

September 5th – 9th 2005
Zell am See / Thumersbach
Province of Salzburg, Austria.

REPORT

SAMCO SUMMER ACADEMY

2005

on Structural Assessment,
Monitoring and Control



The SAMCO Network is funded by the European Commission (EU) within the 5th Framework Programme (FP5). SAMCO is a Thematic Network of the “Competitive and Sustainable Growth” Programme. Project Number: CTG2-2000-33069

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2. Introduction

80 persons from 27 nations from all over the world participated in the SAMCO Summer Academy, which took place from September 5th to September 9th 2005 in the province of Salzburg in Austria, to be more precise, in Thumersbach, situated at the mountain lake Zeller See opposite the small town Zell am See.



The venue was the Cultural Centre Lohninghof, a building first mentioned in the 9th century after Christ and perfectly restored in the year 2000. Lectures were partly given in the big auditory, partly in a smaller seminar room with the possibility for the participants to choose the presentations more interesting for their work.



The aim of the Academy was at first to bring together top experts in structural assessment, monitoring and control from all over the world to build connections across the borders and even with experts from the new EU member states.

The expectancy regarding this important meeting was very high, due to the fact that top experts were invited to report on their practical experience and to discuss current research activities.

Those expectations were exceed by far. In a most fruitful environment participants had the possibility to get to know companies and research institutes better and to discuss the future development in their fields.

Late summer days with lots of sunshine inspired people to hold a lively meeting and to give interesting input and ideas for future projects.



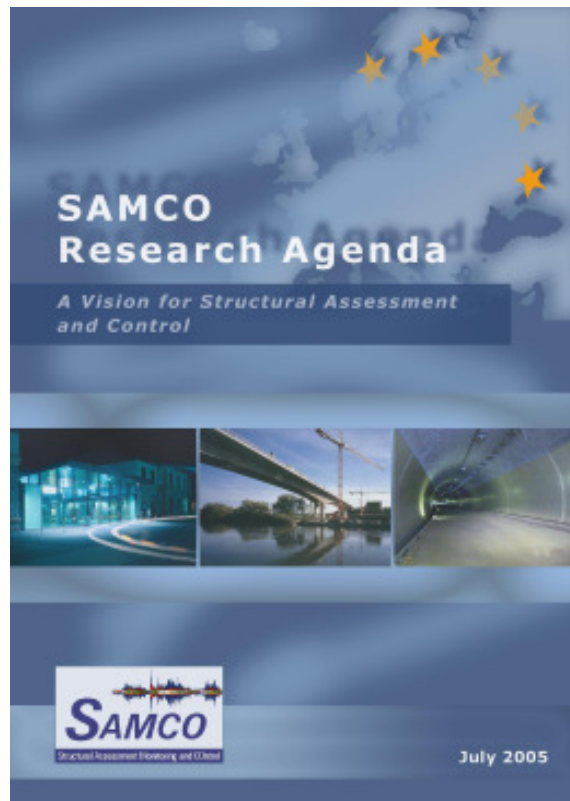


In the course of the Academy the draft of the SAMCO Research Agenda was introduced to the participants by the SAMCO Coordinator Dr. Helmut Wenzel and the European Scientific Officer Dr. Georgios Katalagarianakis outlined the EU Commission's perspective on the 7th Framework Programme.

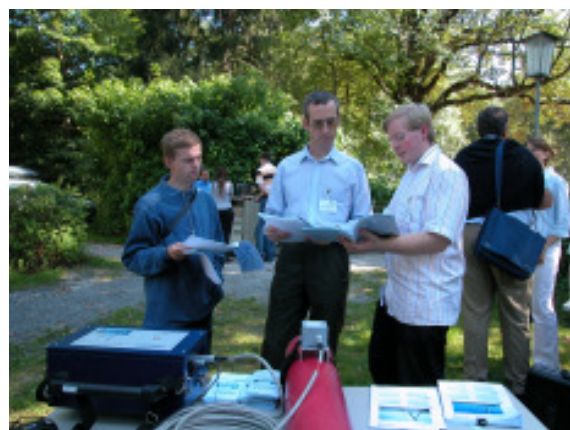
The first day of lectures gave insight into advanced bridge monitoring, seismic assessment and experimental work, for example the 3-D full-scale earthquake testing facility E-DEFENSE from Japan.

