

Integrating Structural Analysis, Risk & Reliability

## 5<sup>th</sup> International ASRANet Conference

Hilton Edinburgh Grosvenor  
5-21 Grosvenor Street  
Edinburgh EH14 1PH, Scotland, UK  
14 – 16<sup>th</sup> June 2010

### PROGRAMME



## **Monday 14<sup>th</sup> June 2010 (Room No. 1)**

09:00-09:45 Registration-Coffee

09:45-10:00 Welcome Speech by Prof. Das

### **Session 1A Reliability-based Design & Optimisation**

#### **Co-Chairs:**

10:00-10:30 **Keynote Paper 1:** 'Using Bayesian Networks for identification and assessment of Risk Performance Indicators' *Peter Hansen, Det Norske Veritas AS, Norway*

10:30-11:00 **Keynote Paper 2:** 'Information Updating in Engineering Risk Analysis: Opportunities, Challenges and Recent Developments'  
*Daniel Straub, Munich University, Germany*

11:00-11:20 'Reliability-based Topology Optimization via a Decoupling Approach'  
*K. Liao, National Taiwan University of Science & Technology, Taiwan*

11:20-11:40 'Robustness and Reliability Based Design Attributes in Multi-criteria Decision Making' *V. Zanic, K. Piric, J. Andric, M. Stipcevic, University of Zagreb, Croatia*

11:40-12:00 'Evaluation of risk-based Robustness using Structural Reliability Estimation Methods' *D.C. Charmpis, University of Cyprus*

12:00-12:20 'V-Optimizer: A Reliability-Based Design Optimization Tool for Ship Hull Girder'  
*T.S. Koko, D.P. Brennan and U.O. Akpan, Lloyd's Register Martec, Canada, B.M. Ayyub, University of Maryland College, USA*

### **12:30-13:30 Lunch**

### **Session 2A Reliability of Deteriorating Structures**

#### **Co-Chairs:**

13:30-13:50 'Life-Cycle Cost Design of Deteriorating Offshore Structures'  
*M.A. El-Reedy, Gulf of Suez Pet. Co.*

13:50-14:10 'Probabilistic Simulation of Deterioration Process of Ship Plating for the Evaluation of Effect of Corrosion on Strength'  
*N. Yamamoto, S. Harada, ClassNK, Japan and M. A. Rahim, ClassNK, UK*

14:10-14:30 'Probabilistic assessment of durability of power-Producing Facilities'  
*M. Holicky and Markova Jana, Klokner Institute CTU in Prague, Czech Republic*

14:30-14:50 'Reliability Analysis of Damaged Steel Structures using Finite Element Analysis' *A.J. Sobey, J.M. Underwood, J.I.R. Blake, R.A. Sheno, University of Southampton, UK*

14:50-15:10 'Structural Reliability of RC Structures under the Combined Effect of Chloride-induced Corrosion, Global Warming and Cyclic Loading' *E. Bastidas-Arteaga and F. Schoefs, GeM, University of Nantes, France and A. Chateauneuf, LaMI-Blaise Pascal University, France and M. Sánchez-Silva, University of Los Andes, Colombia*

- 15:10-15:30 'Intelligent Prediction of Coating Deterioration based on Monitoring of Potential Difference in a Ballast Water Tank'  
*N. Yamamoto, K. Terai, ClassNK, Japan and M. A. Rahim, ClassNK, UK*
- 15:30-16:00 Coffee/Tea Break**
- 16:00-16:30 **Keynote Lecture 1:** 'Chaos-wavelet-dynamic Neural Networks for Health Monitoring and Vibration Control of a New Generation of Smart Structures'  
*Professor Hojjat Adeli, The Ohio State University, U.S.A.*
- 16:30-17:00 **Keynote Lecture 2:** 'Uncertainty Quantification in Structural Dynamics'  
*Sondipon Adhikari, University of Swansea, UK*
- 17:00-17:30 **Keynote Lecture 3:** 'SmartEN: A Marie Curie Research and Training Framework for Smart Management of the Human Environment'  
*Toula Onoufriou, Cyprus University of Technology, Anthony G Constantinides, Imperial College, UK, Anastasis Kounoudes, Signal Generix, Cyprus, Nicholas Mousoulides, Cyprus University of Technology*

