



Technical Programme

Tuesday 12th September

12:30 – 17:00 Site Visit to BPNL

18:00 – 19:30 Early Registration at the Novotel

Wednesday 13th September

07:30 – 08:30 Morning Registration

08:35 Symposium Chairman Welcome - Pierre Carlotti, Préfecture de police

08:40 Opening Keynote Address - Marc Tesson, Director International Networks and Research Animation, Center for Tunnel Studies
Presentation Title: PIARC's expertise at the service of the road tunnels community

SESSION 1: EQUIPMENT

Chairman: Rune Brandt – HBI Haerter, Switzerland

- | | | |
|-------|---|-----|
| 9.10 | Failures, flops and fumbles. The 'true' story of the ventilation of tunnels with jet fans
<i>K Witt, Witt and Sohn AG, Germany</i> | N/A |
| 9.30 | Design and verification of air supply nozzle for low discharge airflow velocity used in a specified condition
<i>T Hakozaki, C Inanobe, J Ishitoya, Metropolitan Expressway Company Limited; H Yanagi, ECHOPLAN Company Ltd, Japan</i> | 199 |
| 9.50 | The effects of solid barriers on the behaviour of smoke in fire events within ventilated tunnels
<i>F Chaabat, P Salizzoni, M Creyssels, University of Lyon, CNRS UMR 5509 Ecole Centrale de Lyon, INSA Lyon, Université Claude Bernard; A Mos, Centre d'Etudes des Tunnels, France</i> | 213 |
| 10.10 | Jet Fan Exhaust Stations – design, as-built verifications and life cycle cost analysis
<i>M Finsson, WSP, Sweden</i> | 229 |
| 10.30 | Exhibitors presentations | |
| 10.50 | Networking Refreshment break – Sponsored by egis | |



11.20 Keynote Address - Didier Marginedes, Vice President Blue Solutions
Presentation Title: Trends in urban mobility : BlueSolutions perspective

Session 2: AERODYNAMICS AND ACOUSTICS Part 1

Chairman: Mark Gilbey, WSP, UK

- | | | |
|-------|---|----|
| 11.50 | Pressures and velocities inside trains – Influence of inter-car connections
<i>A E Vardy, University of Dundee and Dundee Tunnel Research, UK; M Sima, MSiCo AB, Sweden</i> | 5 |
| 12.10 | Boundary layer development along high-speed trains in tunnels as possible cause for contact disturbances of pantographs
<i>S Uster, M Flueckiger, A Busslinger, P Reinke, S Nyfeler, T Wicht, HBI Haerter Ltd; M Raeber, AlpTransit Gotthard AG, Switzerland</i> | 25 |
| 12.30 | Influence of shaft:tunnel geometry on steep pressure waves
<i>H Wang, Southwest Jiaotong University, China; A E Vardy, University of Dundee and Dundee Tunnel Research, UK</i> | 41 |
| 12.50 | Assessment of the pressure load of cavities in a single-track tunnel by model-scale experiments and CFD simulation
<i>H Kühnelt, M Rudolph, Austrian Institute of Technology GmbH (AIT), Austria; D Heine, K Ehrenfried, Deutsches Zentrum für Luft- und Raumfahrt e.V. (DLR), Germany; F Saliger, Austrian Federal Railways (ÖBB), Austria</i> | 55 |
| 13.10 | Exhibitors presentations | |

15.00

Discussion Session

Chairman: Norman Rhodes, Consulting Engineer, USA

Autonomous, battery and fuel cell vehicles – The Tunnel Ventilation Response

Panel:

**Xavier Ponticq, Project Manager & CFD Specialist,
CETU**

Fathi Tarada, Managing Director, Mosen Ltd.

**Jean-Philippe Le Gac, Business Regulator CDA,
Valeo**

**Keith Brown, Director, Systems Interface
Management and Rail Control Systems,
SNC-Lavalin**

SESSION 3a: AIR QUALITY

**Chairman: Ignacio del Rey Llorente – TYPESA,
Tecnica y proyectos, S.A., Spain**

SESSION 3b: FUNDAMENTALS, MODELLING

**Part 1, Chairman: Norman Rhodes,
Consulting Engineer, USA**

**Holistic approach to improve air quality and provide
smoke management for Chicago Union Station and
tunnels using hybrid longitudinal and
semi-transverse ventilation**

