for Increased Reliability and Performance
Monique Ferguson STEWART[1], David BRABB[2], Kenneth MARTIN[2], Anand PRABHAKARAN[3]

Seminar Room 1 16:20 - 18:00
IP_05: Rolling Stock Design and Maintenance
Chair: Kazuhiko NISHIMURA (Central Japan Railway Company (JR Central), Japan)

Predictive pantograph maintenance scanner system
Thomas SCHREVERE[1], Florent BLANCHON[1], Veronique NEWLAND[2], Gérard AUDITEAU[3]

Development of rolling stock under floor visual inspection system by image processing technique
Hiroyuki NAKAJIMA, Akihide UNO, Takehito FUJII (East Japan Railway Company [JR East], Tokyo, Japan)

A Modular Computer Vision Based Solution for Condition-Based Maintenance of Passenger Rolling Stock
Matteo PAMPANA[1], Carlo Alberto AVIZZANO[2], Chiara FARNESI[2], Paolo MASINI[1], Mauro MENCIO[1], Marco CAPOSCIUTTI[1]

Using a rolling stock with a mid-range wireless technology to collect service and diagnose data in areas without mobile signal coverage
Michael MEYER ZU HÖRSTE[1], Lucas Andreas SCHUBERT[1], Miriam GRÜNHÄUSER[2], Said SAOUAMI-WEISS[2], Ingo SCHWARZ[2], Martin DRALLE[3]

Decision Support Model for Rolling Stock Assignment and Predictive Maintenance Scheduling
Meng-Ju WU, Hsin-Cheng SHIH, Yung-Cheng LAI (National Taiwan University, Taipei, Taiwan)

Condition Based Maintenance applied on Railways Compressed Air Generators (rotary screw) for the application of Dynamic Maintenance Management System
Giuseppe BENE[1], Giuseppe Luigi BONACCI[1], Luca LABBADIA[1], Paolo MASINI[2]

Application of Wavelet Packet Analysis in Evaluation of Health Condition for Rolling Stock Lateral Damper
Zhiyan ZHAO, Bin WU (Beijing Jiaotong University, Beijing, China)

Resolution of the train detection loss due to the crushing of autumn leaves

Influence of non-uniform microstructure on the tread shelling of High-speed EMU Wheel
Guanzhen ZHANG, Fangwei ZHAO, Si WU, Tao CONG, Pengpai ZHANG, Hongxiang YIN
(China Academy of Railway Sciences, Beijing, China)
IP_06: Safety, Security and Natural Hazard Management

Chair: Jerzy WISNIEWSKI (International Union of Railways (UIC), France)

Comprehensive and standardised approach for railway cybersecurity
Francois HAUSMAN\(^1\), Katja STUMP\(^2\), Darren HEPBURN\(^3\), Wayne WATSON\(^1\), Claudia LUTZE\(^4\),
Bernhard BRUCKNER\(^5\), Francisco DAZA-PASTRANA\(^1\)\(^\(\text{[1]}\)\), Charleroi, Belgium, \(^6\)Siemens, Berlin, Germany,
\(^7\)Network Rail, London, UK, \(^8\)Thales, Vienna, Austria, \(^9\)Kapsch, Vienna, Austria

A mechanical and economical based framework to help decision-makers for natural hazards and
malicious events impact on infrastructure prevention
Pierre-Jean TISSERAND\(^1\), Muriel RAGUENEAU\(^2\) (\(^1\)Université Paris-Saclay, Cachan, France,
\(^2\)SNCF Réseau, Saint-Denis, France)

Moving-Model Analysis of the Transient Crosswind Stability of High-Speed Trains
James R. BELL\(^1\), Klaus EHRENFRIED\(^1\), Claus WAGNER\(^1\), \(^2\)German Aerospace Center (DLR), Göttingen, Germany,
\(^3\)Technische Universität Ilmenau, Ilmenau, Germany

Earthquake Early Warning for Shinkansen using Ocean Bottom Seismometer
Hiroyuki MIYAKOSHI\(^1\), Hiroto SUZUKI\(^1\), Shunroku YAMAMOTO\(^2\), Wataru SUZUKI\(^3\), Shin AOI\(^2\)
\(^1\)East Japan Railway Company [JR East], Saitama, Japan, \(^2\)Railway Technical Research Institute, Tokyo, Japan,
\(^3\)National Research Institute for Earth Science and Disaster Resilience, Ibaraki, Japan

Integrated information management system, as a method of improving the effectiveness of carrying
out rescue operations at railway accidents
Lucyna SOKOŁOWSKA, Andrzej TORUŃ (Railway Research Institute, Warsaw, Poland)

A method of recovering from derailment of Shinkansen rolling stock in the event of disaster
Hideyuki EGASHIRA (Kyushu Railway Company [JR Kyushu], Fukuoka, Japan)

Development of Derailment Detector with Twin-Sensor
Hiroto OYAMA\(^1\), Masaki NAGAMOTO\(^1\), Shigeki MATSUKA\(^3\), Kenta YANO\(^3\), Takashi MAEDA\(^3\)
\(^1\)Japan Transport Engineering Company, Tokyo, Japan, \(^2\)Tokyo Metro, Tokyo, Japan

Sleepiness Visualization and Sleep Management on Bullet-train Drivers for Human-error Prevention
Yuta YAMAMOTO, Keiichiro TOKUNAGA, Hijiri INOUE, Yoshihiro UCHIDA, Kousuke SHIBATA, Takamitsu YOSHIHARA
(Kyushu Railway Company [JR Kyushu], Fukuoka, Japan)

System precursors to signals passed at danger (SPADs): An exploratory comparison of SPAD
history and rail environment
Anjum NAWEED\(^1\), Lorrielle BOWDITCH\(^1\), Janine CHAPMANN\(^1\), Nora BALFE\(^2\), Jillian DORRIAN\(^4\)
\(^1\)Central Queensland University, Adelaide, Australia, \(^2\)Flinders University, Adelaide, Australia,
\(^3\)Trinity College Dublin, Dublin, Ireland, \(^4\)University of South Australia, Adelaide, Australia

Improved Train-Borne Platform Interface Monitoring
Gavin CAIRD\(^1\) , John CHAN\(^1\), Jina LEE\(^1\) (\(^1\)Ricardo Rail Australia, Sydney, Australia, \(^2\)Transport for NSW, Sydney, Australia)
Wednesday, October 30, 2019

**OS_04: Global Certification for Innovative Product Development**
Organizer/Chair: Lisa STABLER (Transportation Technology Center, Inc. (TTCI), USA)

8:30 **IRIS Certification™ for innovative Product Development**  
Bernard KAUFMANN (UNIFE, Brussels, Belgium)

8:46 **Standardizing the introduction of Top of Rail materials throughout Europe**  
Anup CHALISEY (RSSB, London, UK)

9:02 **Association of American Railroaders System for Approval of Components for North American Interchange**  
David CACKOVIC, Lisa STABLER (Transportation Technology Center, Inc. (TTCI), Pueblo, USA)

9:18 **Certification System of China Railway Products**  
Ming ZHANG (China Academy of Railway Sciences, Beijing, China)

9:34 **International Standardization Strategy for Railway Applications**  
Yuji NISHIE (Railway Research-Culture Promotion Foundation (formerly Ken-yusha, Inc.), Tokyo, Japan)

**OP_13: High Speed Rolling Stock**
Chair: Tadao TAKIGAMI (Railway Technical Research Institute (RTRI), Japan)

8:30 **The Concept of Experimental Platform on Next-Generation Shinkansen Development - Type E956 Prototype Shinkansen named as ALFA-X** -  
Masaaki HARA, Satoshi OOMATA, Osamu KAWAKAMI, Kouji ASANO  
(East Japan Railway Company [JR East], Saitama, Japan)

8:50 **Velaro Novo - Improving Life Cycle Cost by reduction of aerodynamic resistance**  
Michael KOPP (Siemens Mobility, Erlangen, Germany)

9:10 **Development of Traction System for “N700S” Next-generation Shinkansen Rolling Stock**  
Kenji SATO, Hirokazu KATO, Takafulmi FUKUSHIMA (Central Japan Railway Company [JR Central], Aichi, Japan)

9:30 **Innovative freight rail concept for high-speed door-to-door delivery: Hyperfreight**  
Maurizio CAVAGNARO[i], Paolo UMILIACCHI[i], Gianosvaldo FADIN[i], Vincenzo DELLE SITE[i]  
(i)Hyperfreight Initiative, Rome, Italy, (ii)CNC Centro Nuova Comunicazione, Bologna, Italy, (iii)ANIE, Milan, Italy, (iv)Consiglio Nazionale delle Ricerche (CNR), Rome, Italy)
Wednesday, October 30, 2019

**D5**  8:30 - 9:50

**OP_14: Level Crossings**

Chair: Francis BEDEL (International Union of Railways (UIC), France)

8:30  Pedestrian Distraction at Railway Level Crossings: can Illuminated In-ground LEDs attract their Attention Back?

  Grégoire S. LARUE[1, 2], Christopher N. WATLING[1, 3], Alexander A. BLACK[1], Joanne M. WOOD[1],
  Mahrokh KHAKZAR[1] ([1]Queensland University of Technology, Brisbane, Australia,

8:50  An Integrated Level Crossing System Based on IP Network and PE (Programmable Electronic) Safety System

  Takashi MORI, Masaki OTA, Koichiro MASAKI (West Japan Railway Company [JR West], Osaka, Japan)

9:10  Detection of cars at level crossings

  Stefano ROSINI, Francesco RANAURO (Rete Ferroviaria Italiana, Roma, Italy)

9:30  Smart level crossing

  Virginie TAILLANDIER (SNCF, Saint Denis, France)

**D1**  8:30 - 9:50

**OP_15: Investments and Economic Efficiency**

Chair: Julien BRUNEL (SNCF Réseau, France)

8:30  The Hungarian railway reform process and the implementation of periodic timetable (Taktfahrplan)

  Balázs ÁCS (University of Szeged, Szeged, Hungary)

8:50  How to Set Optimum Ticket Price for Maximizing Load Factor of Long Distance Trains?: A Case Study

  Melody KHADEM SAMENI[1], Zahra JAhangiri[1], Alireza ZAKIPOUR[2]
  ([1]University of Science and Technology, Tehran, Iran, [2]Iranian Railways, Tehran, Iran)

9:10  The evolution of insourcing activities for Electronic IXLs and ATPs. A RFI challenging experiment of Management and Industrial Engineering, applied to rail environment

  Salvatore ROMANIELLO, Simone FIORE, Angelo Domenico GIANCOLA, Francesco LAMBARDI DI SAN MINIATO,
  Daniele MORI, Simone PETRALLI, Stefano ROSINI (Rete Ferroviaria Italiana, Roma, Italy)

9:30  A new project finance solution for railway lines and consequently risk analysis for public and private investors

