

Final Programme - Wednesday 14th November 2018

07:30

Morning registration

08:30

Welcome desk, 1st floor conference suite

08:45

Conference Chairman Welcome

Arris S Tijsseling, Assistant Professor, Eindhoven University of Technology, The Netherlands

Arris received an MSc in Applied Mathematics (1986) and a PhD in Civil Engineering (1993) from Delft University of Technology in The Netherlands. He worked on water-hammer and fluid-structure interaction in pipe systems from 1986 to 1993 at Delft Hydraulics and Delft University, and from 1993 to 1999 at the University of Dundee in Scotland. Since 1999 he has been an Assistant Professor at Eindhoven University of Technology. His research interests include water-hammer, fluid-structure interaction, multi-phase transients, sloshing, and the history of science.



08:50

Opening Keynote Address

Professor Joseph Lee, Hong Kong University of Science and Technology, Hong Kong

Prof. J.H.W. Lee is Senior Advisor to the President and Vice-President for Research and Graduate Studies (2010-2016), the Hong Kong University of Science and Technology (HKUST). He is the Chief Editor of the Journal of Hydro-environment Research (JHER) and past Vice-President of the International Association for Hydro-environment Engineering and Research (IAHR). Prof. Lee is recognized internationally for his contributions in hydraulic engineering and has received many awards that include the ASCE Hunter Rouse Hydraulic Engineering Award (2009), the Hilgard Hydraulic Prize (2013), the 2010 China State Scientific and Technological Progress Award (Second Class, PI), and the Croucher Senior Research Fellowship (1998). He is a Fellow of the Royal Academy of Engineering of the UK, and past President of the Hong Kong Academy of Engineering Sciences. He was bestowed Honorary Membership by IAHR in 2015.



Presenting; Water Engineering and the ecological civilisation

09:10

Session 1 - INDUSTRIAL CASE STUDIES

Chairman: Dr Steve Murray, BP Exploration Ltd., UK

09:10

Slower valves closures cause larger pressures!

I T Telci, Bechtel Oil Gas & Chemicals, USA; S R Koirala, City of Austin, USA; F A Locher, Bechtel NS&E, USA **591**

09:25

Rejected take-off engine generated pressure surges and the prediction of surge propagation along an aircraft wing fuel system

D Morrison, M Sandford, Airbus Operations Ltd, UK **603**

09:40

Case study: Hydraulic modelling and field verification on bulk transfer schemes in Southern Africa

K Prinsloo, C2D Consulting (Pty) Ltd, South Africa **613**

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09:55 **Surge transients due to check valve closure in a municipal water pumping station**
D Lozano Solé, R Bosch Segarra, Aquatec Proyectos para el Sector del Agua SAU (SUEZ Group), Spain; T W Walters, Applied Flow Technology, USA 627

10:10 **Exhibitors Presentation – BHR**

BHR Group
EXPERTS IN FLUID ENGINEERING

10:15 **Exhibitors Presentation – Deltares**

Deltares
Enabling Delta Life

10:20 **Exhibitors Presentation – BLACOH**

BLACOH™
SURGE CONTROL

10:25 **Conference Group Photograph**

10:30 **Refreshment break**

11:10 **Session 2 – ENTRAPPED AIR**

Chairman: Dr Anton Bergant, Litostroj Power d.o.o., Slovenia

Keynote Address

Laurent Brosset, Gaztransport & Technigaz, France

Laurent Brosset graduated from ECN in 1984 as a mechanical engineer specialized in naval hydrodynamics. He joined IRCN in 1986 where he was appointed head of the Research department in 1998 supervising many research projects covering both hydrodynamics and structures. After IRCN merged with the French research company Principia in 2001, he was appointed head Of the Research department for Hydrodynamics in Principia Marine. He joined GTT, the French designer of membrane containment systems for LNG tanks, in 2003 where he has been working since as a sloshing expert in charge of the upstream research on sloshing physics. He contributed to the evolution of the experimental modeling of sloshing (sloshing model tests) and of the methodology for sloshing assessment of LNG tanks on floating structures that enabled, among others, the validation of Qflex (220 000 m³) and Qmax (266 000 m³) series of LNG carriers for Qatar gas. He was involved in many large R&D JIPs on sloshing physics such as AZURE, SLOSHEL and more recently SLING. He received twice (2010, 2012), together with co-authors from MARIN, the best paper award from International Ocean and Polar Engineering Conference (ISOPE).