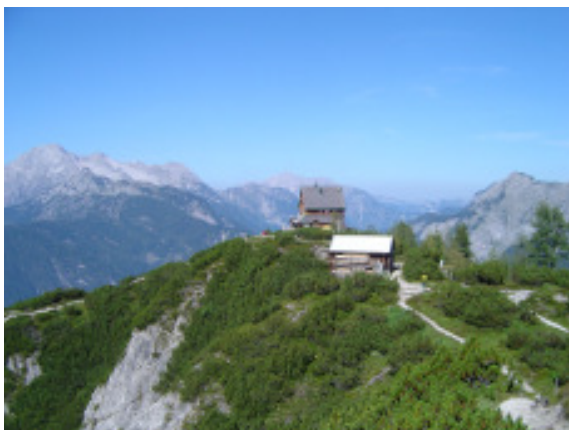
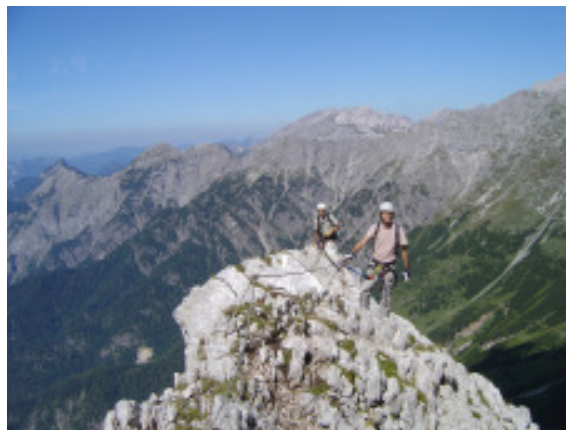
The second day started with lectures on monitoring projects in Japan and the USA and continued with forensic engineering and further speeches on projects carried out by the world's largest test and facility networks.

In the afternoon the Participants had the opportunity to get to know different measuring systems developed by VCE Holding GmbH. Those outdoor demonstrations met with great interest and went off very well thanks to the great weather.



The last day of lectures was dedicated to various topics such as decision support systems, acoustic monitoring, and European research projects as well as to an introduction of the Network for Earthquake Engineering Simulation.





Besides the lectures a range of social events made the Summer Academy an event to remember. On the arrival as well as on the departure day participants had the opportunity to join guided hiking tours in the close mountains or to make a trip to the old town of Salzburg, declared Cultural Heritage of the World by the UNESO in 1997.

Once in the course of the Academy each guest could enjoy the Academy Dinner, a set meal with Austrian delicacies in the restaurant of Lohninghof.

Those activities also added to the good atmosphere which again abetted networking.

The contributions and photos of the SAMCO Summer Academy can be downloaded from the SAMCO Database:

<http://samco.jrc.it/>



3. Detailed Programme

<i>MONDAY - September 5th 2005</i>	
08:00 - 15.00	Optional Mountaineering Tour I Birnbachloch (1340m) or Passauer Hütte (2033m)
14:00	Start of Registration at the Registration Desk in the Cultural Centre Lohninghof (Thumersbach / Zell am See, Seeuferstraße 6)
17:00	SAMCO Road Show Dr. Helmut Wenzel (SAMCO Coordinator) VCE Holding GmbH / Austria
ca 18:30	Welcome of Participants

TUESDAY - September 6th 2005

07:00 **Optional Jogging Tour** (in about 60 minutes around the lake)

Room I Keynote Lecture

09:00 **Advanced Bridge Monitoring**
Dr. Helmut Wenzel
VCE Holding GmbH / Austria

10:30 **Coffee Break**

Room I Special Monitoring Projects and System Identification

11:00 **Special Monitoring Projects**
Prof. Andrea Del Grosso
University of Genoa / Italy