  Marco Santo SPINELLI[1], Carmine ZAPPACOSTA[1], Luca D’AMELIO[1], Antonino LO BURGIO[2]
**Wednesday, October 30, 2019**

### G409 8:30 - 9:50

**OP_16: Energy-Conserving Operation and Energy Storage Technology**
Chair: Vincent DELCOURT (SNCF, France)

#### 8:30

**TransEnergy: Energy storage optimization for peak power and energy consumption reduction in DC electric railway systems**

David FLETCHER, Robert F HARRISON, Samadhi NALLAPERUMA (University of Sheffield, Sheffield, UK)

#### 8:50

**Energy assessment in Shift2Rail European Rail Research Program**

Holger DITTUS[1], Henry VÖLKER[1], Lukas PRÖHL[1], Harald ASCHENMANN[1], Stefan HEIBL[1], Roberto PALACIN[1]

[3]University of Rostock, Chair of Mechatronics, Germany, [4]DB Systemtechnik, München, Germany,
[5]Newcastle University, Newcastle upon Tyne, UK

#### 9:10

**X-EMU: Development and Validation of high performing Fuel Cell- Battery drive systems for hybrid regional trains in a modular traction kit**

Jochen STEINBAUER, Jens-Ole KÜCK (Siemens Mobility, Erlangen, Germany)

#### 9:30

**Development of superconducting feeder cable systems and conducted running test**

MasaTOMITA[1], Kenji SUZUKI[1], YusuKE FUKUMOTO[1], Atsushi ISHIHARA[1], Tomoyuki AKASAKA[1], YusuKE KOBAYASHI[1], Takenori TORII[1], KeiI OGOS[1], Atsushi MAEDA[1], Hervo CARON[1], Toshiya MATSUMOTO[1], Hiroyuki ITO[1]


### Seminar Room 1 8:30 - 9:50

**IP_07: Railway System Interface**
Chair: Eugenio FEDELI (Rete Ferroviaria Italiana (RFI), Italy)

#### Efforts to Utilize the RAMS Standard by Railway Operators

Hirofumi HATANO[1], Shunsuke YATABE[2], Takashi KUNIFUJI[1], Satoru KITAMURA[1], Takashi MORI[2], Masaki OTA[2]


#### Classification of Railway tracks for applying enhanced ERTMS/ETCS Solutions Based on GNSS positioning technologies

Massimiliano CIAFFI[1], Juliette MARAIS[1], GiuseppE EMMANUELLE[1], Omar GARCIA CRESPILO[2], Andrea COLUCCIA[3], Alessia VENNARINI[2], Salvatore SABINA[2], Syed Ali KAZIM[2], Daniel GERBETH[2], Maria CAAMANO[1], Alessandro NERI[2], Elena RAZZANO[2], Fabio SENESI[3]


#### Seamless converged network architecture based on fiber-wireless systems for high-speed railway communication networks

Atsushi KANNO[1], Pham TIEN DAT[1], Naokatsu YAMAMOTO[1], Tetsuya KAWANISHI[1, 2]


#### A Research of New Automatic Train Protection System for Local Line

Hiroshi SHIDA, Masaki OTA (West Japan Railway Company [JR West], Osaka, Japan)

#### 3-phase through 2-phase sample Railway power supply: influence of electromagnetic behaviour for the feeding phasing choice

Lyse-Aline COYITANGIE, Gaël BOUSSAERT, Clément REBOUL, Michel CUCCHIARO (SNCF, St-Denis, France)
EMF issue in railway system - evaluation and communication tool -
Masateru IKEHATA, Yoshihito KATO, Gaku MORITA, Kazuki NAKAMURA, Takashi SASAKAWA
(Railway Technical Research Institute [RTRI], Tokyo, Japan)

Characterization of the pantograph-catenary contact in order to evaluate the melted matters inducing contact wire wear
Thomas BAUSSERON[1], Chikara YAMASHITA[2], Mitsuhiro IKEDA[2], Brice JONCKHEERE[3], Robert BOUZERAR[3]

Seminar Room 2 8:30 - 9:50

IP_08: Aerodynamics, Noise and Vibration
Chair: Pascal FODIMAN (SNCF, France)

**Aerodynamics of High Speed Passenger Trains**
Mohammad Asif SULTAN[1], Subhransu ROY[2], Suresh KUMAR[2]

**Aerodynamic Optimization of Freight Wagons and Containers: An Approach for Alternative Design Configurations**
Emir ÖNGÜNER, Uwe FEY, Arne HENNING (German Aerospace Center (DLR), Göttingen, Germany)

**Aerodynamic Characteristics of Shinkansen under Crosswind**
Yayoi MISU, Kenichi DOI (East Japan Railway Company [JR East], Saitama, Japan)

**The effect for Tunnel Section Area to Running Resistance of High Speed Train**
Hyuck Keun OH, Seung-Koo BAEK, Seokwon KIM, Sangsoo KIM
(Korea Railroad Research Institute, Uiwang, South Korea)

**Improving the prediction and effectiveness of environmental vibration reduction measures**

**Wheel/rail noise above 10 kHz generated on a gently curved track**
Tsugutoshi KAWAGUCHI[1], Takeshi SUEKI[1], Toshiki KITAGAWA[1], Masaya NISHIMURA[2], Hisashi ABE[2]

**Noise Characterization of a Freight Railroad in Brazil**
Yesid ASAFF, Thiago Antonio FIORENTIN, Laura BRAZ (Federal University of Santa Catarina, Joinville, Brazil)

**Drag Determination by Means of Submerged Moving Model Testing**
Jonathan TSCHEPPE[1], Christian Navid NAYERI[1], Christian Oliver PASCHEREIT[1]
Organized Session 5
Hall C 10:20 - 11:40

OS_05: On-Board Monitoring for Vehicle/Infrastructure Diagnostics and CBM
Organizers/Chairs: Giorgio DIANA (Polytechnic of Milan, Italy)
Andrea COLLINA (Polytechnic of Milan, Italy)

10:20 Detection of Resonant Bridges by On-board Measurement
Kodai MATSUOKA[1], Kazuhiro KAJIHARA[1], Hirofumi TANAKA[1], Fumiaki UEHAN[1], Yoshinori SHINDO[2]
[1]Railway Technical Research Institute (RTRI), Tokyo, Japan,

10:35 Continuous railway track monitoring using passenger trains
Clive ROBERTS[1], Mani ENTEZAMI[2], Edward STEWART[3], Graeme YEO[3], Alfredo Peinado GONZALO[3]
[1]University of Birmingham, Birmingham, UK,
[2]MoniRail Ltd., Birmingham, UK,
[3]Network Rail High Speed UK, Kent, UK

10:50 Identification of Local Track Defects Using Axle Box Acceleration of in-service Vehicles
Henrik KARLSSON, Alireza QAZIZADEH, Sebastian STICHEN, Mats BERG
(KTH Royal Institute of Technology, Stockholm, Sweden)

11:05 Condition Based Maintenance in railway asset: use of the commercial fleet as a data probe
Giorgio DIANA[1], Paola FIRM[2], Marco CAPOSIUWTI[3], Maria Antonietta ZOCO[4], Federico GHERARDI[5]
[1]Politecnico di Milano, Milano, Italy,
[2]Rete Ferroviaria Italiana, Roma, Italy,
[3]Trenitalia, Roma, Italy,
[4]Mercitalia, Italy,
[5]Hitachi Rail Italy, Italy

D7 10:20 - 11:40

OP_17: Power Supply
Chair: Stéphane MARIE (SNCF Réseau, France)

10:20 Introduction of the Phase-Controlled Turn-Off Operation into Thyristor Changeover Switches in the Tokaido Shinkansen
Toshimasa SHIMIZU[1], Ken KUNOMURA[1], Masahiko KAI[2]
[1]Central Japan Railway Company [JR Central], Aichi, Japan,
[2]Central Japan Railway Company, Kanagawa, Japan

10:40 Measurements of Frequency Characteristics of Voltage Distribution in DC Traction Substation for Lightning Surge Investigation
Hiroki TANAKA[1], Kenji HAYASHI[2], Kazuhiro ITO[3], Hirokazu MIYAGUCHI[3], Naoto NAGAOKA[3]
[1]West Japan Railway Company [JR West], Osaka, Japan,
[2]Kanden Engineering, Osaka, Japan,
[3]Doshisha University, Kyoto, Japan

11:00 Superconducting devices for traction power supply systems
Guillaume ESCAMEZ[4], Christian Eric BRUZEK[6], Hervé CARON[6], Christian COURTOIS[6]
[4]Nexans Euromold, Aalst, Belgium,
[5]SNCF Réseau, Saint Denis, France

11:20 Pantograph-Catenary Arc Detection Technique based on Conducted Effects Measurement on Railway Supply System
Domenico GIORDANO[1], Gabriella CROTTI[1], Paolo ROCCATO[1], Andrea MARISCOTTI[3], Daniele GALLO[4], Mario LUISO[5], Nazzareno FILIPPINI[6], Irene ROSSETTA[6], Claudio SPAVIERI[6], Alfredo BIANCUCCI[6], Lorenzo DONADIO[6]
[1]Italian National metrology Institute INRIM, Torino, Italy,
[2]ASTM, Chiasso, Switzerland,
[3]Università della Campania Luigi Vanvitelli, Aversa, Italy,
[4]Rete Ferroviaria Italiana, Roma, Italy,
[5]Trenitalia, Roma, Italy,
Wednesday, October 30, 2019

**D5**  10:20 - 11:40

**OP_18: Brake Performance**
Chair: Yoshiyasu HAGIWARA (Mitsubishi Electric Corporation, Japan)

10:20 **Research on Test Method for Attractive Force of Magnetic Track Brake**
Lichao WANG[1], Fuyan DING[2], Lining WANG[3], Ke WANG[3], Liquin GAO[3]
(1)Beijing Zongheng Electro-Mechanical Technology, Beijing, China, 2)China Academy of Railway Sciences, Beijing, China)

10:40 **Analysis of efficient distribution of braking force in train set on simulation**
Daisuke HIJIKATA (Railway Technical Research Institute [RTRI], Tokyo, Japan)

11:00 **Contribution to the certification of a WSP device in a HIL environment through a new adhesion recovery model**
Moncef TOUMI[1], Michel SEBES[2], Karl LADEN[2], Hugues CHOLLET[2], Mohammed BOUALLAGA[1]
(RAILENIUM, Farnars, France, 2)IFTSTTAR, Champs sur Marne, France, 3)Bombardier Transportation, Crespin, France)

11:20 **Next Generation of high capable and safe Brake Electronic Control Solutions**
Heiko GREMMEL[1], Thomas LINKE[1], Angelo GRASSO[2], Martin DEUTER[1]
(1)Knorr-Bremse Systeme für Schienenfahrzeuge, Munich, Germany, 2)WABTEC, Piassasco, Italy)

