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
- Pierre IZARD, Deputy CEO - Chief Technology and Rail Systems Officer, SNCF, 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

**Hall C** 11:30 - 13:10

**Organized Session 1**

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

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

11:30  **A methodology for prioritizing RTS enabling technologies**

Olivier MARTEAUX, Luisa MOISIO (RSSB, London, UK)

11:45  **Exploring the Future of Japan’s Railway Industry through Scanning-Based Foresight Method**

Nanami FURUE[^1], Yuichi WASHIDA[^2], Yasunori TANAKA[^3], Akihisa YAHATA[^4], Motoki KOBAYASHI[^4], Naoaki KITTA[^4]

[^1]: Tokyo University of Science, Tokyo, Japan,[^2]: Hitotsubashi University, Tokyo, Japan,[^3]: The Japan Research Institute, Tokyo, Japan

12:00  **Enabling a global community for rail horizon scanning**

Andrew MEIER (Australasian Centre for Rail Innovation (ACRI), Canberra, Australia)

12:15  **Future by design: the next frontier for radical change in railway systems**

Marcelo BLUMENFELD, Holly FOSS, Clive ROBERTS (University of Birmingham, Birmingham, UK)

12:30  **Digital BowTies for safety delivery on the GB railways**

Coen VAN GULIJ\[^1\], Miguel FIGUERES\[^2\], Liz DAVIES\[^3\], Peter HUGHES\[^4\], Rawia EL-RASHIDY\[^4\]

[^1]: University of Huddersfield, Huddersfield, UK,[^2]: RSSB, London, UK,[^3]: Renfe, Madrid, Spain
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[3], Patrik HAVRILA[3], Jörn C. GROOS[3]
       (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 PERREAL[1], Svenja HAINZ[4], Elodie VANNIER[3], Ida KRISTOFFERSSON[4], Michael MEYER ZU HÖRSTE[3]
       (1)Thales Ground Transportation Systems, Paris, France, (2)German Aerospace Center (DLR), Braunschweig, Germany,
       (3)SNCF, Paris, France, (4)Lund Institute of Technology (LIT), Stockholm, Sweden

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], Zhimai WANG[2]
       (1)China Railway Economic and Planning Research Institute, Beijing, China, (2)China Academy of Railway Sciences, Beijing, China

12:50  High speed fault tolerant Ethernet train networks and passenger information systems services with on board Internet access
       Antonio GHELARDINI, Alessandro VALENTINII, 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]
[1] (Railway Technical Research Institute [RTRI], Tokyo, Japan, [2] National Research Institute for Earth Science and Disaster Resilience, Ibaraki, Japan)

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], Hideo TAKAHASHI[3]

**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 KHOUADJIA[3], Fabrice GANANSIA[3], Latifa OUKHELLOU[1]

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 BASKIOTIS[1, 2], Lucas BECIRSPAHIC[1, 2], Romain BRAULT[1, 2], Stephane DUGUET[1, 2], Vincent GIGUE[3]

12:30 **Integrating train unit shunting problem, train maintenance and routing**
Franck KAMENGA[1, 2], Paola PELLEGRINI[1, 2], Joaquin RODRIGUEZ[1, 2], Boubekr 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)
Objective: To understand the contents of a seminar program.

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**

- **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[2],

- **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 Li[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[2], 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], Ying XIAO[5], Xi WANG[6]
[1]CRRC Qingdao Sifang Rolling Stock institute, Qingdao, China, [2]Harbin Electric Machinery Company, Harbin, China,
[3]Qiqihar Railway Rolling Stock, Qiqihar, China, [4]Zhongnan University, Changsha, China,
[5]China Railway Special Cargo Services, Beijing, China, [6]Beijing Jiaotong University, Beijing, China)

Development of a Bogie for Tilt Control with an Electric Rotary Actuator and an Anti-Roll Bar
Takashi KOJIMA, Akihito KAZATO, Kohai MIYAHARA, Nobuyuki WATANABE
(Railway Technical Research Institute [RTRI], Tokyo, Japan)

Development of AC-fed and battery-powered train “DENCHA” with high-capacity battery
Hirofumi IKEDA[1], Keitaro YASUMORI[2], Munemori KODAMA[3], Kenji HATAKEDA[4], Yoshiaki TAGUCHI[5],

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, Nobuhiko 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, 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**

### 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-PERES1, Estelle ALTAZIN2, Mathieu GAGNON2, François RAMOND2, Sabine TREFOND2  
  (1) Mines Saint-Etienne, Gardeanne, France, 2) SNCF Innovation and Research, Saint Denis, France
- **15:15** Reduced (winter) timetable in the Netherlands: Process, Mathematical Models and Algorithms  
  Pieter-Jan FIOOLE1, Dennis HUISMAN1, 2, Gábor MARÓTI1, 3, Ricardo L. SALDANHA4  
  (1) Netherlands Railways, Utrecht, The Netherlands, 2) Erasmus University Rotterdam, Rotterdam, The Netherlands, 3) VU University Amsterdam, Amsterdam, The Netherlands, 4) SISCOG - Sistemas Cognitivos, Lisbon, Portugal

### D7 14:30 - 15:50

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

- **14:30** Freight Locomotive Wheel Wear Simulation in Train Operational Environment  
  Qing WU1, 2, Maksym SPIRYAGIN1, 2, Yan SUN1, 2, Colin COLE1, 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 YAMAMOTO1, Tonomori GOTO1, Mineyuki ASAHINA1, Norihiko IMAOKA2  
  (1) Railway Technical Research Institute [RTRI], Tokyo, Japan, 2) Japan Transport Engineering Company, Kanagawa, Japan
- **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 FLACCIONI, David RUSSO, Giuseppe GRANDE, Alfredo BIANCUCCI  
  (Trenitalia, Florence, Italy)