11:30 **Damage Identification by Vibration Monitoring**
Prof. Guido De Roeck
Katholieke Universiteit Leuven / Belgium

12:00 **European Science Foundation Projects: COST Action 534**
Prof. Edoardo Proverbio
University of Messina / Italy

12:30 **Lunch Break**

Room I Experimental Work

13:30 **3-D Full-Scale Earthquake Testing Facility (E-DEFENSE)**
Dr. Keiichi Ohtani
National Research Institute for Earth Science and Disaster Prevention / Japan

13:50 **Large Scale Testing of Passive and Active Vibration Damping Systems Performed at ELSA**
Dr. Vito Renda
Joint Research Centre / Italy

14:10 **FRENCH TESTING FACILITY "TAMARIS" Current Experimental Activities and Future Upgrading of the Test Facility**
Jean Claude Queval
Commissariat à l'Energie Atomique / France

14:30 **Laboratories for Materials Testing and Research in Switzerland (EMPA)**
Dr. Glauco Feltrin
Swiss Federal Laboratories (EMPA) / Switzerland

15:00 **Coffee Break**

15:30 **Monitoring and Assessment of Structures under Changed Loading Conditions**
Dr. Werner Rücker

16:00 **Assessment of Earthquake Resistance of Important Existing Buildings - Case Study Kinderhaus / Hospital Leoben / Austria**
Prof. Rainer Flesch
arsenal research Ges.m.b.H / Austria

16:30 **Methodology for Damage Identification based on the Virtual Distortion Method**
Dr. Przemyslaw Kolakowski
Institute of Fundamental Technological Research / Poland

17:00 **Day Closure of Event**

Room II		Bridge Monitoring & Condition Assessment
13:30	Benchmark Analysis: A Typical Bridge Structure under Environmental Loadings Dr. Francesca Lanata	
13:50	Bridge Structures Research Laboratory – Field Research Range and Methods, Quality System Mr Malgorzata Mazanek	
14:10	Finite Element Modelling of a Reinforced Concrete Bridge and Comparison with Vibration Measurement Mrs Uta Stewering	
14:30	External Cables in Bridge Engineering and Their Dynamic Response Mr Alois Vorwagner	
14:50	Condition Assessment Through Modal Analysis of a RC Slab Bridge Before and After Retrofit and Evaluation of the Effectiveness of the Strengthening Intervention Dr. Giovanna Zanardo	
15:10	Coffee Break	
Room II		Seismic Assessment & Power Plants
15:30	Framework for Assessment and Life Extension of Structures and Industrial Plants Mr Maik Brehm	
15:50	Seismic Capability Assessment of the High Voltage Electric Equipment by Experimental Modal Analysis and Finite Element Analysis Mr Ion Manea	
16:10	Role of Tidal Phenomenon in Measurements for Structural Control of Objects Prof. Gyula Mentes	
16:30	NPP Seismic Monitoring Systems Prof. Dimitar Stefanov	
17:00	Day Closure of Event	

WEDNESDAY - September 7th 2005

07:00 **Optional Jogging Tour** (in about 60 minutes around the lake)

Room I Keynote Lectures

09:00 **Monitoring Projects in Japan**

Prof. Dr. Yozo Fujino
University of Tokyo

09:45 **Monitoring Projects in US**

Prof. Dr. Emin Aktan
Drexel University

10:30 **Coffee Break**

Room I Forensic Engineering

11:00 **Lessons Learnt from Failures**

Contributions by
Prof. James Brownjohn, Prof. Andrea Del Grosso, Dr. Helmut Wenzel et al.

