

MONDAY 10 DECEMBER 2007

TUTORIAL

9.30-12.30 hrs : [GALLOPING IN POWER LINES](#)

By Pr. Jean-Louis Lilien, University of Liège (Belgium)

The tutorial will be based on two recently published international documents on the matter :

- ◆ *Transmission Line Reference Book. Wind induced motion.* EPRI (Electric Power Research Institute, Palo Alto, USA). G. Diana (Italy), L. Cloutier (Canada), A. Goel (Canada), C. Hardy (Canada), J.L. Lilien (Belgium), C. Rawlins (USA), J. Wang (USA). Dec 2006.
- ◆ *State of the Art of Conductor Galloping.* "Thematic Brochure" CIGRE N°322. 2007. by J.L. Lilien (Chair), P. Van Dyke, J.M. Asselin, D. Havard, D. Hearnshaw, M. Mito, C. Rawlins, A. Vinogradov.

The following topics will be covered :

- State of the art of the problem in the whole world
- Basic mechanisms
- Simulation tools
- Anti-galloping design and anti-galloping devices available
- case studies, lessons learned (including videos)

SYMPOSIUM

[PREFERRED SUBJECT 4 : FIELD EXPERIENCE SHARING](#)

[Chairman : Wolfgang Troppauer \(Austria\)](#)

13.30 hrs : **Invited speech** :

Identification of extra ordinary load situations on cables and structures by targeted monitoring

Helmut Wenzel, VCE Holding GmbH (Austria)

14.30 hrs : **POSTER SESSION**

- 43 Behavior Comparison of Passive Cable Dampers by Full-scale Experiment**
Sangsup Ahn, Korea Highway Corporation, Korea, Jong-Heon Park, GS Engineering & Construction, Korea, Sang-Hoon Lee, GS Engineering & Construction, Korea, Chan-Min Park, Korea Highway Corporation, Korea
- 45 Design of cable dampers and buffers in incheon cable-stayed bridge**
Jong-Ho Yang, Samsung Corp., Korea, Sangsup Ahn, Korea Highway Corporation, Korea, Ho-Kyung Kim, Mokpo National University, Korea
- 75 Experimental analysis of vibrations of the Dubrovnik bridge**
Mladenko Rak, University of Zagreb, Croatia, D. Damjanovic, University of Zagreb, Croatia, Z. Biocic, University of Zagreb, Croatia
- 27 Damping Characteristics of Cable-Trussed Bridge and Its Energy-Based Evaluation**
Hiroki YAMAGUCHI, Saitama University, Japan, Yoshihiro HAMAZAKI, Kobe Steel Ltd., Japan
- 79 Damping of several single mode vibrations with linear viscous dampers**
Felix Weber, Swiss Federal Laboratories for Materials Testing and Research, Switzerland, Wolfgang Fobo, Swiss Federal Laboratories for Materials Testing and Research, Switzerland, Hans Distl, Swiss Federal Laboratories for Materials Testing and Research, Switzerland
- 80 Free Vibrations of a Cable with an attached MR Damper – Experimental Analysis of Amplitude dependent Damping**
Marcin Maślanka, AGH University of Science and Technology, Poland, Bogdan Sapiński, AGH University of Science and Technology, Poland, Jacek Snamina, Cracow University of Technology, Poland
- 81 A Variety of Transmission Line Conductors Damages and Ways to their Reparation with Helical Fittings**
Sergey V. Ryzhov, JSC Elektrosetjstroyproekt (ESSP), Russia, Andrey V. Tishchenko, JSC Elektrosetjstroyproekt (ESSP), Russia, Alexander A. Vinogradov, JSC Elektrosetjstroyproekt (ESSP), Russia