### D5 14:30 - 15:50

#### 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[2], 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, Köln Verkehrs-Betriebe, Cologne, Germany)

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

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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 VOLKMANN[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 GHOZZI[1], Walter EUSTACCHIO[2], Sandrine SEGRETAIN[2], Laurent DUPONT[1], Vincent ARRIGONI[1], 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[1], Yukinori KOBAYASHI[1], 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)

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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)
15:30 Development of a High-Speed Adjustable Perturbation Slab Track

Dingqing LI[1], Nicholas WILSON[1], Brian MARQUIS[2], Ali TAJADDINI[3]

[1]Transportation Technology Center, Inc. (TTCI), Pueblo, USA,
[2]Volpe Center, Boston, USA,
[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 (T2T 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[1], Vincenzo CALA[2], Mirko ERMINI[2], Mirco GONNELLI[2], Giovanniluca DE VITA[2], Luca TISENI[2], Daniele LEONARDIS[3], Massimo SATLER[3], Federica FIORETTI[3], Massimiliano SOLAZZI[3], Antonio FRISOLI[3], Carlo Alberto AVIZZANO[3](1) Rete Ferroviaaria Italiana, Roma, Italy, 2) Rete Ferroviaaria Italiana, Firenze, Italy, 3) Scuola Superiore Sant’Anna, TeCIP Institute, Pisa, Italy)

Track Geometry modelling - an approach for integrating WTMS data within Asset Management modelling framework

Benoit GUYOT[1], Olivier DUBRULLE[1], Christine FUNFSCHILLING[2] (1) SNCF Réseau, Saint Denis, France, 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[1], Wei ZHOU[1], Wenfeng WANG[2], Wexuan ZHANG[1], Xiangdong Li[1]

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(3), Yuki ENOKIDANI(4), Daiki OGAWA(4), Naoya IMAIZUMI(4), Hideaki SHINOHARA(5) (1)Basis Consulting, Tokyo, Japan, 2)Hokkaido University, Sapporo, Japan, 3)University of Tokyo, Tokyo, Japan, 4)Tokyo Metro, Tokyo, Japan, 5)Metro Rail Facilities, Tokyo, Japan)

System for Preventing Flaking of Lining Concrete in Subway Tunnel Using Four Methods

Hirotake NOGUCHI(1, 2), Shinji KONISHI(1), Daisuke TANAKA(1), Yuki ENOKIDANI(1), Naoya IMAIZUMI(1), Saki NEMOTO(2) (1)Tokyo Metro, Tokyo, Japan, 2)Japan Transport and Tourism Research Institute, Tokyo, Japan)

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) (1)Niigata University, Niigata, Japan, 2)East Japan Railway Company, Saitama, Japan)

Estimating future tamping demands using the Swiss Wear Factor

Stefan MARSCHNIG, Ivan VIDOVIĆ (Graz University of Technology, Graz, Austria)

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**Hall C 16:20 - 18:00**

**Organized Session 3**

**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) (1)Institut de Recherche Technologique Railenium, Famars, France, 2)CNES, Centre National d'Études Spatiales, Toulouse, France, 3)SNCF, Tech4Rail, Saint-Denis, France)

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 CIMATTI(3), Stefano DE MURO(3), Salvatore DE SIMONE(3), Eugenio FEDELI(3), Franco FIUMARA(3), Alberto PETRILLO(3), Stefania SANTINI(3), Diana SERRA(2), Marco TESI(1) (1)Ferrovie dello Stato Italiane, Roma, Italy, 2)Rete Ferroviaria Italiana, Firenze, Italy, 3)Fondazione Bruno Kessler, Trento, Italy, 4)Università degli studi di Napoli Federico II, Napoli, Italy)

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)
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**D7** 16:20 - 18:00

**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
Obla BARBIR[1], Bernhard ANTONY[2], Fritz KOPF[2], Johannes PISTROL[1], Dietmar ADAM[1], Florian AUER[2]
(1)TU Wien, Institut für Geotechnik, Vienna, Austria, 2)Plasser & 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

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

**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[3], 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[2], Alois VORWAGNER[2], Stefan LACHINGER[2], Florian SALIGER[2], Gerrit HEINE[2], Klaus EHRENFRIED[2] (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
Kazuhiko SAKAOKA[1], Masayuki OOTSUBO[1], Kazunori WADA[2], Ryota HASHIMOTO[2], Tomofumi KOYAMA[2] (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[1], Vincenzo CEFALIELLO[2], Gianluca NESTOVITO[1]
(1)University of Perugia, Perugia, Italy, 2)ING. Paolo Petrella srl, Milano, Italy, 3)Rete Ferroviaria Italiana, 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)

D1 16:20 - 18:00

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

16:20 Impact of an onboard fire for the evacuation of a rolling stock
Guillaume CRAVEUR, Thierry DUPRE (SNCF, Le Mans, France)

16:40 Modelling an approaching method for station staff to prevent suicide and development of a gatekeeper training program
Masato KURATANI[1], Ken KUSUKAMI[1], Mitsuko AKAHIRA[2], Kotaro OTSUKA[2]
(1)East Japan Railway Company (JR East), Saitama, Japan, (2)Iwate Medical University, Iwate, Japan