**D1**  10:20 - 11:40

**OP_19: Train Detection and Wayside Monitoring**
Chair: Shigeto HIRAGURI (Railway Technical Research Institute [RTRI], Japan)

10:20 **An automatic tool for real-time monitoring of the regularity of high-speed train services based on plant data**
Andrea FRETTA[1], Vincenzo GALDI[1], Antonio PICCOLO[1], Fabio SENES[2], Raffaele MALANGONE[2],
Vito CALDERARO[1] (1)Università degli Studi di Salerno, Fisciano (SA), Italy, 2)Rete Ferroviaria Italiana, Roma, Italy)

10:40 **Spectral analysis of track circuit signals: potential for train detection and for shunting quality estimation**
Baldrik FAURE[1], Xavier LORANG[2], Sofiane KERBAL[1], Jean-Pierre POITEVIN[1], Jean-Jacques MOGORO[2]
(1)SNCF Innovation and Research, Saint-Denis, France, 2)SNCF Réseau, Saint-Denis, France)

11:00 **Identification of freight train loads using time-histories of rail strains**
Annamaria PAU[1], Fabrizio VESTRONI[1], Elisa DUCA[2], Massimo PLATINI[2] (1)Sapienza Università di Roma, Roma, Italy, 2)GCF Costruzioni Ferroviarie, Roma, Italy, 3)Ace System, Roma, Italy)

11:20 **The Development and Application of A Ground-based Urban Railway Service Dynamic Monitoring System**
Weidong YU, Guangrong TIAN, Hang LU, Qi XIAO, Liepeng LING, Xuwei LI, Hui JIANG, Maozhen LIU
(China Academy of Railway Sciences, Beijing, China)
<table>
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<tr>
<th>Time</th>
<th>Session</th>
<th>Title</th>
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<tr>
<td>10:20</td>
<td>OP_20: Environmentally Friendly Railways</td>
<td>Assessment of greenhouse gas emissions associated with railway project</td>
<td>Jae-Young LEE, Cheul-Kyu LEE, Yong-Ki KIM (Korea Railroad Research Institute, Uliwang-si, Republic of Korea)</td>
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<td>Towards a sustainable railway infrastructure</td>
<td>Matthias LANDGRAF, Stefan MARSHAUS (Graz University of Technology, Graz, Austria)</td>
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<td>11:00</td>
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<td>Research into Diesel Emissions at Enclosed Railway Stations</td>
<td>Richard WALKER, James WRIGHT, Aqeel JANJUA, David GREEN (RSSB, London, UK, King’s College, London, UK)</td>
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<td>11:20</td>
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<td>CFD study of dispersion of particles generated by mechanical braking: application to trains in underground stations</td>
<td>Antoine DURAND, Amine MEHEL, Frédéric MURZYN, Samuel PUECH, Frédérique LARRARTE (SNCF Mobilités, Le Mans, France, ESTACA, Laval, France, IFSTTAR, Bouguenais, France)</td>
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Seminar Room 1

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<tr>
<th>Time</th>
<th>IP_09: Improvement of Service Quality, Speed, Time to Destination and Functionality, I</th>
<th>Developing Objective Timetable Quality Metrics</th>
<th>John ARMSTRONG, Richard RAIN, Stephen DRAPE, John PRESTON (University of Southampton, Southampton, UK, Network Rail, Milton Keynes, UK)</th>
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<td>From PIS to Multimedia Services: Standards and Market Trends</td>
<td>Davide AMATO, Victoria CALLEJA DURO, Laurent LLERENA, Eric LAVILLONIER, Tom LANE (Sadel, Castel Maggiore (BO), Italy, International Union of Railways (UIR), Paris, France, SNCF, Le Mans, France, Mitsubishi Electric R&amp;D Centre Europe, Rennes, France, Ampetronic Ltd, Newark, UK)</td>
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<td>A Decision Support Tool for Real Time Rescheduling in Dense Railway Systems</td>
<td>Mathieu GAGNON, Estelle ALTAZ, Stéphane DAUZERE-PERES, François RAMOND, Sabine TREFOND (SNCF, Saint-Denis, France, Mines Saint-Etienne, Univ Clermont Auvergne, Gardanne, France)</td>
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<td>Design and Implementation of Railway Operation Monitoring System Based on Internet of things and Micro service hybrid Cloud Architecture</td>
<td>Lu YAN, Hao XU (China Academy of Railway Sciences, Beijing, China)</td>
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<td>An Automated intelligent diagnostic system for ERTMS Railway infrastructure: the Italian experience</td>
<td>Fabio SENESI, Raffaele MALANGONE (Rete Ferroviaria Italiana, Roma, Italy)</td>
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<td>Study on Train Control Technology in Virtual Coupling Concept</td>
<td>Xiaoning XU, Zhidan SONG (China Academy of Railway Sciences, Beijing, China)</td>
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<td>Study for Mitigation of Internal Noise Environment from High-speed trains by Changes in Sound Quality</td>
<td>Michiko TANAKA, Mizuki FURUKAWA, Naoki SHIRAKI, Koji SAITO, Shinichi HASEGAWA, Ryohei SHIMAMUNE, Nobuaki HAYASHI, Morio MITSUSHI, Satoshi IKEDA (East Japan Railway Company [JR East], Saitama, Japan, ESTECH Corporation, Kanagawa, Japan)</td>
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IP_10: Safety Assessment and Assurance
Chair: Dingqing LI (Transportation Technology Center, Inc. (TTCI), USA)

A proposal of the correction method of response acceleration according to the damping constant of the pole
Satoshi HARADA[1], Akihiro TOYOOKA[1], Meguru ONODERA[1], Genta OKABE[2]

Design and Implementation of Integrated Supervision Platform of Safety Management of Railway Mechanical Equipment
Ming ZHANG[1], Guanpeng WANG[2], Junhua ZHAO[2][3] (China Academy of Railway Sciences, Beijing, China,
[2]Beijing Time Bridge Enterprise Management Consulting, Beijing, China,
[3]Beijing Jingwei Information Technology Corporation Limited, Beijing, China)

Selecting Safe and Effective Train Drivers: Challenges, Developments and New Psychological Tools
Jo LAWRENCE, Stephen FLETCHER (The Occupational Psychology Centre, Watford, UK)

Development and Operational Performance of an Earthquake Information Distribution System for Railways
Naoyasu IWATA[1], Tomohiro KAWANISHI[1], Masahiro KORENAGA[1], Kimitoshi SAKAI[1], Shunroku YAMAMOTO[1],
Yoshitaka MURONO[2], Shin AOI[2], Hiromitsu NAKAMURA[2], Wataru SUZUKI[2]
[1]Railway Technical Research Institute (RTRI), Tokyo, Japan,
[2]National Research Institute for Earth Science and Disaster Resilience, Ibaraki, Japan

Development of Train Operation Control Method Against Wind Gust Using Doppler Radar
Chusei FUJIWARA[1], Hiroto SUZUKI[1], Kenichi KUSUNOKI[2], Hanako INOUE[2], Naoki ISHITSU[2, 3], Ken-ichiro ARAI[2, 3]
[1]East Japan Railway Company (JR East), Saitama, Japan,
[2]Meteorological Research Institute, Ibaraki, Japan,
[3]Alpha-denshi, Ibaraki, Japan

Assessment of aerodynamic safety aspects with moving-model experiments
Alexander BUHR, Gerrit HEINE, Daniela HEINE, Daniel SCHIEPEL, James BELL, Klaus EHRENFRIED
(German Aerospace Center (DLR), Göttingen, Germany)

Dynamic Stability and Frozen Soil Damage of High Speed Train in Seasonal Cold Region of Northeastern China
Aiping TANG[1], Anping ZHAO[2], Fenling FENG[2], Shijie ZHU[2] (Harbin Institute of Technology, Harbin, China,
[2]Harbingjiang University, Harbin, China, [3]Central South University, Changsha, China)

Intelligent Comprehensive Inspection System/Solution for EMUs First-level Maintenance on Entrance Line
Yu ZHANG[1], Jianping PENG[1], Kai YANG[1], Bo ZHAO[2], Chaoyong PENG[1], Xiaorong GAO[1], Zeyong WANG[1], Li MA[2]
[1]Southwest Jiaotong University, Chengdu, China, [2]Chengdu Lead Science & Technology, Chengdu, China)
**Wednesday, October 30, 2019**

**Hall C  11:55 - 13:15**

**Organized Session 6**

**OS_06: Integration of On-Board and Wayside Measurements with Virtual Methods Towards Safer, More Cost-Effective, Risk-Conscious and Innovation-Spurring Assessment Methods for Running Dynamics**

Organizer/Chair: **Gabriele MALAVASI** (SAPIENZA University of Rome, Italy)

11:55  **Integrating on-board authorisation measurements with in-service measurements and risk assessment towards more effective running dynamics approval**  
Riccardo LICCIARDELLO, Gabriele MALAVASI, Luca RIZZETTO (SAPIENZA University of Rome, Rome, Italy)

12:15  **An Integrated, Systems-Based Approach to Authorisation of Actively-Controlled Running Dynamics**  
Roger GOODALL\(^{(2)}\), Riccardo LICCIARDELLO\(^{(2)}\), Sebastian STICHEL\(^{(3)}\), Peter HUGHES\(^{(4)}\)  
\(^{(2)}\)DICEA, La Sapienza, Rome, Italy, \(^{(3)}\)University of Huddersfield, Huddersfield, UK,  
\(^{(4)}\)KTH Royal Institute of Technology, Stockholm, Sweden

12:35  **Using computer simulations for vehicle dynamics homologation**  
Mikael WRANG\(^{(1)}\), Oldrich POLACH\(^{(2)}\), Alireza QAZIZADEH\(^{(1)}\), Peter HARTWIG\(^{(1)}\)  
\(^{(1)}\)TU/V SÜD Sverige, Stockholm, Sweden, \(^{(2)}\)Independent professional, Neuenhausen am Rheinfall, Switzerland

12:55  **Development of a New Track Damage Test and Performance Criterion for the Qualification of High Performance Freight Car Trucks**  
Nicholas WILSON, Russell WALKER, Matthew WITTE (Transportation Technology Center, Inc. (TTCI), Pueblo, USA)

**D7  11:55 - 13:15**

**OP_21: Signalling and Communication Systems, I**

Chair: **Fabio SENESI** (Rete Ferroviaria Italiana (RFI), Italy)

11:55  **Radar Ground-Profile Correlation for Accurate Speed Measuring**  
Alejandro BADOLATO\(^{(2)}\), Jesus Antonio del CASTILLO\(^{(2)}\), Juan de Dios SANZ\(^{(2)}\), Cesar OTERO\(^{(2)}\)  
\(^{(2)}\)Universidad Politecnica de Madrid, Madrid, Spain, \(^{(2)}\)Universidad de Cantabria, Cantabria, Spain