15.30 hrs : **ORAL SESSION**

- 12 Outdoor Measurements on the Influence of Natural Turbulence on Rain-Wind Induced Vibrations**
Oliver Steiln, Technische Universität Braunschweig, Germany, Udo Peil, Technische Universität Braunschweig, Germany, Mathias Clobes, Technische Universität Braunschweig, Germany
- 37 Fatigue Risk Assessment of Hangers on Great Belt Bridge**
Jakob Laigaard Jensen, COWI, Denmark, Niels Bitsch, COWI, Denmark, Ernst Laursen, A/S Storebælt, Denmark
- 42 Measurement of Dynamic Properties of Bridge Stay Cables**
Harold Bosch, Turner-Fairbank Highway Research Center, USA, James Pagenkopf, Lendis Corporation, USA
- 57 Use of tie-down cables to mitigate seismic response of a cable-stayed bridge during construction**
John Wilson, McMaster University, Canada, KeithHolmes, ND Lea Consultants Ltd, Canada
- 21 Fatigue cumulative damage of overhead conductors**
Sylvain Luc, Universite de Sherbrooke, Canada, Sylvain Goudreau, Universite Laval, Canada, Frederic Legeron, Universite de Sherbrooke, Canada, Louis, Cloutier, Universite de Sherbrooke, Canada
- 60 A Preliminary Investigation of the Hanger Vibrations on the Great Belt East Bridge**
Henrik Gjelstrup, Technical University of Denmark / COWI A/S, Denmark, Christos T. Georgakis, Technical University of Denmark / COWI A/S, Denmark, Allan Larsen, Technical University of Denmark / COWI A/S, Denmark

18.00 hrs : **welcome reception**

TUESDAY 11 DECEMBER 2007

PREFERRED SUBJECT 1 : MODELS AND METHODS FOR CABLE DYNAMICS ANALYSIS

Chairman : **Christian Cremona (France)**

8.30 hrs : **Invited speech** :

Geometrically evolving cable simulations

Robert Zueck, Naval Facilities Engineering Service Center (USA)

9.30 hrs : **POSTER SESSION (I)**

18 Numerical Modeling on the Dynamic Behaviour of Bridge Stay Cables by Three-node Formulation

Shaohong Cheng, University of Windsor, Canada, David T. Lau, Carleton University, Canada

19 Kelvin Model for Analysis of a Stay Cable with Cross Ties

Yagang Zhou, School of Aerospace Engineering and Applied Mechanics, Tongji University, China, Limin Sun, State Key Laboratory for Disaster Reduction in Civil Engineering, Tongji University, China Hongwei, Huang, State Key Laboratory for Disaster Reduction in Civil Engineering, Tongji University, China

35 Alongwind Load Effects for Cable-Stayed Bridges

Pietro Monaco, Politecnico di Bari, Italy, Alessandra Fiore, Politecnico di Bari, Italy

39 Rotational Viscous Dampers for Vibration Mitigation in Stay-Cables

Giuseppe Ricciardi, University of Messina, Italy, Nicola Impollonia, University of Catania, Italy, Fernando Saitta, University of Messina, Italy

61 Evaluation of Cable Loss in Cable Stayed Bridges during Design

Yongsuk Park, Seoul National University, South Korea, Hyun-Moo Koh, Seoul National University, South Korea, Jinkyoo F. Choo, Korea Bridge Design & Engineering Research Center, South Korea, Hokyung Kim, Mokpo National University, South Korea

13 Vibration and instability of the chain with string members as an archery bow model

Ihor Zanevskyy, Casimir Pulaski Technical University, Poland

20 Static and Dynamic Analysis of an Optimized Suspended-dome for Kermanshah Stadium in Iran

Ali Darabadi Zare, ME Student of Structural Engineering, Iran, Houshyar Eimani-Kalehsar, Supervisor, Iran, Nasrollah Diyanat, Co-Supervisor, Iran

36 An Investigation on Overall Seismic Response of the Guyed Masts

Amin Ghannadi-asl, MSC of Structural Engineering, Iran, Ali Darabadi-Zare, M. Sc. Student, Iran

82 Using Cable Finite Elements to Analyze Parametric Vibrations of Stay Cables in Cable-stayed Bridges

Qingwiong Wu, College of Civil Engineering, Fuzhou University, China, Kazuo Takahashi, Department of Civil Engineering, Nagasaki University, Japan, Baochun Chen, College of Civil Engineering, Fuzhou University, China

10.30 hrs : **ORAL SESSION (I)**

59 Stay-Cable Vibration due to Buffeting of Bridge Deck and Pylon

Ho-Kyung Kim, Mokpo National University, Korea, Rep., Sang-Sup Ahn, Korea Highway Corporation, Korea, Rep., Suk Chang, Yooshin Corporation, Korea, Rep., Seung-Jun Jung, Mokpo National University, Korea, Rep.