17:00 Coherent Radar System for Platform Monitoring at Railway Station
Eugenio FEDELI[1], Vincenzo CALA[2], Mirko ERMINI[2], Mirco GONNELLI[2], Antonio ROSSETTI[2]
(1)Rete Ferroviaria Italiana, Roma, Italy, (2)Rete Ferroviaria Italiana, Firenze, Italy

17:20 Developing the new automatic opening and closing system of the platform screen door on non-interlocking lines
Shinya HAKATA (Tokyo Metro, Tokyo, Japan)

17:40 Improving the Safety Performance of Passenger Rail Car Glazing Systems
Jeffrey GORDON[1], Patricia LLANA[2], Kristine SEVERSON[2], Anand PRABHAKARAN[3], Florentina M. GANTOI[3], Andrew ROBITAILLE[3], Matt RADOVICH[3]
(1)USDOT/Federal Railroad Administration, Washington D.C., USA, (2)USDOT/Volpe Center, Cambridge, USA, (3)Sharma and Associates, Countryside, USA

G409 16:20 - 18:00

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[2], 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[2]

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, Takeshi 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[1], Chiara FARNESI[1], Paolo MASINI[1], Mauro MENCI[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 GRÜNTHÄUSER[1], Said SAOUAMI-WEISS[2], Ingo SCHWARZE[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)
Seminar Room 2  16:20 - 18:00

IP_06: Safety, Security and Natural Hazard Management
Chair: Jerzy WISNIEWSKI (International Union of Railways (UIC), France)

Comprehensive and standardised approach for railway cybersecurity

A mechanical and economical based framework to help decision-makers for natural hazards and malicious events impact on infrastructure prevention
Pierre-Jean TISSERAND[1, 2], Muriel RAGUENEAU[2] (Université Paris-Saclay, Cachan, France, 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, 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[3] (East Japan Railway Company [JR East], Saitama, Japan, Railway Technical Research Institute, Tokyo, Japan, 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 SOKŁOWSKA, 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 MATSUOKA[3], Kenta YANO[2], Takashi MAEDA[2] (Japan Transport Engineering Company, Tokyo, Japan, Tokyo Metro, Tokyo, Japan)

Sleepiness Visualization and Sleep Management on Bullet-train Drivers for Human-error Prevention
Yuta YAMAMOTO, Keiichiro TOSHIDA, Hijiri INOUE, Yoshihiro UCHIDA, Kousuke SHIBATA, Takamitsu YOSHIIHARA (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], Lorelle BOWDITCH[1], Janine CHAMPANI[1], Nora BALFE[1], Jillian DORRIAN[1] (Central Queensland University, Adelaide, Australia, Flinders University, Adelaide, Australia, Trinity College Dublin, Dublin, Ireland, University of South Australia, Adelaide, Australia)

Improved Train-Borne Platform Interface Monitoring
Gavin CAIRD[1], John CHAN[1], Jina LEE[1] (Ricardo Rail Australia, Sydney, Australia, Transport for NSW, Sydney, Australia)
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 Railroads 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)

D7  8:30 - 9:50

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, Takaumi 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[1], Paolo UMILIACCHI[2], Gianosvaldo FADIN[3], Vincenzo DELLE SITE[4]
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] (1Queensland University of Technology, Brisbane, Australia, 2Australasian Centre for Rail Innovation, Canberra, Australia, 3Stockholm University, Stockholm, Sweden)

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] (1Iran University of Science and Technology, Tehran, Iran, 2Iranian 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, Rome, Italy)

9:30  A new project finance solution for railway lines and consequently risk analysis for public and private investors
Marco Santo SPINELLI[1, 2], Carmine ZAPPACOSTA[1], Luca D’AMELIO[1], Antonino LO BURGIO[1] (1Italcertifer, Rome, Italy, 2Consultant, Rome, Italy)
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 ASCHEMANN[1], Stefan HEIBL[1], Roberto PALACIN[1]
(1)Deutsches Zentrum für Luft- und Raumfahrt, Stuttgart, Germany, (2) Bombardier Transportation, Henningsdorf, Germany,
(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
Masaru TOMITA[1], Kenji SUZUKI[1], Yusuke FUKUMOTO[1], Atsushi ISHIHARA[1], Tomoyuki AKASAKA[1], Yusuke KOBYASHI[1], Takenori TORII[1], Keiji OGOSE[1], Hervé CARON[5], Hiroyuki ITO[7]
(1)Railway Technical Research Institute [RTRI], Tokyo, Japan, (2)Izuhakone Railway, Shizuoka, Japan (currently Seibu Railway), (3)Tokyo Metropolitan Government, Tokyo, Japan, (4)Tokyo Metro, Tokyo, Japan, (5)SNCF, Paris, France, (6)Hankyu Corporation, Osaka, Japan (currently Kita-osaka Kyuko Railway), (7)Tokyu Corporation, Tokyo, Japan

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]
(1)East Japan Railway Company [JR East], Saitama, Japan, (2)West Japan Railway Company, Osaka, Japan

Classification of Railway tracks for applying enhanced ERTMS/ETCS Solutions Based on GNSS positioning technologies
Massimiliano CIAFFI[2], Juliette MARAIS[1], Giusy EMMANUELE[2], Omar GARCIA CRESPILO[2], Andrea COLUCCIA[3], Alessia VENNARINI[1], Salvatore SABINA[3], Syed Ali KAZIM[1], Daniel GEBERTH[1], Maria CAAMANO[1], Alessandro NERI[3], Elena RAZZANO[3], Fabio SENESI[5]
(1)Univ Lille Nord de France, IFSTTAR, COSYS, LEOST, Villeneuve d’Ascq, France, (2)Rete Ferroviaria Italiana, Rome, Italy, (3)German Aerospace Center (DLR), Oberpfaffenhofen, Germany, (4)Radiolabs, Rome, Italy, (5)Hitachi Rail, Genova, Italy