12:15  **Development of multi-line train approach warning system**  
Kazuuki MICHISHITA, Toru GOCHO (East Japan Railway Company [JR East], Tokyo, Japan)

12:35  **Application of Formal Method in the French railway telephony system**  
Meriem ELHOSNI, Bertrand TAQUIN, Gwendoline MORELLEC, Rachid BABA ALLAL, Dimitri VORCHIN  
(SNCF Réseau, Paris, France)

12:55  **Adaptable Communication System for all Railways**  
Ulrich GEIER\(^{(1)}\), Michael MIKULANDRA\(^{(2)}\), Karl KERNSTOCK\(^{(2)}\), Ben ALLEN\(^{(2)}\)  
\(^{(1)}\)Kapsch CarrierCom Deutschland, Friedrichshafen, Germany, \(^{(2)}\)Kapsch CarrierCom, Vienna, Austria,  
\(^{(3)}\)Network Rail, London, UK
OP_22: Vehicle and Track Interaction
Chair: Anup CHALISEY (RSSB, UK)

11:55 Coupling Multi-body Simulation of Vehicle Dynamics and Finite Elements Models: the Effect of Flexible Wheelset and Track
Danilo SORRENTINO[1], Maryam EL MOUDEDEB[2], Mustapha AFRIAD[1, 2], Sönke KRAFT[1], Patrick DUPOND[1], Emmanuel LAURANS[1] (SNCF Réseau, Saint-Denis, France, Sorbonne Universités, Compiègne, France)

12:15 Monitoring and Managing Wheel - Rail Force by Using Instrumented Wheelset Technology in Revenue Operation at New York City Transit Subway
Yan LIU[1], Albert WABHA[1], Eric MAGEL[1], Thomas LAMB[2] (National Research Council of Canada, Ottawa, Canada, New York Metropolitan Transportation Authority, New York City, USA)

12:35 Analysis of Wheel Polygonal Influence on Wheel/rail Contact Dynamic Stress
Xiaoyi HU[1], Yinqing HOU[2], Zhikun SONG[2], Di CHENG[1], Maorui HOU[1] (China Academy of Railway Sciences Corporation, Beijing, China, Beijing Jiaotong University, Beijing, China)

12:55 Understanding low adhesion and effects of mitigation strategies on GB mainline operations using big data techniques
Aaron BARRETT (RSSB, London, UK)

OP_23: Operation Management, Train Delay Management
Chair: Norio TOMII (Nihon University, Japan)

11:55 Ensuring Interoperability of Train-to-Ground Communication Services
Armin HEINDEL[1], Norbert WAGNER[1], Mikel COLERA[2], Peter FREUDENBERGER[3] (Siemens Mobility, Erlangen, Germany, Bombardier Transportation, Mannheim, Germany, Construcciones y Auxiliar de Ferrocarriles (CAF), San Sebastián, Spain)

12:15 Research of Transport Capacity of Beijing-Shanghai High Speed Railway
Haizhi WANG, Pengju SUN (China Academy of Railway Science, Beijing, China)

12:35 Maximization of passengers’ punctuality by real-time junction rescheduling
Valentina POZZOLI, François RAMOND (SNCF Innovation and Research, Saint Denis, France)

12:55 Quantum Assisted Solution of the Train Platforming Problem
Giovanni Luca GIACCO[1], Lorenzo FERRONE[1], Davide CAPUTO[1], Davide VENTURELLI[1], Marco MAGAGNINI[5], Stefano CASALEGNO[1] (Ferrovie dello Stato Italiane, Rome, Italy, Trenitalia, Rome, Italy, Data Reply, Turin, Italy, USRA, San Francisco, USA, Data Reply, Milan, Italy)
**Wednesday, October 30, 2019**

### G409 11:55 - 13:15

**OP_24: Infrastructure Asset Management**
**Chair:** Eugenio FEDELI (Rete Ferroviaria Italiana (RFI), Italy)

- **11:55** Determining optimal intervention programs for large railway infrastructure networks using a genetic algorithm
  **Marcel BURKHALTER**, Bryan T. ADEY (ETH Zurich, Zurich, Switzerland)

- **12:15** Trial of infrastructure asset management for subway tunnels
  **Daisuke HARA**, Hirokazu AKAGI, Shinji KONISHI, Masato OKADA, Ryota SAKAI
  (Waseda University, Tokyo, Japan, Tokyo Metro, Tokyo, Japan)

- **12:35** From data-based condition analysis to sophisticated asset management for railway tracks
  **Johannes NEUHOLD**, Matthias LANDGRAF (Graz University of Technology, Graz, Austria)

- **12:55** A Study on Railway Construction Management System Architecture based on BIM
  **Chenkun JIN**, Tongjun WANG (China Academy of Railway Sciences, Beijing, China, China Railway, Beijing, China)

### Seminar Room 1 11:55 - 13:15

**IP_11: Power Supply**
**Chair:** Hitoshi HAYASHIYA (East Japan Railway Company (JR East), Japan)

- **A Multi Activities Universal Composite Catenary Cantilever (MUC³)**
  **Fatima BELHASSANE**, **Thomas BAUSSERON**, Florian GENEST, Jean-Pierre MASSAT, David CNOCKAERT, Audrey OLIVIER, Patrice HULOT (SNCF Réseau, Paris, France, STRATIFORME, Barsée, France, ARMINES, Douai, France)

- **Integrating the system of the electric power compensators for the Tokaido Shinkansen**
  **Hiroshi MORIYAMA**, Toshimasa SHIMIZU, Masahiko KAI, Ken KUNOMURA
  (Central Japan Railway Company [JR Central], Kanagawa, Japan, Central Japan Railway Company, Aichi, Japan)

- **Sensitivity analysis applied to multilane traffic rescheduling in case of electrical power failure**
  **Soha SAAD**, Florence OSSART, Jean BIGEON, Harold GANCE, Etienne SOURDILLE, **Thomas BAUSSERON**
  (G-SCOP - CNRS UMR, Grenoble, France, SNCF Réseau, Saint-Denis, France)

- **Development of high precision fault location method at AT-Feeding system**
  **Shunji IMAMURA**, Satoshi KINOSHITA, Moriyuki YOKOSUKA, Hirohisa KATO, Yuya MATSUDA, Takuma NARUSAWA, Ken KUNOMURA
  (Central Japan Railway Company [JR Central], Kanagawa, Japan, Central Japan Railway Company, Aichi, Japan)

- **Introduction of controlled switching system for Scott connection transformer in Shinkansen substation**
  **Hidehiro TAKEDA**, Satoshi KINOSHITA, Akira SUDA, Atsunori SAITO, Yu KOMATSU, Ken KUNOMURA
  (Central Japan Railway Company [JR Central], Kanagawa, Japan, Central Japan Railway Company, Aichi, Japan)

- **Simulated and Measured Inrush Currents In a Traction Transformer**
  **Mehmet TUTUCU**, Nusret GUZEL (Turkish State Railways, Ankara, Turkey)

- **Harmonics analysis modelling for AC Electric Traction Systems Taking into Account the Effect of Resonance of PWM Controlled Vehicles**
  **Masataka AKAGI**, Hiroaki MORIMOTO (Railway Technical Research Institute [RTRI], Tokyo, Japan)
Wednesday, October 30, 2019

Development of Wireless Power Transfer System for Railway Vehicles
Keigo UKITA, Hiroshi YODA, Takayuki KASHIWAGI, Yasuaki SAKAMOTO, Takashi SASAKAWA
(Railway Technical Research Institute [RTRI], Tokyo, Japan)

Seminar Room 2  11:55 - 13:15

IP_12: Track Maintenance
Chair: Sharon ODETUNDE (RSSB, UK)

Development of New Track Condition Monitoring System for the Shinkansen (New RAIDARSS)
Tomoya ARAI, Yasukuni NAGANUMA, Masaru MORIMOTO (Central Japan Railway Company [JR Central], Aichi, Japan)

Innovative track geometry data analysis for turnouts-Preparations to enable the turnout behaviour description
Michael FELLINGER, Petra Antonia WILFLING, Stefan MARSCHNIG (Graz University of Technology, Graz, Austria)

Development and Deployment of Track Facility Monitoring System
Hisashi YOSHIDA, Ryohi KASAI, Shuhei YAMAMOTO, Shigeru MOTOYOSHI, Takaki KUBO
(East Japan Railway Company [JR East], Tokyo, Japan)

Research on Speed Limit Management Value of Track Irregularity under 30-Tons Axle Load
JinZhong JIA[1], XianHong MENG[2], Zhen PAN[3], ZhanGuo MA[3], GuoChen GAO[3]
[3]China Academy of Railway Sciences, Beijing, China

A holistic assessment approach for track maintenance and renewal
Amine DHEMAIED, Gilles SAUSSINE, Aurélie SCHWAGER GUILLEMENET, Jean Michel CORNET, Quang Anh TA,
Mathilde KOSCIELNY, Julie LOSSIGNOL (SNCF Réseau, Paris, France)

Study on track repair method of steel sleeper in fouled ballast section
Takahisa NAKAMURA, Ippei KUJIYA, Yoshitsugu MOMOYA (Railway Technical Research Institute [RTRI], Tokyo, Japan)

Geosynthetic-Reinforced Soil Structures having Staged-Constructed Full-Height Rigid Facing for Railways - RRR System -
Susumu NAKAJIMA[1], Fumio TATSUOKA[2], Masaru TATEYAMA[1], Kenji WATANABE[3]
[1]Railway Technical Research Institute [RTRI], Tokyo, Japan, [2]Tokyo University of Science, Ibaraki, Japan,
[3]University of Tokyo, Tokyo, Japan)
Wednesday, October 30, 2019

Plenary Session 2

Contribution of Railway Suppliers to Elevating the Value of Railways
Moderator: Nick KINGSLEY, Managing Editor, Railway Gazette International
- Jay MONACO, Vice President Global Engineering, Amsted Rail, USA
- Jürgen SCHLAHT, Vice President Innovation Management, Siemens Mobility, Germany
- Takao NISHIYAMA, President, Japan Transport Engineering Company (J-TREC), Japan
- Maurizio MANFELLOTTO, CEO, Hitachi Rail, Italy
- DING Sansan, Vice Chief Engineer, CRRC Qingdao Sifang, China

Organized Session 7

OS_07: Digital Technologies for Predictive Maintenance
Organizer/Chair: Stéphane MARIE (SNCF Réseau, France)

16:20 Remote Diagnosis and Condition Based Maintenance for Rolling Stock at SNCF
Cyril VERDUN[1], Fabien TURGIS[2], Pierre AUDIER[1] (SNCF, Rolling Stock Engineering, Tours, France, KOS, Paris, France)

16:40 Digital twin: concept and first developments into the management of a cyber-physical railways system
Sofia COSTA D’AGUIAR[1], Bruno LANDES[1], Guillaume DUCELIER[2], Corentin STALDER[1] (SNCF Réseau, Paris, France, UTT, Troyes, France)