12:30 **Lunch Break**

Room I European Research Practice & World Largest Test and Facility Networks

13:30 **A Contractor's View on Monitoring**

Dr. Claude Dumoulin
Bouygues / France

14:00 **Networked 3D Hybrid Simulation Tests of a Full Scale Buckling Restrained Braced Frame**

Dr. Keh-Chyuan Tsai
Taiwan Center for Research on Earthquake Engineering / Taiwan

14:30 **Advanced Bridge Research and Monitoring Activities in Korea**

Dr. H. M. Koh
Seoul National University / Korea

15:00 **Coffee Break**

Room I Monitoring Projects

15:30 **State-of-the-Art and State-of-the-Practice of Bridge Health Monitoring in the Mainland of China**

Prof. Jinping Ou
Harbin Institute of Technology / China

16:00 **Variability Characteristics of Structural Health Monitoring Data and Development of Engineering Report Tool for Bridges**

Mr Nicolas A. Londoño
Carleton University / Canada

16:30 **ISIS Canada research projects in SHM**

Dr. Douglas Thomson
University of Manitoba / Canada

17:00 **Day Closure of Event**

<i>Kurpark</i>	<i>Demonstrations</i>
13:30	Measuring Activities of VCE (including BRIMOS) Mr Peter Furtner, Mr. Thomas Stiborek, Mr Martin Stöger
15:00	Coffee Break
<i>Kurpark</i>	<i>Demonstration</i>
15:30	Measuring Activities of VCE (including BRIMOS) Mr Peter Furtner, Mr. Thomas Stiborek, Mr Martin Stöger
17:00	Day Closure of Event

THURSDAY - September 8th 2005

<i>Room I</i>	<i>Keynote Lectures</i>
09:00	Decision Support Systems Dr. Helmut Wenzel VCE Holding GmbH / Austria
09:45	Network for Earthquake Engineering Simulation (NEES) Dr. Joy Pauschke National Science Foundation / Columbia (USA)
10:30	Coffee Break
<i>Room I</i>	<i>FP 7 and International Collaboration</i>
11:00	Commission Perspective on 7th Framework Programme European Scientific Officer Dr. Georgios Katalagarianakis European Commission Directory, Bruxelles / Belgium
11:45	Panel Discussion International Collaboration, SAMCO Research Agenda, FP7
12:30	Lunch Break
<i>Room I</i>	<i>European Research Projects & Practice</i>
13:30	LESSLOSS - Risk Mitigation for Earthquakes & Landslides Mrs. Olga Ktenidou Aristotele University of Thessaloniki / Greece
14:00	EC Project: SUSTAINABLE BRIDGES Dr. Glauco Feltrin Swiss Federal Laboratories (EMPA) / Switzerland
14:30	Monitoring Applications in Spain Dr. Luis Ortega Geocisa / Spain
15:00	Coffee Break
<i>Room I</i>	<i>SAFEPIPES</i>
15:30	SAFEPIPES Dr. Herbert Friedmann and Dr. Fritz-Otto Henkel (Woelfel Beratende Ingenieure GmbH & Co. KG / Germany), Dr. Klaus Kerkhof (MPA Stuttgart / Germany), Prof. Josef Küng (Johannes Kepler Universität Linz / Austria), Dr. Helmut Wenzel (VCE Holding GmbH / Austria) et al.
17:00	Day Closure of Event
19:00	Academy Dinner

<i>Room II</i>		<i>Acoustic Monitoring & Wavelet Analysis</i>
13:30	Site Installation and Testing of Permanent Acoustic Monitoring Mr Stephan Fricker ETH Zürich / Switzerland	
14:00	Wavelet Analysis in Structural Health Monitoring and Damage Detection Dr. Volkmar Zabel Bauhaus-Universität Weimar / Germany	
14:30	Guided Waves for Structural Health Monitoring – Theory, System Development, and Applications (including Demonstration) Dr. Frank Schubert IZFP-Dresden / Germany	
15:00	Coffee Break	
<i>Room II</i>		<i>Practical Workshops</i>
15:30	Data Management & Assessment; GIS Application & Decision Support	
17:00	Day Closure of Event	
19:00	Academy Dinner	

FRIDAY - September 9th 2005

08:00 - **Optional Mountaineering Tour II**
16.00 Kapruner Törl (2639m)
09:00 - **Optional Sightseeingtour**
16.15 Old Town of Salzburg