Seamless converged network architecture based on fiber-wireless systems for high-speed railway communication networks
Atsushi KANNO[1], Pham TIEN DAT[3], Naokatsu YAMAMOTO[3], Tetsuya KAWANISHI[1, 2]
(1)National Institute of Information and Communications Technology, Tokyo, Japan, (2)Waseda University, Tokyo, Japan

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 BAUSSEON[1], Chikara YAMASHITA[2], Mitsuuki 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, Uwang, South Korea)

Improving the prediction and effectiveness of environmental vibration reduction measures
Paul HöLSCHER[1], Jitse PRUIKSMA[2], Hielke ZANDBERG[3], Arjen ZOETEMAN[3]

Wheel/rail noise above 10 kHz generated on a gently curved track
Tsugutoshi KAWAGUCHI[1], Takeshi SUEKI[1], Toshiki KITAGAWA[1], Masaya NISHIMURA[1], Hisashi ABE[1]
([1]Railway Technical Research Institute [RTRI], Tokyo, Japan, [2]JR Central Consultants Company, Tokyo, Japan)

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 NAYER[1], Christian Oliver PASCHEREIT[1]
Wednesday, October 30, 2019

### Hall C  10:20 - 11:40

**Organized Session 5**

**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
  \(^2\)Japan Railway Construction, Transport and Technology Agency, Kanagawa, Japan

10:35  **Continuous railway track monitoring using passenger trains**

- Clive ROBERTS\(^1\), Mani ENTEZAMI\(^1\), Edward STEWART\(^1\), Graeme YEO\(^1\), Alfredo Peinado GONZALO\(^1\)
  \(^1\)University of Birmingham, Birmingham, UK
  \(^2\)MoniRail Ltd., Birmingham, UK

10:50  **Identification of Local Track Defects Using Axle Box Acceleration of in-service Vehicles**

- Henrik KARLSSON, Alireza QAZIZADEH, Sebastian STICHEL, 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\(^1\), Paolo FIRM\(^2\), Marco CAPOSCUITTI\(^3\), Maria Antonietta ZOCCO\(^4\), Federico GHERARDI\(^5\)
  \(^1\)Politecnico di Milano, Milano, Italy
  \(^2\)Trenitalia, Roma, Italy
  \(^3\)Rete Ferroviaria Italiana, Roma, Italy
  \(^4\)Mercitalia, Italy
  \(^5\)Hitachi Rail Italy, Italy

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### 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\(^2\), Masahiko KAI\(^3\)
  \(^1\)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\(^2\), Kazuhiko ITO\(^3\), Hirokazu MIYAGUCHI\(^4\), Naoto NAGAOKA\(^5\)
  \(^1\)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\(^1\), Christian Eric BRUZEK\(^2\), Hervé CARON\(^3\), Christian COURTOIS\(^3\)
  \(^1\)Nexans Euromold, Aalst, Belgium
  \(^2\)SNCF Réseau, Saint Denis, France
  \(^3\)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\(^2\), Andrea MARISCOTTI\(^3\), Daniele GALLO\(^4\), Mario LUISO\(^5\), Nazzareno FILIPPINI\(^6\), Irene ROSSETTA\(^7\)
  \(^1\)Italian National metrology Institute INRIM, Torino, Italy
  \(^2\)ASTM, Chiasso, Switzerland
  \(^3\)Rete Ferroviaria Italiana, Roma, Italy
  \(^4\)Rete Ferroviaria Italiana, Roma, Italy
  \(^5\)Rete Ferroviaria Italiana, Roma, Italy
  \(^6\)Universita della Campania Luigi Vanvitelli, Aversa, Italy
  \(^7\)Rete Ferroviaria Italiana, Roma, Italy
Wednesday, October 30, 2019

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[1], Lining WANG[1], Ke WANG[1], Liquan GAO[1]
(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]
(1)RAILENIUM, Famars, France, (2)IFSTTAR, 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

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 SENESI[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[1]
(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[1], Massimo PLATINI[3]
(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 XAO, Liepeng LING, Xuwei LI, Hui JIANG, Maozhen LIU
(China Academy of Railway Sciences, Beijing, China)
OP_20: Environmentally Friendly Railways
Chair: Marco SACCHI (Hitachi Rail Italy, Italy)

10:20 Assessment of greenhouse gas emissions associated with railway project
Jae-Young LEE, Cheul-Kyu LEE, Yong-Ki KIM (Korea Railroad Research Institute, Uliwang-si, Republic of Korea)

10:40 Towards a sustainable railway infrastructure
Matthias LANDGRAF, Stefan MARSCHNIG (Graz University of Technology, Graz, Austria)

11:00 Research into Diesel Emissions at Enclosed Railway Stations
Richard WALKER[1], James WRIGHT[1], Aqeel JANJUA[1], David GREEN[1] (RSSB, London, UK,
[1]King’s College, London, UK)

11:20 CFD study of dispersion of particles generated by mechanical braking: application to trains in
underground stations
Antoine DURAND[1, 2], Amine MEHEL[2], Frédéric MURZYN[3], Samuel PUECH[2], Frédérique LARRARTE[4]
[4]IFSTTAR, Bouguenais, France

Seminar Room 1

IP_09: Improvement of Service Quality, Speed, Time to Destination and Functionality, I
Chair: Gary FRY (Transportation Technology Center, Inc. (TTCI), USA)