17:00 An Autonomous Monitoring System for Truck Components Characterized by Low-power Consumption
Yasutaka MAKI[1], Kazuya KIDO[2], Hiroshi TAKAHASHI[3] (Railway Technical Research Institute [RTRI], Tokyo, Japan, Kyushu Railway Company, Fukuoka, Japan, Toshiba Corporation, Kanagawa, Japan)

17:20 Development of an Artificial Intelligence (a Deep Neural Network) for the Automation of Railway Maintenance and Safety Inspections
Mario TALBOT[1], John LAURENT[1], Richard FOX-IVEY[2] (Pavmetrics Systems Inc., Québec City, Canada, Pavmetrics Systems Inc., Waterloo, Canada)

17:40 Research on Correlation between Track Geometry and Rail Defects Based on Machine Learning
Nan YAO[1], Xuan ZHANG[2], Kai TAO[1] (China Academy of Railway Sciences, Beijing, China, Virginia Polytechnic Institute and State University, VA, USA)
Wednesday, October 30, 2019

**Organized Session 8D7**
16:20 - 18:00

**OS_08: Maglev Systems**
Organizer/Chair: Ken NAGASHIMA (Railway Technical Research Institute (RTRI), Japan)

16:20  **Linear Motor Powered Urban Transportation in Japan**
Hiroyuki OHSAKI (The University of Tokyo, Chiba, Japan)

16:40  **Progress of the Superconducting Maglev Chuo Shinkansen**
Junichi KITANO (Central Japan Railway Company [JR Central], Tokyo, Japan)

16:55  **Condition Monitoring System for Ground Coils of Superconducting Maglev using Opportunistic Communications and Wake-up Receivers**
Minoru TANAKA[1], Noriyuki TAKAHASHI[1], Ryohi IKEDA[1], Hiroshi YODA[1], Masahito IWAI[2]

17:10  **Maglev Ground Transportation with High-Temperature Superconductors (HTS)**
Frank N. WERFEL, Uta FLOEGEL-DELOR, Peter SCHIRRMEISTER, Thomas RIEDEL, Rene KOENIG, Viktor KANTARBAR, Mirko LIEBMANN (Adelwitz Technologiezentrum (ATZ), Torgau, Germany)

17:30  **Optimal characteristics of an evacuated-tube high-speed maglev (hyperloop) transport system for long distance travel**

17:50  **Development of a Superconducting Magnetic Bearing Capable of Supporting Large Loads in a Flywheel Energy Storage System for Railway Applications**
Yoshiki MIYAZAKI[1], Katsutoshi MIZUNO[1], Masafumi OGATA[1], Tomohisa YAMASHITA[1], Ken NAGASHIMA[1], Kazuya MIYAZAKI[1], Hideki SHIMIZU[1], Hirokazu TSUBOUCHI[1], Hidekazu TESHIMA[1]

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**Organized Session D5**
16:20 - 18:00

**OP_25: Rolling Stock Maintenance**
Chair: Matthew WITTE (Transportation Technology Center, Inc. (TTCI), USA)

16:20  **Wearing models for pantograph stripes condition-based maintenance**
Alfredo BLANCUCCI, Mauro MENCI (Trentitalia, Florence, Italy)

16:40  **Inspection system of the thickness of a slider of a pantograph by image processing technology**
Yuto SAKAI, Takehito FUJII, Hiroyuki NAKAJIMA (East Japan Railway Company [JR East], Saitama, Japan)

17:00  **Development and Application of Trackside Online Monitoring System of Fully Continuous Wheel/Rail Force**
Xuwei LI[1], Yuqing ZENG[2], Xuesong CHAI[1], Fuyong LI[1], Ju QIN[1], Mengdi SHI[1], Weidong YU[1], Guangrong TIAN[1], Hui JIANG[1], Tianzhu CHEN[1] [1]China Academy of Railway Sciences, Beijing, China, [2]Transportation Technology Center Inc. (TTCI), Pueblo, USA

17:20  **Reduction of system-level lifecycle cost through movement-based operation adjustment for railway vehicles**
Julian FRANZEN[1], Michael LINGEN[2], Udo PINDERS[3], Bernd KUHLENKÖTTER[1]
**Wednesday, October 30, 2019**

**17:40** OBAL measurement system - Wheel profile measurement at train speeds up to 250 km/h -  
Paul MITTERMAYR[1], Roman SCHMID[2], Wolfgang ZOTTL[3], Enrico BETTERLE[4], Guido OCCIONI[4]  
([1]Bureau of Applied Mechanics and Mathematics (BAMM), Vienna, Austria, [2]ÖBB-Infrastruktur AG, Vienna, Austria,  

**D1 16:20 - 18:00**

**OP_26: Infrastructure Maintenance**  
Chair: Ananyo BANDYOPADHYAY (Transportation Technology Center, Inc. (TTCI), USA)

16:20 Monitoring Key Railway Infrastructures Using an Hybrid Raman/FBG Optical Fiber Sensor System  
Philippe VELHA[1], Tiziano NANNIPIERI[1], Alessandro SIGNORINI[1], Massimiliano SOLAZZI[1], Margherita LUPPI[1],  
Stefano LISI[1], Franco IACOBINI[1], Paola FIRM[1], Fabrizio Di PASQUALE[1]  
([1]Scuola Superiore Sant’Anna, TeCIP Institute, Pisa, Italy, [2]Rete Ferroviaria Italiana, Roma, Italy)

16:40 Ballasted track stabilization: Comparison of crib compaction with dynamic stabilization using DEM  
Jean-Francois FERELLEC[1], Viet-Hung NHU[1], Gilles SAUSSINE[1]  

17:00 Expanding rail height adjustment range on slab track sections of Kyushu Shinkansen  
Naoki MAEKAWA[1], Kazunari HADANO[2], Kei KUMABE[1]  

17:20 Maintenance Method for Subway Tunnel Using Information and Communication Technology  
Yuki ENOKIDANI[1], Shini KONISHI[1], Daisuke TANAKA[1], Naoya IMAIZUMI[1], Sakie NEMOTO[1]  
([1]Tokyo Metro, Tokyo, Japan, [2]Japan Transport and Tourism Research Institute, Tokyo, Japan)

17:40 Ballasted tracks tamping analysis and optimization using DEM  
Akiko KONO[1], Jean-Francois FERELLEC[2], Viet-Hung NHU[2], Gilles SAUSSINE[2]  
([1]Railway Technical Research Institute [RTRI], Tokyo, Japan, [2]SNCF Réseau, La Plaine Saint Denis, France)

**G409 16:20 - 18:00**

**OP_27: Safety Assessment and Assurance**  
Chair: Jerzy WISNIEWSKI (International Union of Railways (UIC), France)

16:20 Taking a Human Factors Approach to Safety Critical Training: A Case Study  
Huw GIBSON[1], Ann MILLS[2], Claire TURNER[2], Paul TOWNSEND[3], Emma LOWE[3]  

16:40 Relations between the operational rules, both in normal and degraded conditions, and the capacity of a station  
Gabriele MALAVASI[1], Paola FIRM[1], Carlo Domenico RONZINO[1], Andrea LA VALLE[1], Agnese PARENTI[1],  
Roberto ZAMBRANO[1]  

17:00 Modeling the Probability of Train Presence on Adjacent Tracks in Railway Vehicle Intrusion Scenarios  
Chen-Yu LIN, Christopher P.L. BARKAN (University of Illinois at Urbana-Champaign, Urbana, USA)

17:20 Measurement for ensuring the safety and security in automated operation of public transportation in Japan  
Takeshi MIZUMA (The University of Tokyo, Chiba, Japan)
Wednesday, October 30, 2019

17:40  Experimental study on optical fiber grating sensor for railway slope landslide monitor technology
Yinghui CUI, Yangsheng YE, Degou CAI (China Academy of Railway Sciences, Beijing, China)

Seminar Room 1  16:20 - 18:00

IP_13: Improvement of Service Quality, Speed, Time to Destination and Functionality, II
Chair: David SANZ (SNCF Réseau, France)

The effect of Commentary driving for preventing excessive speed
Ayanori SATO, Noriko ONOMA, Takayuki MASUDA (Railway Technical Research Institute [RTRI], Tokyo, Japan)

Mastering Time: understanding passenger time perception in real travel conditions during complex railway journeys
Simone MORGAGNI[1], Guillaume LEMAÎTRE[1], Caroline GUERIN[1], Blandine BEIRNAERT[1], Yvan NEDELEC[1], Valérie GYSELINCK[2], Virginie VAN WASSENHOVE[3] (SNCF, Saint-Denis, France, [2] LaPEA/IFSTTAR/Université Paris Descartes, Versailles, France, [3] INSERM/Université Paris-Sud/Université Paris-Saclay, NeuroSpin center, Gif-sur-Yvette, France)

The Study on Reduction of Unpleasant Odors in a Lavatory of a Railway Station
Tamami KAWASAKI[1], Takashi KYOTANI[1], Tomoyoshi USHiOGI[1], Yoshiki IKEDA[1] (Railway Technical Research Institute [RTRI], Tokyo, Japan, [1] East Japan Railway Company, Tokyo, Japan)

Defining the requirements of a seat comfort selection process
Jordan SMITH (RSSB, London, UK)

Introducing Global Rail Tariff Scheme Using Data Ledger Technologies

New Shinkansen position correcting ground coil for further speed increases
Naoki HASHIMOTO, Masakazu SONOBE, Toru MURAKAMI (East Japan Railway Company [JR East], Tokyo, Japan, Saitama, Japan)

Freight train wireless communication backbone architecture
Jaizki MENDIZABAL[1], Roberto Carlos RAMIREZ[1], Jon GOYA[2], David BATISTA[2], Francisco PARRILLA[2] (CEIT and Tecnun (University of Navarra), Donostia, Spain, [1] Indra Transportation, San Fernando de Henares, Madrid, Spain)

Seminar Room 2  16:20 - 18:00

IP_14: Signalling and Communication Systems
Chair: Kazuki NAKAMURA (Railway Technical Research Institute (RTRI), Japan)

The next interlocking generation to integrate ERTMS and the new Command, Control and Signalling applications
Fabio SENESI, Stefano ROSINI, Alessandro SPINOZZI, Nazzareno FILIPPINI (Rete Ferroviaria Italiana, Rome, Italy)

The SmartRaCon Concept for advanced train control systems
Michael MEYER ZU HÖRSTE[1], Svenja HAINZ[2], Marion BERBINEAU[2,3], Juliette MARAIS[2,3], Emilie MASSON[2,3], Jaizki MENDIZABAL[2,4], Michael HUTCHINSON[1] (German Aerospace Centre (DLR), Braunschweig, Germany, [1] Univ Lille Nord de France, IFSTTAR, COSYS, LEOST, Villeneuve d’Ascq, France, [2,3] Fondation RALENIUM, Lille, France, [2,4] CEIT, San Sebastian, Spain, [4] NSL, Nottingham, UK)
Issues and solutions in migration of the old/new train control system
Takashi KAWANO\textsuperscript{(1)}, Tatsuya SIGETA\textsuperscript{(2)} (\textsuperscript{(1)}East Japan Railway Company [JR East], Tokyo, Japan, \textsuperscript{(2)}Japan International Consultants for Transportation Co., Ltd., Tokyo, Japan)