*J Ko, I Maeviski, Jacobs Engineering; J Grella, HNTB
Corporation, USA*

105

**15.40 Automated coupling of standard one-dimensional
and three-dimensional flow solvers for simulation
of metro ventilation systems**

*Y Scott Shi, C Fleming, C Sejeikan, E Wong, M
Samimi, M Duckham, SNC-Lavalin Inc., Canada*

317

**Biofiltration of road tunnel discharge – An
experimental study**

*B Vidal, J F Burkhart, CETU (Tunnels Study Centre); J F
Petit, P Barbe, C Neaud, CEREMA (Centre for Research
and Expertise on Risks, the Environment, Mobility and
Planning); T Jacquet, B Goussebayle, PHYTORESTORE;
D Muller, CNRS, Université Claude Bernard; T Chardiny,
F Faugier, ENGIE AXIMA, France*

119

**16.00 Full scale fire experiments for smoke propagation
investigations in long rail tunnels**

*P Sturm, T Nöst, Graz University of Technology; J
Rodler, D Fruhwirt, P Föbsteitner, FVTmbH Graz; T
Thaller, J Kari, ÖBB Infrastruktur AG, Austria*

325

16.20 Networking Refreshment break – Sponsored by egis



**Temporary tunnel ventilation for construction and
fitting out of large metro projects**

*J Bristow, S Dar, D Eckford, Mott MacDonald; T Kelly,
Costain, UK*

133

16.50 Critical velocity in inclined tunnels

*L Jiang, M Creyssels, P Salizzoni, R Perkins,
University of Lyon, CNRS UMR 5509 École Centrale
de Lyon, INSA Lyon, Université Claude Bernard; A
Mos, Centre d'Etudes des Tunnel, France*

339

**Ventilation control of unidirectional urban tunnels
with on- and off- ramps**

*S Abe, T Matsumoto, I Nakahori, Sohatsu Systems
Laboratory Inc., Japan; A E Vardy, University of Dundee,
UK*

149

**17.10 Effect of meteorological conditions on smoke
distributions in a railway tunnel**

M Hieke, DB Systemtechnik GmbH, Germany

351

**Diesel locomotive considerations for long
passenger rail tunnels**

A Louie, S Li, S Marsico, WSP, USA

167

**17.30 Implementation of boundary conditions in a CFD
model of a semi-transverse ventilation system**

J Prince, J Alexander, M Tabarra, Arup, UK

397

**Developing dynamic boundary conditions for
modelling moving diesel locomotives in long
passenger rail tunnels**

S Marsico, S Li, A Louie, WSP, USA

181

17:50

18:10 -19.40 Welcome Reception - Sponsored by Zitron



Thursday 14th September

08:40 Opening Keynote Address - Alain Chabert, Deputy general director, Tunnel Euralpin Lyon Turin
Presentation Title: New Lyon-Torino railway line : ventilation layouts of Mont-Cenis basis tunnel

SESSION 4: THERMAL COMFORT IN UNDERGROUND FACILITIES

Chairman: Silas Li - WSP, USA

- 9.10 The impact of groundwater flow on tunnel heat transfer**
J A Thompson, C J Graham, WSP, UK 695
- 9.30 Air quality and long term thermal prediction in complex underground systems: application to the Grand Paris Express metro**
L Agnese, Setec TPI; G Baudienville, Setec ITS; L Fournier, Egis Tunnel; B Soler, Société du Grand Paris, France 711
- 9.50 Global assessment to confirm the need of tunnel cooling in modern automatic metro under very hot climate and way of optimization: application on the Doha metro**
P Gosset, M Gourdache, S Vassoudevane, SYSTRA, France; E Musluoglu, QATAR RAIL, Qatar 725
- 10.10 Application of Model-based Predictive Ventilation Control (MPVC) to misty haze prevention in tunnels**
T Azuma, A Ichikawa, M Akaishi, East Nippon Expressway Company Limited, Japan; S Azuma, Y Sasagawa, Nippon Expressway Research Institute Company Limited; M Yuhara, AMEC Consultants Co. Ltd, Japan 741
- 10.30 Exhibitor Presentations**
- 10.50 Networking Refreshment break**

11.20 Keynote Address - Prof Pierre Sagaut, Laboratoire de Mécanique, Modélisation et Procédés Propres, Aix-Marseille Université
Presentation Title: Lattice-Boltzmann simulations for pollutant transport and Urban Physics

