

IV INTERNATIONAL COURSE ON GEOTECHNICAL AND STRUCTURAL MONITORING

13-15 JUNE | ROME 2017

MASTER CLASSES ON JUNE 12

ORGANIZED BY:
 **NHAZCA** SRL
 NATURAL HAZARDS CONTROL AND ASSESSMENTS

IN COLLABORATION WITH
 DEPARTMENT OF EARTH SCIENCES
 &
 CERI RESEARCH CENTRE  **SAPIENZA**
 UNIVERSITÀ DI ROMA

13-14-15 June 2017 | ROME (Italy)

Tuesday, 13 June, 2017

Course Schedule

	Registration and networking with coffee, tea and snack	08:00-09:00	
	A.1 Welcome and Introduction	09:00-09:20	John Dunnycliff & Paolo Mazzanti
	A.2 Overview of Monitoring – Part 1	09:20-09:40	John Dunnycliff
	 Why do we need to “monitor”?		
	 What do we measure?		
	A.3 Overview of Monitoring – Part 2	09:40-10:00	Paolo Mazzanti
	 Remote vs contact monitoring		
	 Long term vs short term monitoring		
	 Continuous vs periodic monitoring		
	 Monitoring equipment vs monitoring network		
	A.4 Introduction of Participants and Exhibitors	10:00-10:30	John Dunnycliff (moderator)
	Coffee Break	10:30-11:00	
	A.5 Welcome Addresses from Supporters	11:00-11:15	Paolo Mazzanti (moderator)
	A.6 Systematic Approach to Planning Monitoring Programs, Illustrated by a Deep Excavation in a City	11:15-12:15	John Dunnycliff
	B.1 Introduction to Contact Systems	12:15-12:30	John Dunnycliff
	 Sources of information		
	 What the lectures will cover		
	Lunch Break	12:30-13:45	
	B.2 Monitoring Water Pore Pressures: Guidelines and Lessons Learned	13:45-14:15	Martin Clegg
	 Introduction		
	 Applications		
	 Types		
	 Vibrating wire		
	 Data acquisition		
	B.3 Monitoring Displacement: Guidelines and Lessons Learned	14:15-14:45	Daniel Naterop
	 Extensometers, probe extensometers		
	 Inclometers, in-place inclinometers		
	 3D-deformation measurement systems		
	Sessions “A”: Basic Concepts of Geotechnical and Structural Monitoring		
	Sessions “B”: Contact Monitoring		

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	<p>B.4 Short gage Fiber Optics: Guidelines and Lessons Learned</p> <ul style="list-style-type: none"> — Introduction — Types of discrete optical fiber sensors — FBG sensors and data acquisition architecture — Application for bridge monitoring — Application for railways — Conclusions on the Decision Matrix to select Optical Fiber Sensors for a monitoring project 	<p>14:45-15:15</p>	<p>Vincent Lamour</p>
	<p>B.5 Distributed Fiber Optics: Guidelines and Lessons Learned</p> <ul style="list-style-type: none"> — Fundamentals of distributed fiber optic sensing <ul style="list-style-type: none"> - Sensing mechanisms - Localisation — Key sensing parameters (measurement resolution, spatial resolution, measurement range, dynamic range) — Data analysis and visualisation — Case studies 	<p>15:15-15:45</p>	<p>Fabien Ravet</p>
	<p>Coffee break</p>	<p>15:45-16:15</p>	
	<p>NT.1 New Trends in Contact Monitoring</p> <ul style="list-style-type: none"> — Cyclical installation of ShapeArrays (SAA): An improved method for measuring deformation — Non-invasive monitoring and assessment of critical hydro-infrastructure — Real-time sewer tunnel deformation monitoring using novel fiber-optic sensors — Fully-Grouted Piezometers 	<p>16:15-17:15</p>	<p>John Dunnicliff (moderator)</p> <p>Jeffrey Barrett</p> <p>Panagiotis Michalis</p> <p>Gábor Patassy</p> <p>Erik Mikkelsen</p>
	<p>P.1 Presentations by Partners on Contact Methods</p>	<p>17:15-18:00</p>	<p>John Dunnicliff (moderator)</p>
	<p>Welcome Party</p>	<p>19:00-22:00</p>	