Developing Objective Timetable Quality Metrics
John ARMSTRONG[1], Richard RAINEx[2], Stephen DRAPERX[2], John PRESTON[1]

From PIS to Multimedia Services: Standards and Market Trends
Davide AMAT[1], Victoria CALLEJA DURO[1], Laurent LLERENA[2], Eric LAVILLONNIERE[2], Tom LANE[2]

A Decision Support Tool for Real Time Rescheduling in Dense Railway Systems
Mathieu GAGNON[1], Estelle ALTAZIN[1], Stéphane DAUZERE-PERES[3], Franck RAMOND[3], Sabine TREFOND[1]

Design and Implementation of Railway Operation Monitoring System Based on Internet of things
and Micro service hybrid Cloud Architecture
Lu YAN, Hao XU (China Academy of Railway Sciences, Beijing, China)

An Automated intelligent diagnostic system for ERTMS Railway infrastructure: the Italian experience
Fabio SENESI, Raffaele MALANGONE (Rete Ferroviaria Italiana, Roma, Italy)

Study on Train Control Technology in Virtual Coupling Concept
Xiaoning XU, Zhidan SONG (China Academy of Railway Sciences, Beijing, China)

Study for Mitigation of Internal Noise Environment from High-speed trains by Changes in Sound Quality
Michiko TANAKA[1], Mizuki FURUKAWA[1], Naoki SHIRAKI[1], Koji SAITO[1], Shinichi HASEGAWA[1],
Ryohei SHIMAMUNE[1], Nobuaki HAYASHI[1], Morio MITSUISHI[2], Satoshi IKEDA[2]
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[3] (China Academy of Railway Sciences, 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 MURONOF[1], Shin AOI[2], Hiromitsu NAKAMURA[2], Wataru SUZUKI[2]

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-ichiroARA[2, 3]

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[3], Shijie ZHU[1] (Harbin Institute of Technology, Harbin, China)
[2]Heilongjiang 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[1]
[1]Southwest Jiaotong University, Chengdu, China, [2]Chengdu Lead Science & Technology, Chengdu, China)
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[1], Sebastian STICHEL[3], Peter HUGHES[2]

12:35 Using computer simulations for vehicle dynamics homologation

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)

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[1], Jesus Antonio del CASTILLO[2], Juan de Dios SANZ[1], Cesar OTERO[2]
([1]Universidad Politecnica de Madrid, Madrid, Spain, [2]Universidad de Cantabria, Cantabria, Spain)

12:15 Development of multi-line train approach warning system
Kazuyuki 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[1], Karl KERNSTOCK[2], Ben ALLEN[3]
Wednesday, October 30, 2019

**D5**  11:55 - 13:15

**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 MOUEDDEB[1, 2], Mustapha AFRIAD[1, 2], Sönke KRAFT[1], Patrick DUPONT[1], Emmanuel LAURANS[1] ([1]SNCF Réseau, Saint-Denis, France, [2]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**  

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

**D1**  11:55 - 13:15

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

11:55  **Ensuring Interoperability of Train-to-Ground Communication Services**  

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**  
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[1], Hirotaka AKAGI[1], Shinji KONISHI[2], Masato OKADA[3], Ryota SAKAI[1]

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

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

A Multi Activities Universal Composite Catenary Cantilever (MUC3)

Integrating the system of the electric power compensators for the Tokaido Shinkansen
Hiroshi MORIYAMA[1], Toshimasa SHIMIZU[3], Masahiko KAI[1], Ken KUNOMURA[2]
[1,2]Central Japan Railway Company [JR Central], Kanagawa, Japan, [3]Central Japan Railway Company, Aichi, Japan

Sensitivity analysis applied to multiline traffic rescheduling in case of electrical power failure
Soha SAAD[1,2,3], Florence OSSART[4], Jean BIGEON[5], Harold GANCE[6], Etienne SOURDILLE[7],

Development of high precision fault location method at AT-Feeding system
Shunji IMAMURA[1], Satoshi KINOSHITA[1], Moriyuki YOKOSUKA[1], Hirohisa KATO[1], Yuya MATSUDA[1],

Introduction of controlled switching system for Scott connection transformer in Shinkansen substation
Hidehiro TAKEDA[1], Satoshi KINOSHITA[1], Akira SUDA[1], Atsunori SAITO[1], Yu KOMATSU[1], Ken KUNOMURA[2]

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, Hirotaki MORIMOTO (Railway Technical Research Institute [RTRI], Tokyo, Japan)
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]
(1)China Shenhua Energy, Beijing, China, (2)Shenhua Shuohuang Railway, Beijing, China, (3)China Academy of Railway Sciences, Beijing, China

A holistic assessment approach for track maintenance and renewal
Amine DHEMAIED, Gilles SAUSSINE, Aurélie SCHWAGER GUILLENENET, 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 KIJiya, 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]
(1,2)Railway Technical Research Institute [RTRI], Tokyo, Japan, (3)Tokyo University of Science, Ibaraki, Japan, (4)University of Tokyo, Tokyo, Japan)
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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

16:40 Digital twin: concept and first developments into the management of a cyber-physical railways system
**Sofia COSTA D’AGUIAR**[1], Bruno LANDES[3], Guillaume DUCERLIER[2], Corentin STALDER[1]

17:00 An Autonomous Monitoring System for Truck Components Characterized by Low-power Consumption
**Yasutaka MAKI**[1], Kazuya KIDO[4], Atsuro ONISHI[5], Hiroshi TAKAHASHI[1]

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]