**Presenting;
Physics of wave
impacts in LNG
tanks on floating
structures**

Presentation only

11:40 **The influence of air pressurization in stormwater systems flows: experimental and numerical assessment**
J Kaiber da Silva, R D Maestri, A L O Borges, Federal University of Rio Grande do Sul, Brazil; J G Vasconcelos, Auburn University, USA 89

11:55 **Pressure wave behaviour due to entrapped air in hydraulic transient events**
J P Ferreira, D I C Covas, Universidade de Lisboa, Portugal; E Ghezzi, M Ferrante, University of Perugia, Italy 105

12:10 **Modeling complex boundary conditions during transient two-phase mixed flow in storm water systems (SWS)**
M Fuamba, M Daynou, S Bousso, A Rokhzadi, Polytechnique Montreal, Canada 117

12:25 **Exhibitors Presentation – AFT**

AFT
Applied Flow Technology

12:30 **Exhibitors Presentation – Dynaflo Research Group**

**DYNAFLOW
RESEARCH
GROUP.**

12:35 **Lunch**

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Session 3a - HYDRO POWER

Chairman: Professor Hanif Chaudhry,
University of South Carolina, USA

Session 3b – FUNDAMENTALS

Chairman: Dr Nigel Johnston,
University of Bath, UK

A selective literature review of vortex rope in turbine draft tubes and the associated induced pressure pulsations in the conveyance system

Y Chen, J Zhou, Hohai University, China; B Karney, University of Toronto, Canada **503**

13:35

Influence of static pressure on the damping of pressure waves in rocket engine feed lines

S Klein, T Traudt, C Bombardieri, M Oschwald, German Aerospace Center, Germany **411**

The effect of brook intakes, downstream surge tanks and reservoir levels on surge tank stability

L Pitorac, D Bardini, L Lia, Norwegian University of Science and Technology, Norway; K Vereide, Norwegian University of Science and Technology and Sira-Kvina Power Company, Norway **521**

13:50

Analysis of pulsating flow in a large-scale pipeline close to resonance conditions

A Bergant, Litostroj Power d.o.o. and University of Ljubljana, Slovenia; J Gregorc, University of Ljubljana, Slovenia; T Wahl, ETH Zurich, Switzerland; K Urbanowicz, West Pomeranian University of Technology, Poland **423**

Hydraulic transients in pipe networks caused by micro-turbines

D Ferras, IHE Delft Institute for Water Education, The Netherlands; A McNabola, Trinity College Dublin, Ireland **535**

14:05

A modal-based analysis of pipeline networks with applications to time-domain simulation

A C Zecchin, The University of Adelaide, Australia; S H Kim, Pusan National University, Korea; M Ferrante, The University of Perugia, Italy **439**

First principles approach linear model for hydraulic turbines suitable for use in available simulation platforms

B Svingen, NTNU and Hymatek Controls, Norway; T K Nielsen, NTNU, Norway **549**

14:20

Reflections on the acoustic wave propagation speed in homogeneous two-phase flow

A Malekpour, Innovative Hydraulic Group Inc., Canada; B W Karney, University of Toronto, Canada; D McPherson, HDR Inc., USA **455**

An investigation of air inflow into hydropower conduits during emergency closure

F Sadeque, University of British Columbia and BC Hydro, Canada; H Charrette, EPFL, Switzerland; Z Shawwash, University of British Columbia, Canada **565**

14:35

Comparing CFD and 1-D solvers for the classic laminar water-hammer event in a pipe-reservoir system, perspectives on energy transformations and wave reflection

S Mandair, B W Karney, University of Toronto, Canada; R Magnan, J-F Morissette, Institut de recherche d'Hydro-Québec, Canada **471**