11.50 Plenary to parallel stretch break

SESSION 5a: GUIDELINES, RISK ANALYSIS Chairman: Eleftheria Aini - VINCI CGP Hellas, Greece

- Risk and reward in delivery of rail tunnel ventilation systems**
M Gilbey, WSP; I Sweetland, YYSS Ltd, UK; G English, Seattle Fire Department, USA 443
- Risk assessment of fire emergency ventilation strategies during traffic congestion in unidirectional tunnels with longitudinal ventilation**
B Kohl, O Senekowitsch, ILF Consulting Engineers, Austria; I Nakahori, T Sakaguchi, Sohatsu Systems Laboratory, Japan; A E Vardy, University of Dundee, UK 457
- Transient aerodynamic analysis to support safe evacuation strategy for rail tunnels separated by a single wall**
G Weingertner, H Cheong, J Alexander, M Tabarra, Arup UK 473
- Benefits from longitudinal ventilation at fires in bidirectional road tunnels without emergency exits**
R Brandt, HBI Haerter, Switzerland 487

SESSION 5b: FUNDAMENTALS, MODELLING Part 2, Chairman: Norman Rhodes, Consulting Engineer, USA

- 11.55 Critical velocity – from pool fire to train fire**
Q Zhang, GEODATA Engineering SpA, Italy 373
- 12.15 SES software validation studies – is SES keeping up with the times?**
S Fiedler, N Eslaminasab, A Golpaygan, J Habimana, Hatch Corporation, Canada 389
- 12.35 Pressure drop caused by a fire in a tunnel**
P Carlotti, Laboratoire central de la Préfecture de Police; P Salizzoni, University of Lyon, CNRS UMR 5509 École Centrale de Lyon, INSA Lyon, Université Claude Bernard, France 363
- 12.55 An experimental study of the interaction of a tunnel flow with an atmospheric boundary layer**
T Kubwimana, University of Lyon, CNRS UMR 5509 École Centrale de Lyon, INSA Lyon, Université Claude Bernard and Centre of Expertise on Tunnels (CETU); P Salizzoni, P Méjean, M Marro, University of Lyon, CNRS UMR 5509 École Centrale de Lyon, INSA Lyon, Université Claude Bernard, France 411

13.15 Networking Lunch

Compartmentation for train passenger fire safety
K J Harris, R Moreno, WSP, USA 499

Risk-informed specification of passenger train design fires for tunnel ventilation system design
I Bowman, Mott MacDonald, Canada; D Tooley, Mott MacDonald, UK; P Sabapathy, Aurecon Group, Australia 513

15.25 Change of Sessions Stretch Break

SESSION 6a: FIRE AND SMOKE DESIGN
Chairman: Natasha De los Rios - Mott Macdonald, USA

Effect of intercarriage doors on tunnel annulus velocity during tunnel ventilation operations
P Sabapathy, C Biotto, E Bennett, Aurecon Group, Australia 247

Can the fixed fire-fighting system protect tunnel final lining in case of a major fire event?
I Maevski, N Chen, Y Li, R Klein, Jacobs Engineering, USA 263

Impact of platform edge doors on ventilation requirements of underground transit systems
A Golpaygan, N Eslaminasab, J Zhang, S Fiedler, J Habimana, Hatch, Canada 275

16.30 Networking Refreshment break

Flow reversal in case of fire in the proximity of the tunnel portal
R Gertl, J Mütterlein, D Stix, ILF Consulting Engineers Austria GmbH, Austria 299

Concept using water mist systems in ventilation ducts for improving performances of smoke exhaust fans in semi-transverse ventilation systems
F Waymel, L Plagnol, Egis Tunnels, France N/A

Symposium Dinner Boat Cruise

Kindly sponsored by WSP, the gala dinner will be hosted aboard the Hermès Restaurant Boat. Admire the most beautiful urban landscapes.gship of the fleet.