17:40 Research on Correlation between Track Geometry and Rail Defects Based on Machine Learning
**Nan YAO**[1], Xuan ZHANG[2], Kai TAO[3]
(China Academy of Railway Sciences, Beijing, China, [2]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], Ryohshi 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]

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 BIANCUCCI, Mauro MENCİ (Trenitalia, 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 OBAL measurement system - Wheel profile measurement at train speeds up to 250 km/h -
Paul MITTERMAYR[1], Roman SCHMID[1][2], Wolfgang ZOTTI[1][2], Enrico BETTERLE[1][2][3], Guido OCCIONI[1][2][3][4][5][6]

17:20 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][2][3][4][5][6](China Academy of Railway Sciences, Beijing, China, [2]Transportation Technology Center Inc. (TTCI), Pueblo, USA)
Wednesday, October 30, 2019

17:40 Reduction of system-level lifecycle cost through movement-based operation adjustment for railway vehicles
Julian FRANZEN[1], Michael LINGEN[2], Udo PINZERS[3], Bernd KUHLENKÖTTER[1]

(1)Ruhr-University Bochum, Bochum, Germany, (2)ikado, Aachen, Germany, (3)Westfälische Lokomotiv-Fabrik Reuschling, Hattingen, Germany

OP_26: Infrastructure Maintenance
Chair: Ananyo BANDYOPADHYAY (Transportation Technology Center, Inc. (TTCJ), 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 LUPI[2], Stefano LISI[2], Franco IACOBINI[3], Paola FIRM[3], 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[2], Gilles SAUSSINE[1]

(1)SCNF Réseau, La Plaine Saint Denis, France, (2)VIBRATEC, Lyon, France

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

(1)Kyushu Railway Company [JR Kyushu], Kagoshima, Japan, (2)Kyushu Railway Company, Fukuoka, Japan

17:20 Maintenance Method for Subway Tunnel Using Information and Communication Technology
Yuki ENOKIDANI[1], Shinni KONISHI[1], Daisuke TANAKA[1], Naoya IMAIZUMI[1], Saki NEMOTO[2]

(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)SCNF Réseau, La Plaine Saint Denis, France

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[1], Claire TURNER[2], Paul TOWNSEND[3], Emma LOWE[4]


16:40 Relations between the operational rules, both in normal and degraded conditions, and the capacity of a station
Gabriele MALAVASI[1], Paola FIRM[2], Carlo Domenico RONZINO[3], Andrea LA VALLE[2], Agnese PARENTE[2], Roberto ZAMBRANO[1]

(1)Sapienza Università di Roma, Rome, Italy, (2)Rete Ferroviaria Italiana, Rome, Italy

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)
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 LEMAITRE[1,], Caroline GUERIN[1,], Blandine BEIRNAERT[1,], Yvan NEDELEC[1,], Valérie GYSELINCK[2,], Virginie VAN WASSENHOVE[3,] (SNCF; Saint-Denis, France, 
\[1\]LaPEA, IFSTTAR/Université Paris Descartes, Versailles, France, 
\[2\]INSERM/Université Paris-Sud/Université Paris-Saclay, NeuroSpin center, Gil-sur-Yvette, France)

The Study on Reduction of Unpleasant Odors in a Lavatory of a Railway Station
Tamami KAWASAKI[1,], Takashi KYOTANI[1,], Tomoyoshi USHIIOGI[1,], Yoshiki IKEDA[1,] 

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 SÔNOBE, Toru MURAKAMI 
(East Japan Railway Company JRF East], Tokyo, Japan, Saitama, Japan)

Freight train wireless communication backbone architecture
Jaizki MENDIZABAL[1,], Roberto Carlos RAMIREZ[1,], Jon GOYA[1,], David BATISTA[2,], Francisco PARRILLA[2,] 
([1]CEIT and TECNUN (University of Navarra), Donostia, Spain, [2]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 HÔRSTE[1,], Svenja HÀINZ[2,], Marion BERBINEAU[2, 3,], Juliette MARAIS[2, 3,], Emilie MASSON[2,], Jaizki MENDIZABAL[4,], Michael HUTCHINSON[5,] (German Aerospace Centre (DLR), Braunschweig, Germany, 
Wednesday, October 30, 2019

Issues and solutions in migration of the old/new train control system
Takashi KAWANO\(^\text{1}\), Tatsuya SIGETA\(^\text{2}\)  
\(^1\)East Japan Railway Company [JR East], Tokyo, Japan,  
\(^2\)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, Buntaroh 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
Fabien TURGIS[1], Pierre AUDIER[2], Quentin COUTADEUR[3], Cyril VERDUN[1] (IKOS, St Pierre des Corps, France, SNCF, St Pierre des Corps, France)

8:50  Utilizing Deep Learning to Manage Warning Signs of Air Conditioning Unit Malfunctions
Tomohiro TATEMATSU[1], Norishige TANI[1], Masahisa KAGEYAMA[1], Yasuyuki ISOBE[2], Shintaro TAKAHASHI[2], Yushi KAMÔ[3] (West Japan Railway Company [JR West], Osaka, Japan, Toshiba Digital Solutions Corporation, Kanagawa, Japan, Toshiba Infrastructure Systems & Solutions Corporation, Osaka, Japan)

9:10  Evaluation of an Automated Inspection System for Railcar Truck Components
Matthew WITTE[1], Monique Ferguson STEWART[2] (Transportation Technology Center, Inc. (TTCI), Pueblo, USA, U.S.DOT/Federal Railroad Administration, Washington D.C., USA)

