

1st FIG International Symposium on Engineering Surveys for Construction Works and Structural Engineering

Workshop on Measurements and Analysis of Cyclic Deformations and Structural Vibrations

Lenton and Wortley Hall, The University of Nottingham, United Kingdom,
28 June – 1 July 2004

Sunday 27 June,

6 – 8 pm Registration, Lenton and Wortley Hall, The University of Nottingham. Tea and Coffee.

Monday 28 June,

8.00am Registration & Coffee

9.30am Welcome address, Prof A H Dodson

10.00am Working Group 6.4, Dr G W Roberts

10.30am **Session 1**, Surveying in Construction,
Chair Dr Gethin Roberts

The application of dynamic control feedback loops to the problematic issue of controlling 'as designed' compared to 'as built' on construction projects
Paul Watson, Richard Davis and Norman Wienand (United Kingdom)

Surveying by GPS for Construction Works Using the National RTK Reference Network and Precise Geoid
Ahmed El-Mowafy (United Arab Emirates)

Accuracy of simple GPS kinematic techniques: Evidence from experiments, and implications for the study of large flexible engineering structures
K. Protopsalti, A. Nickitopoulou, P. Psimoulis, S. Pytharouli, V. Kontogianni, P. Triantafillidis and S. Stiros (Greece)

Real-time Long-term monitoring and static and dynamic displacements of an office tower, combining RTK GPS and accelerometer data
James MW Brownjohn (United Kingdom), **Chris Rizos** (Australia), **Tan Guan Hong** and **Pan Tso-Chien** (Singapore)

11.50am Coffee

12.00pm **Session 2**, Seismic Response of Structures
Chair Joël VanCranenbroeck

Damage Detection in Structures by Real-Time Monitoring of Dynamic and Static Deformations
Erdal Safak (USA)

Seismic Response of a Tower as Measured by an integrated RTK-GPS System

Xiaojing Li, Linlin Ge, Gang-Ding Peng, Chris Rizos (Australia), **Yukio Tamura** and **Akihito Yoshida** (Japan)

12.45pm Lunch and Poster Session

2.30pm **Session 3**, Laser Scanning in Construction
Chair Andreas Eichorn

Underground Void Visualisation using a Low Cost Laser based System
P.J. Foster, A. Wetherelt, J. Jobling-Purser and **D. Parker** (United Kingdom)

Measurement of Structural Deformation using Terrestrial Laser Scanners
S. J. Gordon, D. D. Lichti, M. P. Stewart and **J. Franke** (Australia)

Analysis of 3D Laser Scanner Data for the Detection of Tunnel Displacements
P. Savva and **K. Lakakis** (Greece)

3.30pm Coffee and Posters

4.15pm **Session 4**, Structural Health Monitoring of Bridges
Chair Ahmed El-Mowafy

The use of dynamic data for the structural health monitoring of bridges
John S Owen and **Steven R. Pearson** (United Kingdom)

Development of a Prototype Remote Structural Health Monitoring System (RSHMS)
Xiaolin Meng, Gethin Roberts, Alan Dodson, Marcus Andreotti, Emily Cosser and **Michele Meo** (United Kingdom)

Single Frequency GPS for Bridge Deflection Monitoring: Progress and Results
Emily Cosser, Gethin W Roberts, Xiaolin Meng and **Alan H Dodson** (United Kingdom)

Structural Deformation Monitoring using Locata
J. Barnes, C. Rizos, Mustafa Kanli, David Small, Gavin Voigt, Nunzio Gambale and **Jimmy Lamance** (Australia)

5.45pm End

Tuesday 29 June,

9.00am **Session 5**, Surveys for Viaducts and Dams
Chair Prof Chris Rizos

Long-term Geodetic Monitoring of two Dams in Western Greece
V. Kontogianni, C. Skourtis, F. Stremmenos, S. Pytharouli, A. Nickitopoulou, P. Psimoulis and **S. Stiros** (Greece)

Quality Control of a Large Dam Geodetic Monitoring System
Maria João Henriques and **João Casaca** (Portugal)

9.45am Coffee and Posters

10.45am **Session 6**, Fibre Optic Workshop
Chair Prof Fritz Brunner

Welcome to FIG Special Task Force 6.4.1
Fritz K. Brunner

Fibre Optic Sensors: An Overview
Fritz K. Brunner

SOFO sensors for static and dynamic measurements
Invited Lecture, **Daniele Inaudi**

Fibre optics Fabry-Pérot sensors, applications and reliability aspects
Invited Lecture, **Wolfgang Habel**

Environmental Sensing Using Fibre Optics
Invited Lecture, **Brian Culshaw**

A structural health monitoring paradigm for civil infrastructure
James MW Brownjohn, **Sushanta Chakraborty**, (United Kingdom),
Tjin Swee Chuan, **Tan Guan Hong** and **Tan Boon Leong** (Singapore)

1.15pm Lunch and Posters

2.30pm **Session 7**, Structural Monitoring
Chair Emily Cosser

RTK GPS Based Sea Piling Engineering: Mathematical Model and its
Application
Chun Liu, **Lianbi Yao** (China) and **Xiaolin Meng** (United Kingdom)

High Precision Alignment Design for Swissmetro Rig
Fengxiang Jin, **Hubert Dupraz** and **Vincent Bourqin** (China)

Parametric identification of thermal deformations using adaptive Kalman-
filtering techniques
Andreas Eichhorn (Austria)

Measurement of Temperature-Induced Deformations in a Large Roof
Structure
W. F. Teskey, **R. S. Radovanovic** and **B. Paul** (Canada)

On the Potential of Geodetic Techniques for the Navigation of Construction
Processes
Wolfgang Niemeier (Germany)