Development study on Next-Generation Train Control system utilizing GNSS and 5G mobile communication network
Hideki KOMUKAI, Buntaoh HORIGOME, Tetsunori HATTORI, Koji SUGIURA, Takashi KAWANO
(East Japan Railway Company [JR East], Tokyo, Japan)

Routing Algorithm for Railside Monitoring on Wireless Sensor Networks
Nagateru IWASAWA, Satoko RYUO, Nariya IWAKI (Railway Technical Research Institute [RTRI], Tokyo, Japan)

Quality of Service requirements of future NaaS based railway communication
Alexander WOLF, Jörg SCHÜTTE (Technische Universität Dresden, Dresden, Germany)

Development of antenna which suppresses backward electric wave output for train radio zone boundary
Yusuke DOHI, Shinichi RYOKI, Fumitoshi ABE, Takashi KUNIFUJI, Reiji ISHIMA
(East Japan Railway Company [JR East], Saitama, Japan)

Implementation of Train integrity function: the route towards the future of ERTMS
Stefano NERI, Alessandro VALENTINI (Trenitalia, Roma, Italy)

Axle-counters: A lightning fast system?
H.W.M. (Erwin) SMULDERS, J.M. (Jelle) BUIT (Movares, Utrecht, The Netherlands)
Thursday, October 31, 2019

**Hall C** 8:30 - 9:50

**OP_28: Condition-Based Maintenance of Rolling Stock**
Chair: Paolo MASINI (Trenitalia, Italy)

8:30  **Industrialization of Condition Based Maintenance for Complex Systems in a Complex Maintenance Environment, Example of NAT**

8:50  **Utilizing Deep Learning to Manage Warning Signs of Air Conditioning Unit Malfunctions**

9:10  **Evaluation of an Automated Inspection System for Railcar Truck Components**

9:30  **Accuracy & Compatibility of rail impact force data captured by Strain-gauge based & accelerometer based systems fitted on the rails**
Sushil Kumar SINGH (Ministry of Railways, Lucknow, India)

**D7** 8:30 - 9:50

**OP_29: Open Market and Transportation Planning**
Chair: Robert HOPKIN (University of Birmingham, UK)

8:30  **The Systematic Timetable in a liberalized Railway Market**
Martin SMOLINER (Graz University of Technology, Graz, Austria)

8:50  **Research on Data Analysis for Improving the Transportation Planning At the Terminus Railway Station**
Chao PAN, Xin HE, Bertrade HOUZEL (SNCF, Paris, France)

9:10  **Reservation system as a tool for conversion of trends into improvement of passenger experience**
Andrey SOKOLOVSKIY (Joint Stock Company Railway Research Institute, Moscow, Russia)

9:30  **Are European railways harnessing the power of society in the era of digitalization?**

**D5** 8:30 - 9:50

**OP_30: Human Factors and Train Operation**
Chair: Stefano GUIDI (Railway Consultancy Services, Italy)

8:30  **Understanding Signals Passed at Danger Through a Human Factors Lens**
Huw GIBSON, Ann MILLS, Alice MONK, Sam WATERS, Jordan SMITH (RSSB, London, UK)
Thursday, October 31, 2019

8:50  Exploring non-technical skills linked with inadvertent increases in safety-risk in rail network control: A preliminary scenario-based analysis  
Anjum NAWEED\(^1\), Philippa MURPHY\(^2\)  
\(^1\)Central Queensland University, Adelaide, Australia, \(^2\)Rail Safety and Standards Board, London, UK

9:10  Extraction and Improvement of Driver’s Non-technical skills  
Takashi ENOMOTO, Kazumasa OYAMA, Takuji HONZAWA, Hiroaki SATO  
(East Japan Railway Company [JR East], Tokyo, Japan)

9:30  AFO: Real-Time Police Support onboard the Italian trains  
Francesco SORVILLO  
(Trenitalia, Rome, Italy)

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<td><strong>OP_31:</strong> Service Quality and Reliability</td>
<td>Chair: Giovanni Luca GIACCO (Trenitalia, Italy)</td>
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<td>8:30</td>
<td>Initiative to Achieve Zero Train Delays Caused by Flying Objects</td>
<td>Ayumi TAGUCHI, Kenichi ANDO (Kyushu Railway Company [JR Kyushu], Fukuoka, Japan)</td>
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<td>8:50</td>
<td>A DTM-aided adaptive GNSS/INS navigation solution in railways</td>
<td>Chengming JIN, Jian WANG, Baigen CAI (Beijing Jiaotong University, Beijing, China)</td>
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<td>9:10</td>
<td>PASSENGER SATISFACTION WITH THE COMMUTER TRAIN QUALITY: A COMPARISON OF STRUCTURAL EQUATION MODELS</td>
<td>Asal FARAJPOUR, Morteza BAGHERI (Iran University of Science and Technology, Tehran, Iran)</td>
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<td>9:30</td>
<td>An Effect of Train Transport Stability under Staggered Commuting to Ease Overcrowding on Train Using Train Transport Simulation</td>
<td>Tomoya ONO, Hideyuki YOSHINO, Shigeaki ADACHI, Masahito KORESAWA (Tokyo Metro, Tokyo, Japan)</td>
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<td><strong>OP_32:</strong> Pantograph and Catenary Interaction</td>
<td>Chair: Takamasa HAYASAKA (Railway Technical Research Institute (RTRI), Japan)</td>
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| 8:30 | Vision-based measurement system of contact force for a pantograph with double pantograph head | Taiki YAMAMOTO\(^1\), Yusuke WATABE\(^1\), Seiji TABAYASHI\(^1\), Tatsuya KOYAMA\(^1\)  
\(^1\)Meidensha Corporation, Tokyo, Japan, \(^2\)Railway Technical Research Institute, Tokyo, Japan |
| 8:50 | A Contactless Measurement Method of Overhead Contact Wire Wear on Rolling Stock | Wei ZHOU, Haiying WANG, Wenxuan ZHANG, Peng DAI, Xiantang XUE  
(China Academy of Railway Sciences, Beijing, China) |
| 9:10 | Tension variability in contact wire and messenger wire of auto tensioned catenaries | Arnaud CAPITAINE\(^1\), Jean-Philippe BIANCHI\(^2\), Philippe CONSTANT\(^1\), Florian GENEST\(^1\)  
\(^1\)SNCF Réseau, La Plaine Saint Denis, France, \(^2\)SDTools, Paris, France |
| 9:30 | Evaluation of an Actively Controlled Pantograph Based on Hybrid Simulation | Shigeyuki KOBAYASHI\(^1\), Takayuki USUDA\(^1\), Yoshitaka YAMASHITA\(^1\), Arata MASUDA\(^1\), David P. STOTEN\(^2\)  
\(^1\)Railway Technical Research Institute, Tokyo, Japan, \(^2\)Kyoto Institute of Technology, Kyoto, Japan, \(^3\)University of Bristol, Bristol, UK |
Thursday, October 31, 2019

Seminar Room 1  8:30 - 9:50

IP_15: Sustainability
Chair: Giulia COSTAGLII (Rete Ferroviaria Italiana (RFI), Italy)

A Development of 3D Training Simulator for Multiple Tie Tamper
C. S. KIM[1], J. H. KANG[2]  (1)Korea National University of Transportation, Ui-Wang Si, Korea, 2)KORAIL HQ, Dae-jeon Si, Korea)

Development of pole rebuilding vehicle “Pole handling road railer”
Mitsuhiro YANO[1], Hiroaki OYAMA[2], Shingo HASHIMOTO[3]  (1)West Japan Railway Company [JR West], Osaka, Japan, 2)Nishinohon Electricity System Company, Osaka, Japan, 3)TADANO, Kagawa, Japan)

First experimentation of a device collecting at source airborne particles issued from rolling stocks brakes systems
Philippe CLÉMENT[1], Loïc ADAMCZAK[2], Adrien MAISTRE[2], Fayes GHOZZI[3], Vincent NICOT[3]  (1)SNCF Mobilités, Le Mans, France, 2)Titanio Technologie, Boulogne-Billancourt, France, 3)SNCF Mobilités, Vitry/Seine, France)

The study of energy conserving effect of two effective utilization systems of regenerative braking energy in traction power supply system
Masato TOGE (Tokyo Metro, Tokyo, Japan)

Development and Evaluation of the Traction Battery System for the Battery-Powered Train Series BEC819 "DENCHA"
Yoshiaki TAGUCHI[1], Satoshi KADOWAKI[1], Gaku YOSHIKAWA[1], Kenji HATAKEDA[2], Hirofumi HATANAKA[2], Takashi KANEKO[3]  (1)Railway Technical Research Institute [RTRI], Tokyo, Japan, 2)Kyushu Railway Company, Fukuoka, Japan, 3)Hitachi, Tokyo, Japan)

Development of the fuel cell hybrid powered railway vehicle
Kenichi OGAWA, Takashi YONEYAMA, Takayuki SUDO, Hayato GOCHO, Takayuki KASHIWAGI, Takamitsu YAMAMOTO (Railway Technical Research Institute [RTRI], Tokyo, Japan)

Optimal Rail System Design with Multiple Layers of Fault Trees
Yung-Cheng LAI, Chun-Lin LU, Yu-Fu CHEN (National Taiwan University, Taipei, Taiwan)

Carbon footprint guideline of railway infrastructure with Asian practices
Cheul-Kyu LEE, Jae-Young LEE (Korea Railway Research Institute, Uiwang, Korea)

Seminar Room 2  8:30 - 9:50

IP_16: Economics, Policy and Planning
Chair: Andrew MEIER (Australasian Centre for Rail Innovation (ACRI), Australia)

International Comparative Study on the Diversified Operation Strategy of Railway Enterprises in Typical Countries
Guangzhi JIA, YI FANG, Yufeng LIU (China Academy of Railway Sciences, Beijing, China)

PRISM: A Macroscopic Monte Carlo Railway Simulation
Markus ZINSER[1], Torsten BETZ[1], Maurice BECKER[1], Michael GELKE[1], Carla TERSCHLÜSEN[1], Adam KALUZA[1], Ingrid JOHANSSON[1], Jennifer WARG[2]  (1)DB Analytics, Frankfurt am Main, Germany, 2)KTH Royal Institute of Technology, Stockholm, Sweden)

Passenger Movement Information using WiFi Sensor Technology
Ravi RAVITHARAN[1], Beng OH[2]  (1)Monash University, Melbourne, Australia, 2)YPB Group, Brisbane, Australia)
Thursday, October 31, 2019