Mitigation of pressure pulsations of a small hydro pit turbine

M Bruns, Voith Hydro Holding GmbH & Co. KG, Germany; L Cosmai, Voith Hydro S.r.l., Italy **581**

14:50

Applicability of the Lattice Boltzmann Method to the simulation of pressure surges of liquid nitrogen

T Traudt, S Schlechtriem, German Aerospace Centre (DLR), Germany **487**

14:50 Refreshment Break

Session 4a – AIR VESSELS AND CURTAINS

Chairman: Belinda Madin, BSE,
Australia

Session 4b - SIGNAL ANALYSIS, FAULT DETECTION, BIG DATA

Chairman: Professor Stephen Beck,
University of Sheffield, UK

Control of dynamic peak loads with air bubble curtain

I Szeredi, Candidate of Technical Sciences, MVM senior strategy expert (retired), Hungary **31**

15:35

Big data and “democratization” of transient monitoring

B Cliché, Digital Utility, France

Presentation only

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Transient thermodynamic processes in air chambers with a gas cushion for surge protection

F Haakh, Zweckverband Landeswasserversorgung, Germany 47

15:50

Inverse transient analysis using the head-based method of characteristics with a flexible grid: a laboratory verification

C Zhang, J Gong, A R Simpson, M F Lambert, A C Zecchin, The University of Adelaide, Australia 785

Comparison of the extended rational heat transfer model with 3D simulations

S van der Zwan, S L Kooreman, Deltares hydraulics for industry and infrastructure, The Netherlands 65

16:05

Regularization for pipeline impulse response extraction with least square deconvolution

X Wang, M S Ghidaoui, Hong Kong University of Science and Technology, Hong Kong, China; P J Lee, University of Canterbury, New Zealand 795

CFD and 1D simulation of transient flow effect on air vessel

M Besharat, H M Ramos, University of Lisbon, Portugal; O E Coronado-Hernández, Universidad Tecnológica de Bolívar, Colombia; V S Fuertes-Miquel, Universitat Politècnica de València, Spain; M T Viseu, Laboratório Nacional de Engenharia Civil (LNEC), Portugal 73

16:20

Comparison of probabilistic modelling techniques for transients in water distribution networks

E Kazemi, R Collins, University of Sheffield, UK 805

16:35 **Stretch break**

16:45 **Session 5 – Open Discussion**

“Data mining is currently useless”

Led by:

Dr Steve Murray, BP Exploration Ltd., UK

&

Professor Mohamed Ghidaoui, Hong Kong University of Science and Technology, China

17:15 **Close of day one conference**

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08:45 **Session 6 – FAULT DETECTION**

Chairman: Sarah Jones, Mott MacDonald Ltd., UK

08:45

Keynote Address

Dr. Jim C. P. Liou, University of Idaho, USA

Dr. Jim C. P. Liou is a Professor of Civil Engineering at the University of Idaho, USA. His education includes a BS from National Taiwan University, a MS from University of Idaho, and a Ph.D. from University of Michigan. He first became interested in hydraulic transients while at Michigan studying under Professor Streeter and Professor Wylie. After Michigan, he worked for Bechtel Inc (3 yrs) and for Stoner Associates Inc (7 years) before returning to Idaho. Hydraulic transients have been the focus of his teaching, research, and consulting. With Professor Wylie, they have been giving a two-day water hammer short course to practicing engineers for American Society of Civil Engineers (ASCE) twice yearly since 2001. Dr. Liou has worked on transients in water, natural gas, LNG, oil, and nuclear power sectors. His work on leak detection of petroleum products pipelines is widely used and has influenced the US federal regulation on hazardous liquid pipelines. The highlights of his professional activities includes serving as the chair of the hydromechanics committee of the Hydraulics Division of ASCE, and the organizer and co-chair (with the Japanese Society of Mechanical Engineers) of two International Water Hammer symposia.



