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 Woking 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. Triantafilidis 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 VanCranenbroek

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. Savvaidis 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

María 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 Bourquin (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 Mentes** (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 Gharagozlou** (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 GW 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