Exploring Smart Card Data of an Urban Railway System: the Investigation of Spatiotemporal Patterns of Trip Distribution and Demand-Side Characteristics
Nai-Tzu YEH, Kuan-Chieh LEE, Yu-Ting HSU (National Taiwan University, Taipei, Taiwan)

**Plenary Session 3**

**Research and Development for Future Railways**
Moderator: Roderick SMITH, Emeritus Professor and Chairman, Future Railway Research Centre, Imperial College London

- Norimichi KUMAGAI, President, Railway Technical Research Institute (RTRI), Japan
- François DAVENNE, Director General, International Union of Railway (UIC)
- Luisa MOISIO, Director of Research and Development, RSSB, UK
- Carole DESNOST, Chief Innovation Officer, SNCF, France
- Carlo BORGHINI, Executive Director, Shift2Rail, EU
- ZHOU Li, Chairman, China Academy of Railway Sciences (CARS), China

**Organized Session 9**

**OS_09: Global Vision for Railway Development**

11:55 GVRD II - The Global Vision for Railway Development
Boris LAPIĐUS (RZD - Joint Stock Company "Russian Railways", Moscow, Russia)

12:15 The 12 Capabilities

12:35 SEESARI - the development of the transport system in South Eastern Europe

12:55 From the 1st to the 12th WCRR - How far have we advanced in European railway research? A personal review of European Commission sponsored rail research in the last 25 years
William BIRD (European Commission, DG Research & Innovation, Brussels, Belgium)
Thursday, October 31, 2019

D7 11:55 - 13:15

OP_33: Track Materials and Components
Chair: Yoshitsugu MOMOYA (Railway Technical Research Institute (RTRI), Japan)

11:55 Evaluation Method of Running Safety and Strength of Turnouts by Analysis
Saki SHIMIZU, Yuuya OIKAWA, Katsutoshi SHIOTA, Hiroo KATAOKA
(Railway Technical Research Institute (RTRI), Tokyo, Japan)

12:15 Field Evaluation of Fatigue and Wear Resistant Rail Steels under Heavy Axle Loads
Ananyo BANDYOPADHYAY, Benjamin D. BAKKUM, Megan BRICE, Joseph A. LOPRESTI
(Transportation Technology Center Inc. (TTCI), Pueblo, USA)

12:35 Load environment and force transfer in railway fastening systems: A case study of the broken spike mystery
Tom ROADCAP[1, 2], Marcus DERSCH[1], J. Riley EDWARDS[3] (University of Illinois at Urbana-Champaign, Illinois, USA,
[2]Technical University of Munich, Munich, Germany)

12:55 Applicability of Synthetic Fibre Reinforced Concrete for railway sleepers
Dayani KAHAGALA HEWAGE[1], Christophe CAMILLE[1], Olivia MIRZA[1], Fidelis MASHIRI[1], Brendan KIRKLAND[1],
Todd CLARKE[2] (Western Sydney University, Sydney, Australia, [2]BarChip Australia, Sydney, Australia)

D5 11:55 - 13:15

OP_34: Signalling and Communication Systems, II
Chair: Kunihiro KAWASAKI (Railway Technical Research Institute (RTRI), Japan)

11:55 Safe satellite-based localization of the train thanks to a combination of accuracy enhancement and fault detection and exclusion schemes
Juliette MARAIS[1], Ni ZHU[1], Marion BERBINEAU[2], David BETAILLE[2]
([1]Univ Lille Nord de France, IFSTTAR, COSYS, LEOST, Villeneuve d’Ascq, France,
[2]IFSTTAR, COSYS, Villeneuve d’Ascq, France)

12:15 ERTMS ON CROSS BORDER LINES: ERTMS PLACE IN SERVICE ON ISELLE-DOMODOSSOLA LINE
Stefano MARCCOCIO, Fabio SENESI, Salvatore BUONINCONTRI, Daniele CARONTI
(Rete Ferroviaria Italiana, Rome, Italy)

12:35 Providing high speed data to high speed trains - LTE performance measurements with different antenna setups
Friederike MAIER (DB Fernverkehr, Munich, Germany)

12:55 The New Ground-to-Train Radio Communication System using 100 GHz Band Millimeter-wave
Kazuki NAKAMURA[1], Nagatani IWASAWA[1], Nariya IWAKI[1], Koki IWAMOTO[1], Kunihiro KAWASAKI[1],
Nobuhiro SHIBAGAKI[1], Yosuke SATO[2], Masato FUJII[2], Ken-ichi KASHIMA[2], Atsushi KANNO[2],
Tetsuya KAWANASHI[3, 4] (Railway Technical Research Institute [RTRI], Tokyo, Japan, [3]Hitachi Kokusai Electric, Tokyo, Japan,
Thursday, October 31, 2019

**OP_35: Passenger Flow, Mobility from Door-to-Door**
Chair: François RAMOND (SNCF, France)

- Bettina DOETSCH[1]
- François HAUSMAN[2]
- Birgit MIlius[2]
- Claudio MONTI[2]
- Jacques PORÉ[3]
- Salvatore SABINA[3]
  [1] Thales Deutschland, Ditzingen, Germany
  [2] Siemens Mobility, Braunschweig, Germany

12:15 **Estimate of Congestion for Each Area of Stations by Existing Data**
Toru SAHARA, Sei SAKAIRI (East Japan Railway Company [JR East], Saitama, Japan)

12:35 **Increasing the efficiency of the railway station by relocating the service facilities using simulation**
- Parinaz BAZEGHI KISOMI[1]
- Arman TADAYON[2]
- Morteza BAGHERI[2]
- Vahid POURAHMADI[3]
  [2] School of Railway Engineering Iran University of Science & Technology, Tehran, Iran
  [3] Amir Kabir University, Tehran, Iran

12:55 **Passenger flow optimization through cognitive load analyses of different information modalities: A dual study between regular and occasional travelers in virtual reality and naturalistic conditions**
Allan ARMOUGUM[1, 2], Chantal Joie-La MARLE[1]
  [1] SNCF Mobilités, Paris, France
  [2] Paris University, Boulogne-Billancourt, France

**OP_36: Low-Cost Operation**
Chair: Simon FLETCHER (International Union of Railways (UIC), Belgium)

11:55 **The Need for Track Friendly Vehicles**
- Martin HIENSCH[1, 2]
- Arjen ZOETEMAN[3]
- Mark LINDERS[2]
  [2] DEKRA Rail, Utrecht, The Netherlands
  [3] ProRail, Utrecht, The Netherlands

12:15 **Monitoring System for Station Platform from on Board for One-man Operation**
Tetsuya TAKEDA, Nobuhiko NAKAMURA (East Japan Railway Company [JR East], Tokyo, Japan)

12:35 **Driver Advisory System (DAS) for energy-conservation and punctuality**
- Kentaro MAKI[1]
- Atsushi ODA[2]
- Mako MURAKAMI[2]
- Satoru ITO[2]
- Toru NISHINO[2]
- Junichi HARADA[3]
  [1] Hitachi, Ibaraki, Japan
  [2] Hitachi, Tokyo, Japan
  [3] Tokyo Monorail, Tokyo, Japan

12:55 **CCS based on ERTMS Level 3 for regional applications: a new way of managing rail operation beyond the digitalization of the signalling system**
Gabriele RIDOLFI, Francesco DI FLAVIANO, Fabio SENESI, Marco RESTANTE (Rete Ferroviaria Italiana, Rome, Italy)

**Seminar Room 1**

**IP_17: Condition-Based Maintenance of Infrastructure, II**
Chair: Hiroo KATAOKA (Railway Technical Research Institute (RTRI), Japan)

**Track Monitoring Using Ride Quality Measurements**
- Elton TOMA[1]
- Yan LIU[1]
- Aliok JAHAGIRDAR[2]
- Erik OXELGREN[2]
  [1] National Research Council Canada, Ottawa, Canada
  [2] VIA Rail Canada, Montreal, Canada
Thursday, October 31, 2019

Introduction of Track Machine Vision Systems in Japanese Railway: how to fulfil the requirements to replace patrolling and periodical manual inspection
Giuseppe AURISICCHIO[1], Hirotaka YOKOUCHI[2] (1)MER MEC Japan, Tokyo, Japan,
(2)West Japan Railway Company, Osaka, Japan

Stereo Vision Based Automatic Measurement System for Rail Structure Gauge
Hironobu FUKAI[1], Yusuke WATABE[1], Seji TABAYASHI[1], Norihisa WATANABE[2]
(1)Meidensha Corporation, Shizuoka, Japan, (2)Tokyu Corporation, Tokyo, Japan

Real time Deep Learning for Sleeper Crack Detection
Luca CAROTTI, Sante ALTIZIO, Clelia MANDRIOTA, Cosimo RUBINO (MER MEC, Monopoli, Italy)

Monitoring of non-ballasted railway tracks in tunnel: development of a robot for the automatic detection of damaged concrete blocks
Tien HOANG[1], Denis DUHAMEL[1], Gilles FORET[1], Jean-Luc POCHET[1], Francis SABATIER[2]
(1)Ecole des Ponts ParisTech, Champs-sur-Marne, France, (2)Eurotunnel Group, Coquelle, France

Determination of Probability of a Track Geometry Defect based on GPR Measured Subsurface Conditions Using Data Analytics
Allan M. ZAREMBSKI[1], Denis YURLOV[2], Joseph PALESE[1], Nii ATTOH-OKINE[1] (1)University of Delaware, Newark, USA,
(2)Israel Railways, Lod, Israel

Seminar Room 2 11:55 - 13:15

IP_18: Condition-Based Maintenance of Infrastructure, III
Chair: Stéphane MARIE (SNCF Réseau, France)

Feasibility of a space-based system for Railway Infrastructure Monitoring
Elena RAZZANO[1], Rosaria ESPOSITO[1], Francesco RANAURO[1], Vincenzo STANZIONE[2], Marco D’ERRICO[3],
Franco IACOBINI[1], Stefano ROSINI[1], Gilles MARIOTTI[1], Giuseppe FICCO[2], Daniele FILIPPETTO[3]
(1)Rete Ferroviaria Italiana, Rome, Italy, (2)RTRI, Tokyo, Japan, (3)Università degli Studi della Campania “Luigi Vanvitelli”, Caserta, Italy

Study on Quality Assessment of Catenary
Baoguo WANG[1], Zaimin LIU[1], Wenxuan ZHANG[1], Jing WANG[1] (1)China Railway, Beijing, China,
(2)China Academy of Railway Sciences, Beijing, China

A Condition-based Evaluation Method for Concrete Signal Poles
Shunsuke SHIOMI[1], Mizuki TSUNEMOTO[1], Toru IUJIMA[1], Yoshikazu OSHIMA[1], Tatsuya OMORI[1], Kyoko IKURA[1],
Takayuki ONO[2], Naoki KAWASAKI[2] (1)Railway Technical Research Institute [RTRI], Tokyo, Japan,
(2)East Japan Railway Company, Tokyo, Japan