 Sessions "B": Contact Monitoring

 Sessions "NT" New Trends in Monitoring

 Sessions "P": Presentations by Partners



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Course Schedule

<p>— C.1 Introduction to Remote Systems</p> <ul style="list-style-type: none"> — Basic principles and criteria for remote monitoring — Overview of existing remote systems — How to effectively choose a remote system — Sources of information 	09:00-09:15	Paolo Mazzanti
<p>— C.2 Monitoring of Displacements by Topographic and GNSS Systems: Guidelines and Lessons Learned</p> <ul style="list-style-type: none"> — Principles of displacement monitoring using total stations, GNSS sensors and camera based monitoring — Achievable accuracy and long term stability — Design of robust monitoring solutions — Current hardware and future developments — Use cases: landslide monitoring, rock face monitoring etc. 	09:15-09:45	Werner Lienhart
<p>— C.3 Monitoring of Displacements by Laser Scanner: Guidelines and Lessons Learned</p> <ul style="list-style-type: none"> — Introduction to Laser Scanner — Measurements and monitoring: application examples 	09:45-10:00	Paolo Mazzanti
<p> Coffee Break</p>	10:00-10:30	
<p>— C.4 Monitoring of Displacements by Radar Systems: Guidelines and Lessons Learned</p> <ul style="list-style-type: none"> — Basic principles of radar systems — Radar Interferometry — Satellite SAR monitoring — Terrestrial SAR and RAR monitoring systems — Examples of application 	10:30-11:00	Alfredo Rocca
<p>— NT.2 New Trends in Remote Monitoring</p> <ul style="list-style-type: none"> — ESA business applications for satellite interferometry — The unmanned systems landscape — Computer vision and rockfall monitoring applications: an innovative approach to monitoring, the Mont De La Saxe landslide case studies and future applications — Distributed dynamic strain and displacement response of a damaged masonry rail viaduct 	11:00-12:00	Paolo Mazzanti (moderator) Roberto Cossu Howard Jameson Davide Bertolo Sinan Acikgoz

— Sessions "C": Remote Monitoring

— Sessions "NT" New Trends in Monitoring

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	P.2 Presentations by Partners on Remote Methods	12:00-12:30	Paolo Mazzanti (moderator)
	D.1 Fundamentals of Vibration Monitoring: Things to Consider	12:30-13:15	Andrea Bellino
	<ul style="list-style-type: none">  Principles of vibration analysis  Vibration sensors  Civil engineering applications  Strong motion monitoring  Advanced analyses 		
	Lunch Break	13:15-14:30	
	D.2 Fundamentals of Data Acquisition Systems (Including Wireless Systems): Things to Consider	14:30-14:50	Iain Oakes-Green
	<ul style="list-style-type: none">  What is a data acquisition system  Data types & visualisation  Quality assurance and verification  Instrumentation  Communication  Software 		
	D.3 Fundamental of Web-Based Data Management for Instrumentation: Things to Consider	14:50-15:15	Angus Maxwell
	<ul style="list-style-type: none">  Data collection and organization methodologies for efficient transfer  Data models, pre-processing, loading and storage  Auditing, filters and alarm reviews  Post processing, data analysis and combination 		
	D.4 Underwater Monitoring	15:15-16:00	Per Magnus Sparrevik
	<ul style="list-style-type: none">  Environmental conditions to be aware of  Some practical advice when being under water  Where is the challenge, in shallow or deep waters?  Differences in approach for direct monitoring solutions above and under water  Methods for remote monitoring under water  Wireless under water  Lessons learned and some case histories 		



Coffee Break

16:00-16:30

 Sessions "P": Presentations by Partners  Sessions "D": Vibration Monitoring, underwater monitoring, data transmission and management