Departure of Participants

4. List of Participants

Nr.	Surname	First Name	Organisation	Country	Contact
1	Aktan	Ahmet Emin	Drexel University	Philadelphia / USA	aaktan@post.drexel.edu
2	Angerer	Thomas	ASFINAG	Austria	Thomas.Angerer@asfinag.at
3	Bischoff	Reinhard	EMPA	Switzerland	reinhard.bischoff@empa.ch
4	Bohinc	Uros	ZAG	Slovenia	uros.bohinc@zag.si
5	Bosiljkov	Vlatko	ZAG	Slovenia	vlanko.bosiljkov@zag.si
6	Brehm	Maik	Bauhaus-Universität Weimar	Germany	maik.brehm@bauing.uni-weimar.de
7	Brownjohn	James	University of Sheffield	United Kingdom	james.brownjohn@sheffield.ac.uk
8	Buchmüller	Irene	VCE	Austria	buchmueller@fcp.at
9	Chiarella	Claudio	SPEA AUTOSTRADA	Italy	claudio.chiarella@spea.autostrada.it
10	Ciudad-Real	Mauricio	Kinematics Inc.	California / USA	mcr@kmi.com
11	De Roeck	Guido	KUL	Belgium	guido.deroeck@bwk.kuleuven.ac.be
12	De Stefano	Alessandro	Politecnico di Torino	Italy	alessandro.destefano@polito.it
13	Del Grosso	Andrea	University of Genoa	Italy	delgrosso@diseg.unige.it
14	Dumoulin	Claude	Bouygues	France	c.dumoulin@bouygues-construction.com
15	Feltrin	Glauco	EMPA	Switzerland	glauco.feltrin@empa.ch
16	Formann	Judith	VCE	Austria	formann@vce.at
17	Frankenstein	Bernd	IZFP Dresden	Germany	bernd.frankenstein@izfp-d.fraunhofer.de
18	Fricker	Stephan	ETH Zürich	Switzerland	fricker@ibk.baug.ethz.ch
19	Friedmann	Herbert	Wölfel Beratende Ingenieure	Germany	friedmann@woelfel.de
20	Fujino	Yozo	University of Tokyo	Japan	fujino@civil.t.u-tokyo.ac.jp
21	Furtner	Peter	VCE	Austria	furtner@vce.at
22	Gode	Kristaps	SIA ZTF Inženierbūve	Latvia	kristaps.gode@inzenierbuve.lv
23	Gsell	Daniel	EMPA	Switzerland	daniel.gsell@empa.ch
24	Halbkram	Susanne	VCE	Austria	halbkram@vce.at
25	Henkel	Fritz-Otto	Wölfel Beratende Ingenieure	Germany	henkel@woelfel.de
26	Hille	Falk	BAM	Germany	falk.hille@bam.de
27	Hoffmann	Simon	BOKU	Austria	simon.hoffmann@boku.ac.at
28	Hrůzová	Pavla	INFRAM	Czech Republic	p.hruzova@seznam.cz
29	Jocius	Mečislovas	TRRI	Lithuania	m.jocius@tkti.lt
30	Katalagarianakis	Georgios	EC Directory Bruxelles	Belgium	georgios.katalagarianakis@cec.eu.int
31	Kerkhof	Klaus	MPA Stuttgart	Germany	Klaus.Kerkhof@mpa.uni-stuttgart.de
32	Koh	Hyun-Moo	Seoul National University	Korea	hmkoh@snu.ac.kr
33	Kolakowski	Przemyslaw	IFTR	Poland	pkolak@ippt.gov.pl
34	Král	Radomil	ITAM	Czech Republic	kral@itam.cas.cz
35	Krašauskas	Laimonas	TRRI	Lithuania	l.krasauskas@tkti.lt
36	Ktenidou	Olga-Joan	AUTH	Greece	ktenidou@civil.auth.gr
37	Küng	Josef	JKU Linz	Austria	jkueng@faw.uni-linz.ac.at