4.15pm Coffee and Posters

- 4.45pm **Session 8**, Frequencies and Cyclic Monitoring of Structures
Chair Maria João Henriques
- From St Paul's to the Tate Modern – overcoming problems in monitoring bridge deflections using GPS
Gethin Roberts, Xiaolin Meng and Chris Brown (United Kingdom)
- Measurement and analysis of cyclic deformations and movements of the TV tower in Sopron
Gyula Mentés (Hungary)
- 5.30pm End
- 6.30pm Drinks Reception
- 7.00pm Conference Dinner

Wednesday 30 June,

- 9.00am **Session 9**, Surveying During Construction and Planning
Chair Stathis Stiros
- Adjustment of the Rion-Antirion Cable-Stayed Bridge: An Innovative Multidisciplinary Response to a Construction Challenge
M. Marchetti, R. Boudon, J. Monnerie, P. Bouve, D. Dupuis, F. Dadoun, G. Baechler and J. Olsfors (France)
- Urban Planning for Tehran, By Using Environmental Modeling and GIS/RS
Alireza Gharagozlu (Iran)
- A Tool for Civil Engineering Work Visualisation Using Virtual Reality
Mauricio Capra, Marcio Aquino, Alan Dodson and Steve Benford (United Kingdom)
- DGPS Based Nationwide Highway Surveying in China
Pengfei Cheng, Xiyin Li, Li Zhang, Yanhui Cai, Xiujuan Wu and Jingbin Liu (China)
- 10.45am Coffee and Posters
- 11.30am **Session 10**, Engineering Surveying Equipment for Construction
Chair Prof Pengfei Cheng
- Precise Engineering Applications of Pseudolites Augmented GNSS
Emily Cosser, Xiaolin Meng, Gethin Roberts, Alan Dodson (United Kingdom) **C. Rizos and Joel Barnes** (Australia)
- Structural Monitoring with the Leica Nivel20 Dual Axis Inclination Sensor
Joël van Cranenbroeck and Neil Brown (Switzerland)
- 12.30pm Lunch and Posters

2.00pm

Session 11, Engineering Surveying Equipment for Construction
Chair Fengxiang Jin

An Innovative Concept to Manage GPS Reference Stations Network and Implement GPS in Structural Movement Monitoring
Vincent Lui (Hong Kong)

Structural Health Monitoring Systems "SHMS" for Bridge with Hybrid Sensor System
Renpeng Wang (China) **Xiaolin Meng**, **Gethin Roberts** and **Alan Dodson** (United Kingdom)

Close Range Measurement and 3D Modeling
Halim Setan (Malaysia)

3.30pm End

Posters

The following posters will be displayed throughout the symposium:

Mapping Soil Surface Conditions and Monitoring Desertification Based on Geographic Information System and Multi-Spectral and Multi-Temporal Satellite Data (Case Study: Damghan Playa)
Alavi Panah, S.K. and **Ehsani, AH** (Iran)

The development of a windows-based software for construction surveying using Visual Basic 6.0 and OLE automation
Halim Setan and **Chong Tuck Seng** (Malaysia)

A geodetic deformation survey to monitor the behavior of a concrete slab during its axial compression testing
Zainal Abidin Md Som, **Halim Setan** and **Khairul Nizam M. Idris** (Malaysia)

The use of geodetic methodology in Precast Concrete Building Assembling
George D. Georgopoulos and **Elisavet C. Telioni** (Greece)

Bridge Monitoring With Garmin Handheld Receivers
Emily Cosser, **Chris J Hill**, **Gethin W Roberts**, **Xiaolin Meng**, **Terry Moore** and **Alan H Dodson** (United Kingdom)

Load testing measurements for structural assessment using geodetic and photogrammetric techniques
Maria Tsakiri, **Charalambos Ioannidis**, **Marinos Kattis** and **Paraskevas Papanikos** (Greece)

Leica GPS Spider for Deformation Monitoring
Joël van Cranenbroeck and **Lienhart Troyer** (Switzerland)

Results of long-term observation of deformation of the VEPP-4 acceleration-storage complex structure, BINP
M.Bokov, **D.Burenkov**, **Yu. Levashov**, **A. Polyansky** and **Yu. Pupkov** (Russia)

Preliminary Test of Using Pseudolite to Improve GPS Precision
Fang-Shii Ning, Szu-Pyng Kao, Chia-Chyang Chang (Taiwan) and
Xiaolin Meng (United Kingdom)

Recognizing the Existing Potentials of Iran in Identification of Natural
Resources for Ecological Studies with a Land Use Planning Approach
Alireza Gharagozlu and Eng. **Talebzadeh** (Iran)

Thursday 1 July,

Workshop on Measurements and Analysis of Cyclic Deformations and Structural Vibrations

- 09:00 Registration and welcome (coffee)
- 10:00 Structural Health Monitoring Systems
Mr **N Knowles**, retired director, WS Atkins
- 10:40 The Global Positioning System
Dr **GW Roberts**, The University of Nottingham
- 11:20 Coffee and Posters
- 11:30 Finite Element Modelling
Dr **M Meo**, Cranfield University
- 12:10 Current GPS Monitoring Systems
Dr **G W Roberts**, The University of Nottingham
- 12:40 EPSRC project: A Remote Health Monitoring System Using Computational Simulation and GPS Sensors
Dr **GW Roberts**, Professor **AH Dodson** and Dr **X Meng**
- 13:00 Lunch and Poster Session
- 14:00 Project Results
Dr **X Meng**, Dr **GW Roberts** and Dr **M Meo**
- 14:30 Industrial Needs
Mr **R Evans**, Retired Humber Bridge Master
- 15:00 Coffee Break and System Demo
- 15:30 Panel Q&A
Dr **GW Roberts**
- 16:00 End