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NT.3 New Trends in Vibration/Data Management and Transmission Monitoring	16:30-17:15	Paolo Mazzanti (moderator)
— Wireless dataloggers for the monitoring of geotechnical and civil infrastructure		Cristina Lafuente
— Remote monitoring of structural dynamics		Hans-Jürgen Nitzpon
— Italian guidelines for seismicity, ground deformation and pore pressure monitoring related to Oil&Gas production and storage		Ilaria Antoncecchi
P.3 Presentations by Partners on Vibration/Data Management and Transmissions	17:15-18:00	Paolo Mazzanti (moderator)

— Sessions "NT": New Trends in Monitoring

— Sessions "P": Presentations by Partners

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|---|--------------------|-----------------------------|
| ➤ E.1 Workshop on Systematic Planning of a Monitoring Program for a Landslide | 09:00-10:15 | Paolo Mazzanti (moderator) |
| ➤ E.2 Case Histories and Lessons Learned: Structural Health Monitoring to Extend the Safe Working Life of Infrastructures | 10:15-10:45 | Susan Taylor |
| ➤ Loughbrickland bridge with full B-WiM and WIM system | | |
| ➤ FlexiArch bridge system: structural health monitoring | | |
|  Coffee Break | 10:45-11:15 | |
| ➤ E.3 Case Histories and Lessons Learned: Presentations by Participants | 11:15-12:30 | John Dunnycliff (moderator) |
| ➤ An initial study of the application of DFOS in driven precast concrete and steel piles | | Jakub Kania |
| ➤ Pipeline monitoring for subsidence | | Martin Derby |
| ➤ Case of geotechnical instrumentation in gas pipeline (Perù, South America) | | Dimas Robles |
| ➤ Issues and challenges in geotechnical instrumentation in hydro power projects | | Brejesh Kumar Gupta |
| ➤ Several brief Case Histories, with emphasis on lessons learned | | John Dunnycliff |
| ➤ E.4 Case Histories and Lessons Learned: the Role of Monitoring for the Control of Geotechnical Construction and for the Assurance of Safety and Performance | 12:30-13:15 | John Burland |
| ➤ Monitoring control of the Big Ben Clock Tower during and after compensation grouting | | |
| ➤ Monitoring control of the Pisa Tower during and after stabilisation by soil extraction | | |
| ➤ Assurance monitoring of a highly sensitive medical facility during nearby diaphragm wall construction | | |



Lunch Break

13:15-14:30

➤ Sessions "E": Workshop and Case Histories



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<p>➤ E.5 Case Histories and Lessons Learned: Geotechnical Monitoring, the Perspective of an Asset Manager</p> <ul style="list-style-type: none"> ➤ Overview of a geohazard management system ➤ Slope monitoring on a network scale ➤ Slope monitoring and Geotechnical Asset Management ➤ Using instrumentation, slope monitoring and event data to develop a performance metric 	14:30-15:00	Ty Ortiz
<p>➤ E.6 Case Histories and Lessons Learned: Presentations by Participants</p> <ul style="list-style-type: none"> ➤ Experiences from monitoring of a steep rock fall area in Kåfjord, Northern Norway, using a ground based radar system ➤ Indoor usage of total stations ➤ Rockfall hazard on the A9 Pyhrn high-speed motorway ➤ Rockfall in Alpine climatic area ➤ Contact or remote monitoring? Some insights from case studies 	15:00-16:15	Paolo Mazzanti (moderator) Gudrun Majala Dreiàs Victor Lebedev Gerhard Koch Saverio Romeo Alessandro Brunetti
<p> Coffee Break</p>	16:15-16:45	
<p>➤ E.7 Case Histories and Lesson Learned: Presentation of the Eternal City</p>	16:45-17:15	Paolo Mazzanti (moderator)
<p>➤ E.8 Closing Remarks</p>	17:15-17:30	

➤ Sessions "E": Workshop and Case Histories