**Presenting;
Reliable pipeline
leak detection**

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09:15	Characterization of transient pressure traces due to the effects of different anomalies and features in water pipelines <i>J Bohorquez, A Simpson, M Lambert, The University of Adelaide, Australia</i>	151
09:30	Explanation for the frequency shift pattern of non-uniform blocked pipeline systems from an energy perspective <i>T C Che, H F Duan, B Pan, The Hong Kong Polytechnic University, Hong Kong SAR, PR China; P J Lee, The University of Canterbury, New Zealand; M S Ghidaoui, The Hong Kong University of Science and Technology, Hong Kong SAR, PR China</i>	171
09:45	Keynote Address Professor Mohamed Ghidaoui, Hong Kong University of Science and Technology, China <p>M.S. Ghidaoui is Chair Professor in the Department of Civil and Environmental Engineering at the Hong Kong University of Science & Technology (HKUST). His general interests are in the fields of hydraulics, water resources and environmental fluid mechanics. In particular, unsteady friction and turbulence in waterhammer; defect detection in pipes using waterhammer (transient) waves; numerical modelling of surface and closed conduit flows; and stability of shallow shear flows. Currently, he leads a strongly-international large-scale theme-based project on smart urban water supply systems (Smart UWSS http://smartuws.ust.hk/). He is the editor of the Journal of Hydraulic Research, IAHR and served as its associate editor for 15 years. He is also an associate editor of the Journal of Hydraulic Engineering, ASCE; and the Journal of Hydro-environment Research, IAHR-APD. He is an editorial board member of the Theoretical & Applied Mechanics Letters (TAML), Chinese Academy of Sciences and The Chinese Academy of Theoretical and Applied Mechanics and he served as an advisory board of the Journal of Hydroinformatics for 12 years. He is the chair IAHR's Fluid Mechanics Committee. He is a founding member of the IAHR Hong Kong Chapter and served as its chair over 10 years ago. His awards include the Arthur Ippen Award, IAHR; the Albert Berry Memorial Award, American Water Works Association; and Hilgard Award for best paper (runner-up), Journal of Hydraulic Engineering, ASCE. He has received two teaching excellence awards from the school of engineering at HKUST.</p>	 <p>Presenting; Time reversal of pressure surges: from physics to defect detection <i>Presentation only</i></p>
10:15	Refreshment Break	
11:00	Session 7 – INDUSTRIAL CASE STUDIES Chairman: Steve Murray, Black & Veatch Ltd., UK	
11:00	Modeling of transient pneumatic events in a combined sewer overflow storage tunnel system <i>P Klaver, LimnoTech, USA; K Robinson, City of Portland, Oregon Bureau of Environmental Services, USA; D Collins, David J Collins Engineering, USA</i>	645
11:15	Numerical investigation of reciprocating valve characteristics on pressure pulsations <i>W Schoemakers, F Bos, E J Lingen, Dynaflo Research Group, The Netherlands</i>	659
11:30	Surge mitigation in a marine fuel oil terminal <i>D Witte, Purple Mountain Technology Group, USA; D Jackson, Sealaska, USA; T Walters, Applied Flow Technology, USA</i>	677
11:45	A case study of hydraulic design of an undulating sewage pumping main <i>A Alidai, D J Mitchell, S Stanford, Atkins - Member of the SNC Lavalin Group, UK</i>	691
12:00	Case analysis on surge problems and further updating design of a throttled surge tank <i>J Zhou, Y Chen, F Cai, Hohai University, China</i>	701
12:15	Smart use of topography in surge mitigation <i>M O Al Dajani, P H Leruth, M Al Ali, Abu Dhabi Transmission and Despatch Company (TRANSCO), UAE</i>	715
12:30	Lunch	

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Session 8a - PUMPS, TURBINES AND VALVES

Chairman: Dr Bjørnar Svingen, Hymatek Controls, Norway

Session 8b - FLUID STRUCTURE INTERACTION

Chairman: Dr Anton Heinsbroek, Stichting Deltares, The Netherlands

Modelling valve behaviour in unsteady conditions
J P Ferreira, N M C Martins, D I C Covas, Universidade de Lisboa, Portugal 729

13:30

The influence of pipe support stiffness on pressure transients in pipe coils: An experimental investigation