**Monday 14<sup>th</sup> June 2010 (Room No. 2)**

**Session 1B Probabilistic Fatigue Analysis**

**Co-Chairs:**

**10:00-11:00 Keynote Papers (Room No.1)**

- 11:00-11:20 'Reliability of Marine Welded Joints Subjected to Stochastic Geometry: From Measure to Computation' *F. Schoefs, M. Chevreuril, A. Clement, GeM, University of Nantes, France and M. Cazuguel, O. Pasqualini, DCNS, France*
- 11:20-11:40 'Fatigue Reliability of Bulk Carrier – A Case Study' *L. Yu, M. Zhou, T. Li, J. Tong and S. Wong, Lloyds Register, UK and P.K. Das, University of Strathclyde, UK*
- 11:40-12:00 'Study of Probabilistic Fatigue Assessment of Existing Orthotropic Steel Decks'  
*Y. Takada, Hanshin Expressway Management Technology Center, Y. Toyota, Osaka City University, Japan*
- 12:00-12:20 'Estimation of Development of Fatigue Damage in a Bilge Corner of Ro-Ro Ship'  
*Z. Górski & J. Kozak, Gdansk Technical University, Poland*

**12:30-13:30 Lunch**

**Session 2B Accidental Load Scenarios**

**Co-Chairs:**

- 13:30-13:50 'Sample-based Characterisation of Stranding Events' *L. Garrè, B. Leira, T. Nguyen and J. Amdahl Norwegian University of Science and Technology*
- 13:50-14:10 'Risk Analysis of Damaged Ships' *Subin K.K, P. K. Das, J. Quigley, University of Strathclyde, and S.E. Hirdaris, University of Edinburgh, UK*

- 14:10-14:30 'Reliability Analysis of Double Hull Oil Tanker in Different Damage Scenarios' *I. Khan and S. Zhang, Lloyd's Register, UK*
- 14:30-14:50 'Reliability of Structural Members Subjected to Fire' *A. Usmani, D.J. Lange & A. Webb, University of Edinburgh, UK and C.S. Manohar & V.S. Sundar, Indian Institute of Science, India*
- 14:50-15:10 'Risk-Based Fire and Gas Detector Placement' *B.K. Yuen, K.O. Shahin, T.S. Koko and U.O. Akpan, Lloyd's Register Martec, Canada*
- 15:30-16:00 Coffee/Tea Break**
- 16:00-17:30 **Keynote Papers (Room No 1)**

**Tuesday 15<sup>th</sup> June 2010 (Room No. 1)**

**Session 3A Risk-based Integrity Management**

**Co-Chairs:**

- 09:00-09:30 **Keynote Lecture:** 'Reconciling Experts Opinion Concerning the Value of Testing using Bayesian Networks: A Bridge Too Far?' *Professor John Quigley, University of Strathclyde, UK*
- 09:30-09:50 'Maintenance Planning of Reinforced Concrete Bridges Based on Eurocode Multi-requirements' *E. A. Tantele, T. Onoufriou, R. A. Votsis, Cyprus University of Technology, Cyprus*
- 09:50-10:10 'Risk Based Improvement of NDT Tools for Structural Maintenance: the  $\alpha - \delta$  Method' *J. Boero, B. Capra, Oxand S.A and F. Schoefs, GeM, University of Nantes, France*
- 10:10-10:30 'RISPECT Risk-Based Expert System for Through-Life Ship Structural Inspection and Maintenance and New-Build Ship Structural Design' *Nigel Barltrop, Li Xu and Nabile Hifi, University of Strathclyde, UK*
- 10:30-10:50 'Modelling Risk in the Ship Dismantling Industry' *S.A. McKenna, S. Alkaner and P.K. Das, University of Strathclyde, UK*

**10:50-11:10 Coffee/Tea Break**

**Session 4A Risk-based Integrity Management**

**Co-Chairs:**

- 11:10-11:30 'Risk Based Inspection Planning in Ships' *U. Bharadwaj, TWI, UK*
- 11:30-11:50 'Application of Bayesian Networks for Risk Assessment of Safety Barriers' *J. Karel, M. Jana, Klokner Institute of the Czech Technical University in Prague, Czech Republic*

11:50-12:10 'Assessment of Bridges Registered as Industrial Heritage' *M. Holicky, Jana Markova, Miroslav Sykora, Czech Technical University in Prague, Klokner Institute, Czech Republic and K. Kvaal and Thomas Thiis, Norwegian University of Life Sciences, Norway*

12:10-12:30

**12:30-13:30 Lunch**

**Session 5A Computational Methods in Structural Reliability Analysis**

**Co-Chairs:**

13:30-14:00 **Keynote Lecture:** 'Structural crashworthiness of ships due to collisions in Arctic Ocean' *Professor Jeom Kee Paik, Pusan National University, Korea*

14:00-14:20 'Reliability Analysis Using MCMC Importance Sampling' *H. Furuta, K. Miyake, K. Nakatsu, Kansai University and T. Sato, Kobe-Gakuin University, Japan*

14:20-14:40 'Reliability Analysis of Reinforced Concrete Structures Involving Random Spatial Variability' *D.L. Allaix, V.I. Carbone, G. Mancini, Politecnico di Torino, Italy*