Soundness confirmation method of the traction substation facilities by the sound
Taichi HIRANO, Motohiko ONUKI, Shigeo MUKAI, Yoshiaki SHIMADA
(East Japan Railway Company [JR East], Tokyo, Japan)

Anomaly detection model based on switch monitoring data for condition-based maintenance
Daniela NAREZO GUZMAN[1], Edin HADZIC[2], Jörn C. GROOS[1]
(1)German Aerospace Center (DLR), Berlin/Braunschweig, Germany, (2)Strukton Rail, Utrecht, The Netherlands

Design of a Data Acquisition System for Condition Evaluation and Operation Optimization of a Light Rail Vehicle and Infrastructure
Markus TESAR, Philip OTTO, Peter GRATZFELD (Karlsruhe Institute of Technology, Karlsruhe, Germany)
Organized Session 10

**OS_10: From Research to Benefits: How to Accelerate the Innovation Process**

**Organizers/Chairs:** Luisa MOISIO (RSSB, UK)  
Corinne TALOTTE (SNCF, France)

- Arne BENOX, SBB-CFF-FFS, Switzerland  
- Andy DOHERTY, Network Rail, UK  
- Yoshiyasu HAGIWARA, Mitsubishi Electric Corporation, Japan  
- Anson JACK, University of Birmingham, UK

**D7**

**OP_37: Passenger Rolling Stock Design**

**Chair:** Francesco ROMANO (Titagarh Firema, Italy)

14:35  
**Smart and innovative approaches in composite materials carbody design**  
Luca LENZI, Angelo SURINI, Marco AIELLO (Hitachi Rail, Pistoia, Italy)

14:55  
**Research for improving standardization of fire-fighting systems for railway vehicles**  
Laura FOCONI, Mauro FINOCCHI, Giampaolo MANCINI, Carmine ZAPPACOSTA (Italcertifer, Florence, Italy)

15:15  
**Development of the measures against snow accretion of Hokuriku Shinkansen vehicle**  
Nobuaki IZAWA, Tetsuya NAKAMURA, Shinya MASHIMO, Takuya YAMANAKA (West Japan Railway Company [JR West], Osaka, Japan)

15:35  
**Validation of Novel Active Wheelset Steering System through Numerical Simulation**  
Petr VOLTR1, Cristian ULIANOV1, Paul BATTY2 (1-Newcastle University, Newcastle upon Tyne, UK, 2-Grand Central Railway Company, UK)

**D5**

**OP_38: Infrastructure Resilience During Extreme Events**

**Chair:** Gary FRY (Transportation Technology Center, Inc. (TTCI), USA)

14:35  
**Soils, Structures and Hydraulics: Expertise and Applied Research (SSHEAR) Project**  
Mark CHEETHAM1, Christophe CHEVALIER2, Frédérique LARRARTE2, Franziska SCHMIDT3, Edouard DURAND3, Philippe SERGENT3, Philippe GONDRET4, Sidoine de la ROQUE4, SNCF Réseau, Paris, France, IS2/IFSTTAR, Marne la Vallée & Bouguenais, France, INFRAIES, Blois & Compiègne, France, Laboratoire FAST, Orsay, France, Vinci Autoroutes, Saran, France

14:55  
**Scour risk management at bridges - A comparison of Japanese and French scoring methodologies**  
Tsuyoshi TAKAYANAGI1, Edouard DURAND4, Denis DAVI2, Christophe CHEVALIER3, Mark CHEETHAM4, Naoto NAITO1, Taisuke SANAGAWA1, Kenji WATANABE3 (1-Railway Technical Research Institute [RTRI], Tokyo, Japan, 2-CEFEMA, Blois and Aix-en-Provence, France, 3/4/IFSTTAR, Marne-la-Vallée, France, 4/SNCF Réseau, Paris, France, 5-The University of Tokyo, Tokyo, Japan)

15:15  
**A data model for heat-related rail buckling: implications for operations, maintenance and long-term adaptation**  
David JAROSZWSKIE, Qian FU, John EASTON (University of Birmingham, Birmingham, UK)
Thursday, October 31, 2019

15:35 Evaluation of Track Stability against Buckling Under Earthquake by Using Embankment and Ballasted Track Model on Large Shaking Table Test
Shuhei KIKKAWA[1], Takahisa NAKAMURA[1], Yoshitsugu MOMOYA[1], Takashi USHIDA[1], Taisuke SANAGAWA[1], Hidetoshi NISHIOKA[2] (1)Railway Technical Research Institute [RTRI], Tokyo, Japan, 2(formerly Railway Technical Research Institute, Tokyo, Japan)

OP_39: Noise and Vibration
Chair: Baldrick FAURE (SNCF, France)

14:35 Rail source definition for noise mapping using CNOSSOS prediction method
Franck POISSON[1], Fabrice AUBIN[1], Baldrick FAURE[1], Fabien LETOURNEAUX[1], Claire CHAUFOUR[1] (1)SNCF Mobilités, Vitry-sur-Seine, France, 2(SNCF Mobilités, Le Mans, France, 3(SNCF, Saint Denis, France)

14:55 Noise Control in Shift2Rail European Rail Research Project

15:15 Experimental study on curve squeal noise with an actual test train
Takeshi SUEKI, Tsugutoshi KAWAGUCHI, Hiroyuki KANEMOTO, Masahito KUZUTA, Tatsuya INOUE, Toshiki KITAGAWA (Railway Technical Research Institute [RTRI], Tokyo, Japan)

15:35 Control Vehicle Vibration from Track Irregularities and Wheel Rail Forces to Improve Passenger Comfort and Safety
Jianfeng GUO, Zaitian KE, Jinzhao LIU, Kai TAO, Chunping DAI, Xiaodi XU (China Academy of Railway Sciences, Beijing, China)

G409 14:35 - 15:55

OP_40: Passenger Information and Ticketing
Chair: Alessio GAGGELLI (Trenitalia, Italy)

14:35 Estimating the Passenger Information Demand in German Regional Trains
Tobias MONZERT[1], Manfred BOLTZE[1], Leif FORNAUF[1] (1)Technische Universität Darmstadt, Darmstadt, Germany, 2(DB Regio, Frankfurt/Main, Germany)

14:55 Estimating the number of people in a train carriage: using data to provide future forecasts and current estimates in real time
James PRITCHARD (University of Southampton, Southampton, UK)

15:15 An indoor navigation application for all pedestrians within railway stations
Coralie REUTENAUER, David SANZ (SNCF, Saint-Denis, France)

15:35 Development of ASSIST MARS -Remote Customer Service Using Reserved Seating Ticket Vending Machines-
Isamu MATSUDA, Norihiro MIZOGUCHI, Hirokazu OOYA (Railway Information Systems, Tokyo, Japan)
Thursday, October 31, 2019

Seminar Room 1 14:35 - 15:55

IP_19: Structures, Materials and Track Components
Chair: Monique Ferguson STEWART (U.S.DOT/Federal Railroad Administration, USA)

Development of a bridge sleeper fastening system for CWR on an existing open-deck steel bridge
Inchul BAck\(^1\), Sanghyun CHOI\(^2\), Chanyoung LEE\(^3\), Sunghyun PARK\(^4\), Younggil CHOI\(^5\), Hodam LEE\(^5\)
\(^1\)KORAIL Institute, Daejeon, Korea, \(^2\)Korea National University of Transportation, Uiwang, Korea, \(^3\)ESCO RTS, Seoul, Korea, \(^4\)Seohyun Engineering, Anyang, Korea

Water Damage in Cracked Pretensioned Concrete Sleepers
Josué C. BASTOS, Riley EDWARDS, Marcus DERSCH, Thomas ROADCAP
(Univ. of Illinois at Urbana-Champaign (UIUC), Urbana, USA)

Sustainable mix design for improving the durability of the concrete infrastructures
Le Hung NGUYEN, Richard POQUET (SNCF Réseau, La Plaine Saint Denis, France)

Spalling Prevention Method for Tunnel Lining Using Polyurea Resin
Kazuhide YASHIRO\(^1\), Keisuke SHIMAMOTO\(^2\), Masami KOSHIISHI\(^2\), Kazunao IDE\(^3\)
\(^1\)Railway Technical Research Institute [RTRI], Tokyo, Japan, \(^2\)Shimizu Corporation, Tokyo, Japan, \(^3\)Mitsui Chemicals, Tokyo, Japan

Field Investigation of Under Ballast Mat Effectiveness to Mitigate Differential Movement Problems in Railway Bridge Transition Zones
Arthur de O. LIMA\(^1\), Marcus S. DERSCH\(^1\), Jacob M. BRANSON\(^1\), Ricardo J. Q. OROZCO\(^2\), J. Riley EDWARDS\(^3\)
\(^1\)University of Illinois at Urbana-Champaign, Urbana, USA, \(^2\)Voestalpine Nortrak, Cheyenne, USA

Overhaul of the European normative interface to check dynamic compatibility of rolling stock with existing railway bridges
Marco GAIO RESENDE, Muriel RAGUENEAU, Quentin JUNGERS (SNCF Réseau, Paris, France)

Characteristics of Uplifting Force Acting on Bridge Bearings during Earthquakes
Masamichi SAITO\(^1\), Tatsuya NIHEI\(^2\), Yugo DOUCHI\(^2\), (\(^1\)Railway Technical Research Institute [RTRI], Tokyo, Japan, \(^2\)JR Souken Engineering, Tokyo, Japan

Seminar Room 2 14:35 - 15:55

IP_20: Infrastructure Maintenance
Chair: Masayuki KODA (Railway Technical Research Institute (RTRI), Japan)

Local Rail Grinding for Effective Lubrication
Naoki KEMMOTSU\(^1\), Shinichi WATANABE\(^2\), Itsuo ARAI\(^3\), Naomi KUBO\(^4\)
\(^1\)Tokyo Metro, Tokyo, Japan, \(^2\)Nippon Steel & Sumikin Railway Technology, Osaka, Japan

A Study on Wheel-Burn Based on the Vehicle Dynamic Response Data
Xiaodi XU, Jinzhao LIU, Shanchao SUN, Liubin NIU, Jianfeng GUO (China Academy of Railway Sciences, Beijing, China)

Video Track Inspector - Automated identification and severity classification of defects at track assets
Thomas HEMPEL\(^1\), Stefan KLUCKNER\(^2\), Christof HOPPE\(^3\), Benjamin HARTMANN\(^4\), Kejun XU\(^5\)
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Fault diagnosis for railway point machines based on sound analysis
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Effect Verification of Repairing Method Using UFC for Upper Surfaces of Damaged Buckle Plate Girders

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Study for Establishing Chloride Protection System for Rectangular Subway Tunnels

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Hall C 16:15 - 17:15

Closing Ceremony