55 Wavelet Analysis of Cable-model Response

Terje Leenhardt, Andersen University of Stavanger, Norway, Jasna B. Jakobsen, University of Stavanger, Norway, Michael G. Savage, National Research Council, Canada

65 Corotational cable elements for the study of fluid-structure interaction

Luca Martinelli, Politecnico di Milano, Italy, Mariagrazia Di Pilato, Politecnico di Milano, Italy, Francesco Martelli, Structural Engineer - Milano, Italy, Luca Martinelli, Politecnico di Milano, Italy

66 Theoretical and Experimental Identification of Parametric Excitation of Inclined Cables

John Macdonald, University of Bristol, UK, Claire Massow, University of Bristol, UK, Alicia Gonzalez-Buelga, University of Bristol, UK, Alan Champneys, University of Bristol, UK, David Wagg, University of Bristol, UK

23 Dynamic Analyses of Guyed Towers for Transmission Line Structures : Wind Loading and Parametric Excitation

Ferawati Gani, Université de Sherbrooke, Canada, Frédéric Légeron, Université de Sherbrooke, Canada

70 Modelling of Aeolian Vibrations of Overhead Transmission Lines : A Comparison among Time and Frequency Domain

Ferruccio Resta, Politecnico di Milano, Italy, Marco Belloli, Politecnico di Milano, Italy, Alessandra Manenti, Politecnico di Milano, Italy, Sara Muggiasca, Politecnico di Milano, Italy

13.30 hrs : **POSTER SESSION (II)**

67 Combined Buffeting and Dry Galloping Analysis of Inclined Stay-Cables

John Macdonald, University of Bristol, UK, Joseph Symes, University of Bristol, UK, Stoyan Stoyanoff RWDI Inc., Canada

11 Consideration of wind-structure interaction in cable bundles in transmission lines

Tatiana Oliveira, Universidade Federal do Rio Grande do Sul, Brazil, Jorge Riera, Universidade Federal do Rio Grande do Sul, Brazil

33 Nonlinear Aeroelastic Vibrations And Galloping of Iced Conductor Lines Under Wind

Fedor Shklyarchuk, Institute of Applied Mechanics, Russia, Alexander Danilin, Moscow Aviation Institute, Russia, Jean-Louis Lilien, Montefiore Institute of Electricity, University of Liege, Belgium, Dmitry Snegovskiy, Montefiore Institute of Electricity, University of Liege, Belgium

46 Algorithm for dimensioning of twin spacer dampers for a given diameter of conductors in the bundle

Elizabeta Bahtovska, University St Kliment Ohridski, Macedonia (Rep. of), Aleksandar Bahtovski, University St Kliment Ohridski, Macedonia (Rep. of)

52 Development of simple calculation program for isolation distance between power cable and cable way rope

Akihiro Kimura, Kansai Electric Power Co. Inc., Japan, Masaya Shigenaga, Kansai Electric Power Co., Inc., Japan, Teruhiro Yukino, Kansai Electric Power Co., Inc., Japan, Toshio Nakano, Kanden Engineering Ltd., Japan, Tatsuya Yokomaku, MEC Inc., Japan

53 Discrete Model for Analyzing In-plane Dynamic Characteristics of Transmission Line with Small Ratios of Sag to Span

Shuguo Liang, Wuhan University, P. R. China

71 A Dynamic Model for Spacers on Triple- and Quad-Bundles of Conductors
Laszlo E. Kollar, University of Quebec at Chicoutimi, Canada, Masoud Farzaneh, University of Quebec at Chicoutimi, Canada

77 Subspan vibrations calculations for triple bundle with the TDD devices
Alexander Vinogradov, Elektrosetjstroyproekt Cy (ESSP), Russia, Iosif Siarghey, Belarus Nat.Techn.Univ., Belarus, Irina Platonova, ESSP, Russia, Sergei Kolosov, ESSP, Russia, Jean-Louis Lilien, University of Liege, Belgium

14.30 hrs : **ORAL SESSION (II)**

22 Damping Evaluation of Cable with Practical Nonlinear Dampers
Nam Hoang, Ho Chi Minh City University of Technology, Vietnam, Yozo Fujino, The University of Tokyo, Japan, Shinsuke Yamazaki, Nippon Steel Engineering, Japan