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 HOPKINS (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?
Susana MORRETTO[1], Antonio B. MONIZ[1-3], Rosario MACARIO[3], Douglas D. K. ROBINSON[4] (Universidade NOVA de Lisboa (UNL), Lisbon, Portugal, Karlsruhe Institute of Technology (KIT), Karlsruhe, Germany, Technical University of Lisbon (IST), Lisbon, Portugal, Universite Paris-Est Marne-la-Vallee, Champs-sur-Marne, France)

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] (Central Queensland University, Adelaide, Australia, 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)

D1 8:30 - 9:50

OP_31: Service Quality and Reliability
Chair: Giovanni Luca GIACCO (Trenitalia, Italy)

8:30 Initiative to Achieve Zero Train Delays Caused by Flying Objects
Ayumi TAGUCHI, Kenichi ANDO (Kyushu Railway Company [JR Kyushu], Fukuoka, Japan)

8:50 A DTM-aided adaptive GNSS/INS navigation solution in railways
Chengming JIN, Jian WANG, Baigen CAI (Beijing Jiaotong University, Beijing, China)

9:10 PASSENGER SATISFACTION WITH THE COMMUTER TRAIN QUALITY: A COMPARISON OF STRUCTURAL EQUATION MODELS
Asal FARAJPOUR, Morteza BAGHERI (Iran University of Science and Technology, Tehran, Iran)

9:30 An Effect of Train Transport Stability under Staggered Commuting to Ease Overcrowding on Train Using Train Transport Simulation
Tomoya ONO, Hideyuki YOSHINO, Shigeaki ADACHI, Masahito KORESAWA (Tokyo Metro, Tokyo, Japan)

G409 8:30 - 9:50

OP_32: Pantograph and Catenary Interaction
Chair: Takamasa HAYASAKA (Railway Technical Research Institute (RTRI), Japan)

8:30 Vision-based measurement system of contact force for a pantograph with double pantograph head
Taiki YAMAMOTO[1], Yusuke WATABE[1], Seiji TABAYASHI[2], Tatsuya KOYAMA[2] (Meidensha Corporation, Tokyo, Japan, Railway Technical Research Institute, Tokyo, Japan)

8:50 A Contactless Measurement Method of Overhead Contact Wire Wear on Rolling Stock
Wei ZHOU, Hailiang 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] (SNCF Réseau, La Plaine Saint Denis, France, 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[2], David P. STOTEN[3] (Railway Technical Research Institute, Tokyo, Japan, Kyoto Institute of Technology, Kyoto, Japan, University of Bristol, Bristol, UK)
Thursday, October 31, 2019

Seminar Room 1 8:30 - 9:50

**IP_15: Sustainability**
Chair: Giulia COSTAGLI (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[2]  
  (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[1]  
  (1)SNCF Mobilités, Le Mans, France, (2)Taliano 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 YOSHIIKAWA[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[2], Maurice BECKER[3], Michael GELKE[2], Carla TERSCHLÜSEN[3], Adam KALUZA[1], Ingrid JOHANSSON[2], Jennifer WARG[2]  
  (1)DB Analytics, Frankfurt am Main, Germany, (2)TH Royal Institute of Technology, Stockholm, Sweden

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

OS_09: Global Vision for Railway Development
Organizers/Chairs: Boris LAPIDUS (UIC / RZD - Joint Stock Company "Russian Railways", Russia)
    Jerzy WISNIEWSKI (International Union of Railways (UIC), France)
    Dennis SCHUT (International Union of Railways (UIC), France)

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

12:15 The 12 Capabilities
    Martin BRENNAN[1], Ulrich MEUSER[2], Johan JONSSON[3] ([1]International Union of Railways (UIC), Paris, France,

12:35 SEESARI - the development of the transport system in South Eastern Europe
    Peter VERLIČ[4], Dennis SCHUT[5] ([4]Slovenian Railways / SEESARI, Slovenia,
    [5]International Union of Railways (UIC), Paris, France)

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, Yuya OIKAWA, Katsutoshi SHIOTA, Hiroyo 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 ROADCAP¹,², Marcus DERSCH¹, J. Riley EDWARDS³  
¹University of Illinois at Urbana-Champaign, Illinois, USA, ²Technical University of Munich, Munich, Germany

12:55  **Applicability of Synthetic Fibre Reinforced Concrete for railway sleepers**  
Dayani KAHAGALA HEWAGE¹, Christophe CAMILLE¹, Olivia MIRZA¹, Fidelis MASHIRI¹, Brendan KIRKLAND¹,  
Todd CLARKE²  
¹Western Sydney University, Sydney, Australia, ²BarChip 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 MARAIS¹,², Ni ZHU¹, Marion BERBINEAU³, David BETAILLE³  
¹Univ Lille Nord de France, IFSTTAR, COSYS, LEOST, Villeneuve d’Ascq, France, ²IFSTTAR, COSYS, Villeneuve d’Ascq, France, ³IFSTTAR, COSYS, SII, Bouguenais, France

12:15  **ERTMS ON CROSS BORDER LINES: ERTMS PLACE IN SERVICE ON ISELLE-DOMODOSSOLA LINE**  
Stefano MARCOCCIO, 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 NAKAMURA¹,², Nagateru IWASAWA¹,³, Nariya IWAKI³,², Koki IWAMOTO³,², Kunihiro KAWASAKI³,²,  
Nobuhiko SHIBAGAKI³,², Yosuke SATO³,², Masato FUJI³,², Ken-ichi KASHIMA³,², Atsushi KAMINO³,²,  
Tetsuya KAWANISHI¹,²,³  
¹Railway Technical Research Institute [RTRI], Tokyo, Japan, ²Hitachi Kokusai Electric, Tokyo, Japan, ³National Institute of Information and Communications Technology, Tokyo, Japan
Thursday, October 31, 2019