14:40-15:00 'Double linearization technique for Efficient Derivation of the Higher-order Moments of Offshore Structural Response' *G. Najafian, University of Liverpool, UK*

15:00-15:20 'Estimation of Reliability Parameters for PSA using Bayesian Analysis' *A. El-Shanawany, Corporate Risk Associates Limited, UK*

**15:20-15:40 Coffee/Tea Break**

**Session 6A Wind Dominated Structures**

**Co-Chairs:**

15:40-16:00 'Reliability Evaluation of Power Train of Tidal Current Turbines' *C. Iliev and D. Val, Heriot-Watt University, UK*

16:00-16:20 'Reliability-based Design of Rotor Blades of Tidal Current Turbines' *D. Val and L. Chernin, Heriot-Watt University, UK*

16:20-16:40 'Bayesian Networks as a Decision Tool for O&M of Offshore Wind Turbines' *J.J. Nielsen and John Dalsgaard Sørensen, Aalborg University, Denmark*

**Tuesday 15<sup>th</sup> June 2010 (Room No. 2)**

**Session 3B      System Reliability**

**Co-Chairs:**

09:00-09:30      **Keynote Paper (Room No. 1)**

09:30-09:50      ‘Domino Effect Analysis of Process Equipments Using Fragility Curves’ *S. Yasseri, Kellog-Brown & Root, UK, R.B. Mahani, Morgan Oil Ltd., UK*

09:50-10:10      ‘A Non-linear Dimension Reduction Methodology of Uncertain Structural Systems’ *R. Chowdhury & S. Adhikari, Swansea University, UK*

10:10-10:30      ‘System Reliability Estimation using Subset Simulation with Modified Metropolis-Hastings Algorithm’ *A. M. Santoso, P. Kok-Kwang, Q. Ser-Tong, National University of Singapore*

10:30-10:50      ‘GA-Based Extended Kalman Filter to system Identification’ *F. K. Huang, Tamkang University and G. S. Wang, Chaoyang University of Technology, Taiwan*

**10:50-11:10      Coffee/Tea Break**

**Session 4B      Seismic Reliability**

**Co-Chairs:**

11:10-11:30      ‘Establishment of Hazard-consistent Fragility Curves for Soil Liquefaction’ *F. K. Huang, Tamkang University and G. S. Wang, Chaoyang University of Technology, Taiwan*

11:30-11:50      ‘Non-Linear Analysis of Corrosion Damaged RC Bridges in Earthquake Regions’ *M. Kashani, Scott Wilson & University of Bristol, A. Crewe, University of Bristol, G. Canisius, Scott Wilson, UK*

11:50-12:10      ‘Probabilistic Seismic Hazard Assessment for Nuclear Sites’ *P. Smith, N. Prinja and P. Chauhan, AMEC Nuclear, UK*

12:10-12:30      ‘Risk-Based Analysis of Frame-Seismic-Resistant School Structures’ *R. Farag, Housing and Building Research Centre, Egypt*

**12:30-13:30      Lunch**

**Session 5B      Development of Codes**

**Co-Chairs:**

13:30-14:00      **Keynote Paper (Room No.2)**

14:00-14:20      ‘Annual Maximum Wind Simulation based on Moment Parameters of Parent Distribution’ *J. Kanda and Yuan-Lung Lo, University of Tokyo, Japan*

- 14:20-14:40 'Evaluation of the Reliability Performance of Euro Code and API Design Standards for a New Generation of Offshore Structures' *A. Kolios and F. P. Brennan, Cranfield University, UK*
- 14:40-15:00 'Reliability Tool for Plates/Stiffened Plates Subject to Lateral Pressure and Axial Compression' *M. Vallascas and P.A. Frieze, PAFA Consulting Engineers, UK*
- 15:00-15:20 'Reliability-based Design of Roof Structural Elements Exposed to Snow Load' *V. Křivý, VŠB-TU Ostrava, Czech Republic and M. Stríž, Czech Hydrometeorological Institute, Czech Republic*