L-D Nguyen, University of Science and Technology (UST), Republic of Korea; M Kim, T Kim, K Do, B Choi, University of Science and Technology (UST) and Korea Institute of Machinery and Materials (KIMM), Republic of Korea 351

Unappreciated challenges in applying four quadrant pump data to waterhammer simulation part 1: fundamentals
T W Walters, S A Lang, D O Miller, Applied Flow Technology, USA 741

13:45

Effect of structural vibration in the propagation of high-frequency waves through a fluid-filled elastic pipe

G Grigoropoulos, M Louati, M S Ghidaoui, E G Dimitrakopoulos, Hong Kong University of Science and Technology, Hong Kong 365

Unappreciated challenges in applying four quadrant pump data to waterhammer simulation part 2: application examples
T W Walters, S A Lang, D O Miller, Applied Flow Technology, USA 755

14:00

Structural response under transient load combination

M Simão, H M Ramos, Universidade de Lisboa, Portugal 381

Pump-turbine four-quadrant characteristics model for analysis of transient operation
I Szeredi, Candidate of Technical Sciences, MVM (Hungarian Power Companies), senior strategy expert (retired), Hungary 771

14:15

Fluid-structure interaction in pipelines with anchor blocks against longitudinal movement

D Ferras, IHE Delft Institute for Water Education, The Netherlands; P A Manso, A J Schleiss, École Polytechnique Fédérale de Lausanne, Switzerland; D I C Covas, Universidade de Lisboa, Portugal 393

14:30 Refreshment Break

Session 9a - SURGE MITIGATION

Chairman: Sam van der Zwan, Deltares, Delft, The Netherlands

Session 9b - TRANSIENT MULTIPHASE FLOW

Chairman: Dr Jose Vasconcelos, Auburn University, USA

Exploring surge protection strategies: system modification, operational considerations, surge protection devices, emergency control procedures and inter-systems protection
B S Jung, Tebodin Middle East, UAE; B W Karney, University of Toronto, Canada 821

15:00

Multiphase fluid hammer during priming operation: comparative analysis between water and liquid nitrogen

J-B Gouriet, Z Petro, J-M Buchlin, von Karman Institute for Fluid Dynamics, Belgium; J Steelant, ESTEC-ESA, The Netherlands 893

Transient analysis of sewer rising mains
J Amorim, A Shimmin, M Toscano, Mott McDonald Limited, UK 833

15:15

A Finite-Volume approach for water-hammer events with column-separation

F Daude, EDF Lab Paris-Saclay and Université Paris-Saclay, France; P Galon, Université Paris-Saclay, France 909

Smaller air chambers through consideration of transient heat transfer in the pressure surge calculation? Results from comparison calculations
F Haakh, M Veit, Zweckverband Landeswasserversorgung, Germany 851

15:30

Experimental measurements of momentum changes at hydraulic jump in a transparent horizontal pipe

K Kaur, I Annus, J Laanearu, Tallinn University of Technology, Estonia 925

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Using water hammer software to model extended period simulation and surge analysis in a water supply network

M Toscano, L Henriques, D Steel, Mott MacDonald Limited, UK 865

15:45

Two-phase CFD modelling of air-water flow transition in a horizontal circular pipe and comparisons with experimental results

J Laanearu, K Kaur, Tallinn University of Technology, Estonia 937

Experimental assessment of pressure pulsations and transient characteristics of a 1400 m pipe line

I K Vilberg, Flow Design Bureau AS and Norwegian University of Science and Technology, Norway; M Kjeldsen, Flow Design Bureau AS, Norway; B Svingen, T K Nielsen, Norwegian University of Science and Technology, Norway 881

16:00

A parametric sensitivity analysis of numerically modelled piston-type filling and emptying of an inclined pipeline with an air valve

O E Coronado-Hernández, Universidad Tecnológica de Bolívar, Colombia; V S Fuertes-Miquel, Universitat Politècnica de València, Spain; M Besharat, H M Ramos, University of Lisbon, Portugal 949