Coach pick up times:
Novotel: 19:00 | Ibis: 19:30

Coach drop off times:
Novotel: 24:00 | Ibis: 23:30

Best Paper Award - Sponsored by HBI Haerter

14.45 Thermophysical justification of new ventilation patterns for double-track subway tunnels in cold climate
S G Gendler, St. Petersburg Mining University; Eu A Savenkov, Open joint – stock company “LenMetroGiproTrans”, Russia 427

SESSION 6b: PROJECT PRESENTATION
Chairman: Mohammad Tabarra - ARUP, UK

15.30 Using a real time simulator in a large and complex road tunnel for time and cost savings
L Elertson, Swedish Transport Administration, Sweden 529

15.50 The Marmaray project – an intercontinental tunnel
I Sweetland, AVR / Yyss Ltd; M Gilbey, AVR / WSP Ltd, UK; A Faik Ascı, DLH/AYGM, Turkey 543

16.10 Ventilation and safety concept of the emergency stop station and the cross passages of the 33 km long Koralm rail tunnel
M Bacher, P Sturm, Graz University of Technology; D Fruhwirt, J Rodler, FVTmbH; H Steiner, J Sampl, ÖBB Infrastruktur AG, Austria 559

17.00 Comparison of numerical models of the analysis of ventilation system’s performance in tunnels: The Craeybeckx tunnel
M Pachera, M Lappano, X Deckers, Fire Engineered Solution Gent, Belgium N/A

17.20 Ventilation of a geological disposal facility – Nuclear ventilation
D Abi-Zadeh, Arup; R Hardy, RWM, UK 575



Dress Code: Business/Casual

Friday 15th September

SESSION 7: RETROFITTING OF TUNNELS

Chairman: Igor Maevski - Jacobs Engineering, USA

- 8.40 Replacement of a jet fan tunnel ventilation system in an operational road tunnel
S Johnson, E Draper, D Ajewole, Mott MacDonald Ltd, UK 647
- 9.00 Innovative upgrade of a transverse ventilation system to manage a 100 MW design fire
M Bilson, P Kumar, S Marsico, WSP, USA 663
- 9.20 Validation of 3D turbulent CFD modelling of retrofitting works ventilation with experimental measurements for a rail tunnel
N A Tonello, Y Eude, Renuda, UK; E Béraud, SNCF RÉSEAU, France 677
- 9.40 Exhibitor Presentations

10.00 Networking Refreshment break

10.30

Debate Session

Chairman: Ian Sweetland, Yyss Ltd., UK

“It ought not be necessary for fire responders to understand tunnel design”
Your speakers need YOUR vote!

“For”

Mr Mark Gilbey, Technical Director, Rail, WSP

Lieutenant Colonel Laurent Fuentes, Paris Fire
Brigade

“Against”

Dr Fathi Tarada, Managing Director, Mosen Ltd.

Dr Marco Bettelini, Member of Management Board,
Amberg Fire and Safety

Debate sponsored by mosen



Session 8: RESPONSE TO INCIDENT, TESTING OF SYSTEMS

Chairman: Ian Sweetland, Yyss Ltd., UK

- 11.30 Tunnel ventilation and emergency responders
G English, Underground Command and Safety, LLC, USA 593
- 11.50 Re-validation of airflow and tunnel air velocities in working tunnels in Delhi Metro Rail Corporation, India
A K Garg, L Kumar, S Arora, Delhi Metro Rail Corporation Limited, India 607
- 12.10 Report on the collapse accident of the ceiling boards for transverse ventilation at the Sasago Tunnel
A Mizuno, Kogakuin University, Japan 621
- 12.30 The development of an emergency tunnel ventilation strategy for the WMATA system
N de los Rios, Mott MacDonald; T O'Dwyer, S Russo, AECOM; P Petersen, WMATA, USA 631
- 12.50 Exhibitor Presentations
- 13.10 Networking Lunch

Session 9: AERODYNAMICS AND ACOUSTICS Part 2

Chairman: Alan Vardy - University of Dundee & Dundee Tunnel Research, UK

- 14.40 New approach to assess aural pressure comfort in high-speed trains running on German high-speed lines with single-track tunnels
P Claus, P Deeg, T Tielkes, DB Systemtechnik GmbH, Germany 71
- 15.00 Acoustic modelling of micro-pressure waves emitted from high-speed railway tunnels with vented tunnel hoods
T Miyachi, T Fukuda, Railway Technical Research Institute, Japan; M Hieke, C Gerbig, T Tielkes, DB Systemtechnik GmbH, Germany 79
- 15.20 Integration of tunnel ventilation and train control systems
M Duckham, K Brown, C F Fleming, SNC-Lavalin, Canada 93
- 15.40 Symposium Chairman Closing Summary - Pierre Carlotti, Préfecture de police
- 15.50 Closing Refreshment break

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