**15:20-15:40 Coffee/Tea Break**

**Session 6B Marine Structures**

**Co-Chairs:**

- 15:40-16:00 'Effect of Weld Induced Residual Stress on the Buckling Strength of Stiffened Panels' *Pretheesh Paul C & Purnendu K. Das, University of Strathclyde, Anthony Crow & Stuart Hunt, BAE Systems, Glasgow, UK*
- 16:00-16:20 'On the prediction of Wave Induced Hydrodynamic Loads and their relation to Structural Reliability Analysis' *S.E. Hirdaris, Lloyd's Register Strategic Research Group, UK*
- 16:20-16:40 'Ice Loading Analysis of Underwater Structure Dedicated to the Intervention and Remediation of Trapped Pollutant in Tanker Wrecks' *D. Mazarakos, Ath. Kotzakolios, F. Andritsos and V. Kostopoulos, University of Patras, Greece*
- 16:40-17:00 'On the Equivalent Plate Thickness Approach for Stiffened Plate Structures with Non-uniform Plate Thickness: Application to Ultimate Strength Analysis' *J. Kwan Seo and J.K. Paik, Research Institute for Ship and Offshore Structural Design Innovation (LRET Research Centre of Excellence), Pusan National University, Republic of Korea*
- 17:00-17:20 'Calculating the Global Structural Loads on a Damaged Ship, as Part of a Damaged Ship Structural Integrity Analysis' *T.W.P Smith, K.R. Drake, D. Fone, University College London, UK*

**19.00 Conference Dinner**

**Wednesday 16<sup>th</sup> June 2010 (Room No. 1)**

**Session 7 Reliability of Composite Structures**

**Co-Chairs:**

- 09:00-09:20 'A High-fidelity shell element for the robust optimization of laminated composite plates' *F. Faimun, ITS Surabaya, Indonesia, P.D. Gosling, Newcastle University, UK and O. Polit, Laboratoire de Mécanique de ParisX, France*
- 09:20-09:40 'Application of Response Surface Method for the Reliability Analysis of Stiffened Laminated Plates' *N. Yang, Subin K.K. and P. K. Das, University of Strathclyde, UK*

- 09:40-10:00 ‘Modelling the Interfaces of Bondable Pultrusions’ *J.A. Nisar and S. Hashim, University of Glasgow, UK*
- 10:00-10:20 ‘Ship Hull Composite Panels with Imperfections Loaded at Shock’ *I. Chirica, S. Ripa, D. Boazu, E.F. Beznea, University Dunarea de Jos of Galati, Romania*
- 10:20-10:40 ‘Multi-scale Probabilistic Analysis of Fibre Reinforced Composite Materials’ *S. Sriramula, University of Aberdeen, A. Shaw and P.D. Gosling, Newcastle University and M.K. Chryssanthopoulos, University of Surrey, UK*

**10:40-11:10 Coffee/Tea Break**

**Session 8 Risk and Reliability Application**

- 11:10-11:30 ‘Reliability Analysis of Jack up Structures’ *S. Yasseri, Kellogg-Brown & Root, UK and R.B. Mahani, Morgan Oil Ltd., UK*
- 11:30-11:50 ‘Reliability of Damaged Ship Structures’ *P.K. Das, Subin K.K., University of Strathclyde, UK*
- 11:50-12:10 ‘Study on Bending Strength Evaluation of Non-composite and Composite I Girders by Reliability Analysis’ *K. Hashimoto, Kyoto University, Japan and T. Yamaguchi, Osaka City University, Japan*
- 12:10-12:30 ‘Reliability-Based Evaluation of Lateral Spread-induced Pile Failure’ *R. Farag, Housing & Building Research Centre and M. El-Meligy, Mansoura University, Dakahlia, Egypt*
- 12:30-12:50 ‘Probabilistic Engineering Critical Assessment of Offshore Structures’ *T.S. Koko, U.O. Akpan, K.O. Shahin, and B.K. Yuen, Lloyd’s Register Martec, Canada*
- 12:50-13:10 ‘Loading and Structural Reliability of the Thames Barrier’ *A.J. Fyfe, PAFA Consulting Engineers, UK*
- 13:10-14:10 **Lunch**
- 14:10-14:30 ‘Numerical Modelling of Subsea Multiphase Plumes: A Eulerian Integral Approach’ *A. Abubakr-Bibilazu, J.A. Andrawus, E. Adom, J.A. Steel and T. Brikinn, Robert Gordon University, UK*
- 14:30-14:50 ‘Risk – Cost – Benefit (RCB) Selection of Optimum Early Warning Technologies for Heavy Equipment Operations in Mining’ *G. Kizil, J. Joy, Minerals Industry Safety and Health Centre (MISHC), University of Queensland and A. Bye (BRC), Australia*
- 14:50-15:10 ‘A Methodology for Building Tailor Made RBS for Project Risks Management in Construction’ *R. Mehdizadeh, D. Breysse, M. Chaplain and H. Niandou, Université Bordeaux, France*
- 14:50 Conference Close**

### Organising Committee

**Prof. P.K. Das**, Universities of Glasgow and Strathclyde, UK [**co-chair**]

**Prof. M.K. Chryssanthopoulos**, University of Surrey, UK [**co-chair**]

**Dr G. Canisius**, Scott Wilson, UK

**Dr S. Yasserli**, Kellog, Brown & Root (KBR), UK

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