16:15 **Stretch Break**

16:30 **Session 10 - Discussion Session**

Chairman: Martin Hamilton, Spectrum Fluid Dynamics, UK

Making the world a safer and better place – a plea for more data, validation cases and guidelines for waterhammer simulation

T W Walters, Applied Flow Technology, USA; G G Orioux, Q Li, L Thomson, Enbridge Pipelines Inc, Canada 961

16:45 **Discussion topic “Global Codes and Guidelines”**

Led by

Paul-Henri Leruth, TRANSCO, UAE

&

Professor Bryan Karney, University of Toronto, Canada

17:15 **Close of day two conference**

Conference Dinner at Château LAFITTE

www.chateau-lafitte.fr

Coaches depart The Pullman Hotel Lobby at 18:30



Dress Code; smart/casual

Best Paper Award Sponsored By



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Session 11a – FAULT DETECTION

Chairman: Dr Dídía Covas, IST -

Technical University of Lisbon, Portugal

Session 11b – FLUID AND STRUCTURAL DAMPING

**Chairman: Professor Helena Ramos, IST -
Technical University of Lisbon,
Portugal**

Leak detection in a long pipe system

H Alharbi, S B M Beck, R P Collins, University of Sheffield, UK 187

09:00

Acceleration-dependent unsteady friction revisited

A E Vardy, University of Dundee, UK 265

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Correlation of post-burst hydraulic transient noise for pipe burst/leak localisation in water distributions systems

J Gong, S T N Nguyen, M F Lambert, A Marchi, A R Simpson, A C Zecchin, The University of Adelaide, Australia; M L Stephens, South Australian Water Corporation, Australia 201

09:15

Comparing analytical solutions for unsteady laminar pipe flow

K Urbanowicz, M Firkowski, West Pomeranian University of Technology, Poland; A Bergant, Litostroj Power d.o.o., Slovenia 283

Multiple defects detection and characterization in pipes

F Zouari, M Louati, E Blåsten, M S Ghidaoui, Hong Kong University of Science and Technology, Hong Kong 217

09:30

Effect of creep compliance derivative in modeling water hammer in viscoelastic pipes

K Urbanowicz, M Firkowski, West Pomeranian University of Technology, Poland 305

Wave-defects interaction in a simple pipe system

M Louati, M S Ghidaoui, Hong Kong University of Science and Technology, Hong Kong; M M Tekitek, University of Tunis-Manar, Tunisia 233

09:45

A frequency-domain transient-based method for the analysis of viscoelastic parameters of plastic pipes

B Pan, H F Duan, T C Che, The Hong Kong Polytechnic University, Hong Kong SAR, PR China; S Meniconi, B Brunone, The University of Perugia, Italy 325

Numerical investigation of high-frequency wave-leak interaction in water-filled pipes

Z Lai, Zhejiang University of Technology, China; M Louati, M Ghidaoui, Hong Kong University of Science and Technology, Hong Kong, China 251

10:00

Field measurements and theoretical modeling of hydraulic transients in HDPE pipeline with PRV interaction

H C Yan, M Y Lam, J H W Lee, Hong Kong University of Science and Technology, Hong Kong, China 339

10:15 Refreshment break

11:00 Session 12 – ACCIDENTS AND INCIDENTS

Chairman: Dr Peter Glover, Peter Glover Consulting Ltd., UK

11:00 **Litigation Cases related to Water Hammer Failures**

H Chaudhry, University of South Carolina, Columbia

Presentation only

11:20 **Owning up to our misbehaving systems: the complex and multifaceted assessment of failure**

B W Karney, University of Toronto, Canada

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11:40 **Pump start-ups ignite nuclear power plants: history, law, and risk**

R A Leishear, Leishear Engineering, LLC, USA

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12:00 Special Session

“Photos and Videos”

Led by

Dr Peter Glover, Peter Glover Consulting Ltd., UK

&

Mr Sam van der Zwan, Deltares, Delft, NL

12:30 Close of Conference Address by Professor Angus Simpson, University of Adelaide, Australia

12:45 Farewell Lunch

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