50 Experiment and Damping Evaluation on Stay Cables Connected by Cross Ties
Limin Sun, Tongji Univ., China, Yagang Zhou, Tongji Univ., China, Hongwei Huang, Tongji Univ., China

58 Experimental Studies on Cable Dampers of Long Span Bridge
Dong Liang, Tongji University, China, Limin Sun, Tongji University, China, Hongwei Huang, Tongji University, China, Shijie Du, Tongji University, China, Shinsuke Yamazaki, Nippon Steel Corporation, Japan

17 Equivalent Damping in a Cable-damper System by Energy-based Finite Element Method
Shaohong Cheng, University of Windsor, Canada, Xianshu Jiang, University of Windsor, Canada

16.20 hrs : **ORAL SESSION (III)**

34 Study of Optimal Spacer Placement In the Bundle Conductor Span
Vladimir Shalashilin, Moscow Aviation Institute, Russia, Alexander Danilin, Moscow Aviation Institute, Russia, Jean-Louis Lilien, Montefiore Institute of Electricity, University of Liege, Belgium, Dmitry Snegovskiy, Montefiore Institute of Electricity, University of Liege, Belgium

48 Sequential Estimation of the Bending Stiffness and the Damping Parameters of Transmission Line Conductors
Carlos Matt, Electric Power Research Center, Brazil, Daniel Castello, Department of Mechanical Engineering/Federal University of Rio de Janeiro - Poli/COPPE, Brazil

54 Experimental Linear/Nonlinear Dynamics of an Extensible Sagged Inclined Cable
Giuseppe Rega, SAPIENZA University of Rome, Italy, Narakorn Srinil, SAPIENZA University of Rome, Italy, Rocco Alaggio, University of LAquila, Italy

24 Spatial correlation of turbulent wind loading on overhead-line crossing
Ferawati Gani, Université de Sherbrooke, Canada, Mathieu Ashby, Université de Sherbrooke, Canada, Frédéric Légeron, Université de Sherbrooke, Canada

WEDNESDAY 12 DECEMBER 2007

PREFERRED SUBJECT 2 : MONITORING, DIAGNOSIS AND CONTROL OF CABLE STRUCTURES

Chairman : Peter Irwin (Canada)

8.30 hrs : **Invited speech** :

Application of a Vision System to the Monitoring of Cable Structures

Elsa Caetano, Faculty of Engineering of the University of Porto, Portugal, Sérgio, Silva, Fac. Eng. University Porto, Portugal, João Bateira, Fac. Eng. University Porto, Portugal

9.30 hrs : **POSTER SESSION**

38 Advantages of Viscous Damping for Stay Cables

Erik Mellier, FREYSSINET INTERNATIONAL, France, GUY Sevoz, FREYSSINET INTERNATIONAL, France, Stéphane JOYE, FREYSSINET INTERNATIONAL, France

63 Development of a Cable Damper - A Tailor-made Design Approach for Stay Cables

Helmut Wenzel, VCE Holding GmbH, Austria

56 Monitoring of Cable Structures with Assistance of Vibrating Driven Robot

Jatsun Sergey, Head of Mechatronical Department, Russia, Jatsun Andrey, Student of Mechatronical Department, Russia

30 Efficiency Study of Torsional Damper and Detuner Using Cinematic Model for Hysteretic Dissipation of Vibrational Energy

Alexander Danilin, Moscow Aviation Institute, Russia, Jean-Louis Lilien, University of Liege, Belgium, Dmitry Snegovskiy, University of Liege, Belgium, Alexander Vinogradov, JSC "Elektrosetstroyproekt", Russia

32 Dynamic Properties of a Transmission Tower with Hanging Jumper Beams

Makoto Honda, Japan Steel Tower, Co., Ltd., Japan, Nobuyuki Ishida, Japan Steel Tower, Co., Ltd, Japan, Junji Maeda, Kyushu University, Japan, Tsukasa Nakatake, Kyushu Electric Power Co., Inc., Japan, Yoshifumi Ajiro, Kyushu Electric Power Co., Inc., Japan

10.30 hrs : **ORAL SESSION**

3 Vibration Control of Stay Cables in Cable-stayed Bridges Using Magnetorheological Fluid Dampers

Hui Li, Harbin Institute of Technology, China, Min Liu, School of Civil Engineering of Harbin Institute of Technology, China