**D1** 11:55 - 13:15

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

Bettina DOETSCH[1], Francois HAUSMAN[2], Birgit MLIUS[2], Claudio MONTI[3], Jacques PORÉ[4], Salvatore SABINA[2]

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]

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]

**G409** 11:55 - 13:15

**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]

12:15 **Monitoring System for Station Platform from on Board for One-man Operation**
Tetsuya TAKEDA, Nobuhiro 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[1], Mako MURAKAMI[2], Satoru ITO[1], Toranori EDA[1], Toru NISHINO[2], Junichi HARADA[1]

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 RIODOLFI, Francesco DI FLAVIANO, Fabio SENESI, Marco RESTANTE (Rete Ferroviaria Italiana, Rome, Italy)

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

**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], Alok JAHAGIRDAR[1], Erik OXELGREN[1], Paul CHARBACH[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], Seiji TABAYASHI[1], Norihisa WATANABE[2]
(1)Meidensha Corporation, Shizuoka, Japan, (2)Tokyo 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[1]
(1)Ecole des Ponts ParisTech, Champs-sur-Marne, France, (2)Eurotunnel Group, Coquelles, 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[1], Marco D’ERRICO[1], Franco IACOBINI[2], Stefano ROSINI[2], Gilles MARIOTTI[2], Giuseppe FICCO[2], Daniele FILIPPETTO[2]
(1)Rete Ferroviaria Italiana, Rome, Italy, (2)SITAEL, Mola Di Bari, Italy, (3)Università degli Studi della Campania “Luigi Vanvitelli”, Caserta, Italy

Study on Quality Assessment of Catenary

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

A Condition-based Evaluation Method for Concrete Signal Poles

Shunsuke SHIMOTSUKI[1], Mizuki TSUNEMOTO[1], Toru IJIMA[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)
Thursday, October 31, 2019

Hall C  14:35 - 15:55  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**  14:35 - 15:55

**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 VOLTR[1], Cristian ULIANOV[1], Paul BATTY[2] (1)Newcastle University, Newcastle upon Tyne, UK,  
2)Grand Central Railway Company, UK)

**D5**  14:35 - 15:55

**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 CHEETHAM[1], Christophe CHEVALIER[2], Frédérique LARRARTE[3], Franziska SCHMIDT[5], Edouard DURAND[3],  
Philippe SERGENT[3], Philippe GONDRET[4], Sidoine de la ROQUE[2]  
1)SNCF Réseau, Paris, France,  
2)IFSTTAR, Marne la Vallée & Bouguenais, France,  
3)Cerema, Blois & Compiègne, France,  
4)Laboratoire FAST, Orsay, France,  
5)Vinci Autoroutes, Saran, France)

14:55  Scour risk management at bridges - A comparison of Japanese and French scoring methodologies -  
Tsuyoshi TAKAYANAGI[1], Edouard DURAND[2], Denis DAVI[3], Christophe CHEVALIER[3], Mark CHEETHAM[3],  
Naoto NAITO[5], Taisuke SANAGAWA[3], Kenji WATANABE[5]  
1)Railway Technical Research Institute [RTRI], Tokyo, Japan,  
2)CEREMA, Blois and Aix-en-Provence, France,  
3)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 JAROSZWESKI, 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,

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

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

14:55 Noise Control in Shift2Rail European Rail Research Project
Nezam SANEI[1], Siv LETH[2]
[1]Alstom Group, Paris, France,

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[2]
[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 CHO[1], Chanyoung LEE[2], Sunghyun PARK[3], Younggil CHOI[1], Hodam LEE[1]  
  ([1]KORAIL Institute, Daejeon, Korea, [2]Korea National University of Transportation, Uiwang, 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[3], Kazunao IDE[4]  
  ([1]Railway Technical Research Institute [RTRI], Tokyo, Japan, [2]Shimizu Corporation, 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[1]  
  ([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]  

- **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]  
  ([1]Siemens Mobility, Erlangen, Germany, [2]Siemens Mobility, Berlin, Germany)

- **Fault diagnosis for railway point machines based on sound analysis**  
  Yongkui SUN[1], Yuan CAO[1], Guo XIE[1], Tao WEN[1], Mingjun XIE[1]  
  ([1]Beijing Jiaotong University, Beijing, China,  
  [2]Xi’an University of Technology, Xi’an, China, [3]CRSC(Xi’an) Rail Transit Industry Group, Xi’an, China)
Thursday, October 31, 2019

Effect Verification of Repairing Method Using UFC for Upper Surfaces of Damaged Buckle Plate Girders

Mamoru FUKUMOTO[^1], Masayuki HASHIMOTO[^2], Hiroshi MITAMURA[^3], Kunitaro HASHIMOTO[^4]
[^1]West Japan Railway Company [JR West], Osaka, Japan,
[^2]Japan Construction Method and Machinery Research Institute, Shizuoka, Japan,
[^4]Kobe University, Hyogo, Japan

Study for Establishing Chloride Protection System for Rectangular Subway Tunnels

Yoshihiro MUTO[^1], Shinji KONISHI[^2], Hiroki NITTA[^2], Mitsunari ADACHI[^1]
[^1]Metro Rail Facilities, Tokyo, Japan,
[^2]Tokyo Metro, Tokyo, Japan

Hall C 16:15 - 17:15

Closing Ceremony