7 Damping of Stay Cables by Controlled Friction Type Dampers

Felix Weber, Swiss Federal Laboratories for Materials Testing and Research, Switzerland, Hans Distl, Maurer Soehne GmbH & Co. KG, Germany, Glauco Feltrin, Swiss Federal Laboratories for Materials Testing and Research, Switzerland

76 Dynamic Analysis of A Cable Network with Multiple Dampers

Luca Caracoglia, Northeastern University, USA, Delong Zuo, Texas Tech University, Lubbock TX, USA, Nicholas P. Jones, Johns Hopkins University, Baltimore MD, USA

62 Bringing experimental tests and numerical modeling together for a reliable investigation of cables

Andrea Mordini, VCE - Vienna Consulting Engineers, Austria, Helmut, Wenzel, VCE - Vienna Consulting Engineers, Austria

10 Damping levels full scale measurements of bridge stays at high row number

Olivier FLAMAND, CSTB, France

15 Bridge Cable Health Monitoring and Strength Evaluation

Khaled Mahmoud, Bridge Technology Consulting, USA, Bernard Laskowski, Analatom Incorporated, USA, Kevin Kwan, Analatom Incorporated, USA, John O'Day, Analatom Incorporated, USA, Benjamin Caldwell, Analatom Incorporated, USA, Jeffrey Morse, Analatom Incorporated, USA

PREFERRED SUBJECT 3 : CFD AND LABORATORY TESTING ON CABLE DYNAMICS PROBLEMS

Chairman : Guy Larose (Canada)

13.30 hrs : **Invited speech** :

The effect of turbulence and of the Reynolds number on aeolian vibrations

Giorgio Diana, Politecnico di Milano, Italy

14.30 hrs : **ORAL SESSION (I)**

5 Cross flow response of circular cylinder influenced by Karman vortex mitigation

Masaru Matsumoto, Kyoto University, Japan, Tomomi Yagi, Kyoto University, Japan, Yoichi Adachi, Nishimatsu Construction Co.,Ltd., Japan, Hideaki Hatsuda, Tokuyama Corporation, Japan, Takanori Shima, Kyoto University, Japan

6 Sensitivity of Dry-state Galloping of cable stayed bridges to Scruton number

Masaru Matsumoto, Kyoto University, Japan, Tomomi Yagi, Kyoto University, Japan, Hideaki Hatsuda, Tokuyama Corporation, Japan, Takanori Shima, Kyoto University, Japan, Masanobu Tanaka, Kyoto University, Japan

72 Development of Aerodynamically Improved Overhead Transmission Cables in Free Vibration

Naoshi Kikuchi, VISCAS Corporation, Japan, Kiyoshi Tamura, The Kansai Electric Power Co., INC., Japan, Teruhiro Yukino, The Kansai Electric Power Co., INC., Japan, Katsuhiko Fujimoto, The Kansai Electric Power Co., INC., Japan, Takashi Nishihara, Central Research Institute of Electric Power Industry, Japan

64 Wind Tunnel Studies to Assess Aeolian Excitation of Overhead Power Cable Insulator Arrays

Kevin Garry, Cranfield University, UK, Jenny Holt, Cranfield University, UK

16.20 hrs : **ORAL SESSION (II)**

14 Investigating the addition and oscillation of artificial rivulets to stay cables using a Discrete Vortex Method

Andrew Robertson, University of Strathclyde, UK, Ian J. Taylor, University of Strathclyde, UK

49 Vortex Induced Vibration on a circular cylinder in the critical Reynolds Number range

Sara Muggiasca, Politecnico di Milano, Italy, Giorgio Diana, Politecnico di Milano, Italy, Marco Belloli, Politecnico di Milano, Italy, Stefano Giappino, Politecnico di Milano, Italy, Sara Muggiasca, Politecnico di Milano, Italy, Alberto Zasso, Politecnico di Milano, Italy

28 Experimental Investigation for the Dynamic Behaviour of a Catenary Riser Under Top Imposed Excitations

Ioannis Chatjigeorgiou, National Technical University of Athens, Greece, Gilbert Damy, Ifremer, France, Marc LeBoulluec, Ifremer, France

17.20 hrs : **CLOSING SESSION**