38	Lanata	Francesca	DISEG	Italy	lanata@diseg.unige.it
39	Lau	David T.	Carleton University	Canada	david_t_lau@carleton.ca
40	Lienhart	Werner	TU Graz	Austria	werner.lienhart@tugraz.at
41	Londoño	Nicolas Anselmo	Carleton University	Canada	nlondono@ccs.carleton.ca
42	Magalhães	Filipe	FEUP	Portugal	filipema@fe.up.pt
43	Majka	Michal	NUI Galway	Ireland	michal.majka@nuigalway.ie
44	Mazanek	Makgorzata	IBDIM	Poland	mmazanek@ibdim.pl
45	Mentes	Gyula	Hungarian Academy of Sciences	Hungary	mentes@ggki.hu
46	Mercalli	Andrea	AUTOSTRADA per l'Italia	Italy	amercalli@autostrade.it
47	Meyer	Jonas	EMPA	Switzerland	jonas.meyer@empa.ch
48	Mróz	Arkadiusz	IFTR	Poland	amroz@ippt.gov.pl
49	Ortega	Luis M.	GEOCISA	Spain	lob-geocisa-madrid@dragados.com
50	Ohtani	Keiichi	NIED	Japan	ohtani@bosai.go.jp
51	Ou	Jinping	HIT	China	oujinpings@hit.edu.cn
52	Pauschke	Joy	NSF	Columbia / USA	jpauschk@nsf.gov
53	Pérez	Gema	GEOCISA	Spain	gps-geocisa-madrid@dragados.com
54	Proverbio	Edoardo	University of Messina	Italy	proverbi@ingegneria.unime.it
55	Pudil	Martin	ITAM	Czech Republic	pudil@itam.cas.cz
56	Queval	Jean Claude	CEA	France	jcqueval@cea.fr
57	Renda	Vito	JRC	Italy	vito.renda@jrc.it
58	Rücker	Werner	BAM	Germany	werner.ruecker@bam.de
59	Rupasinghe	Rohan	BRE	United Kingdom	rupasingher@bre.co.uk
60	Schubert	Frank	IZFP-Dresden	Germany	frank.schubert@izfp-d.fraunhofer.de
61	Stefanov	Dimitar	CLSMEE	Bulgaria	seismech@geophys.bas.bg
62	Stewering	Uta	Ruhr-Universität Bochum	Germany	uta.stewering@rub.de
63	Stiborek	Thomas	VCE	Austria	stiborek@vce.at
64	Stöger	Martin	VCE	Austria	stoeger@vce.at
65	Strauss	Alfred	BOKU	Austria	alfred.strauss@boku.ac.at
66	Tanaka	Hiroshi	VCE	Austria	tanaka@vce.at
67	Thomson	Douglas	University of Manitoba	Canada	douglas_thomson@umanitoba.ca
68	Todorova	Tsena	RISK ENGINEERING	Bulgaria	tzodorova@riskeng.bg
69	Tsai	Keh-Chyuan	NCREE	Taiwan	kctsai@ncree.org
70	Vanderborck	Gerard	THALES	France	gerard.vanderborck@fr.thalesgroup.com
71	Veit	Robert	VCE	Austria	veit@vce.at
72	Völgyi	István	BUTE	Hungary	volgyi@vbt.bme.hu
73	Vorwagner	Alois Franz	TU Graz	Austria	vorwal@sbox.tugraz.at
74	Wang	Jianfeng	IMECH	China	wangjf@imech.ac.cn
75	Wenzel	Helmut	VCE	Austria	wenzel@vce.at
76	Wietek	Wolfgang	ASFINAG	Austria	Wolfgang.Wietek@asfinag.at
77	Wisniewski	Dawid	University of Minho	Portugal	dawid@civil.uminho.pt
78	Yamashita	Ryuji	VCE	Austria	
79	Zabel	Volkmar	Bauhaus-Universität	Germany	volkmar.zabel@bauing.uni-weimar.de

Weimar					
80	Zanardo	Giovanna	University of Padua	Italy	zanardo@caronte.dic.unipd.it

5. List of Presentations

Nr.	Title of Lecture	Organisation	Lecturer
1	Research on Experimental Tools for Infrastructure Health Monitoring	Drexel University, Philadelphia (USA)	Aktan
2	Framework for Assessment and Life Extension of Structures and Industrial Plants	Bauhaus-University Weimar, Germany	Brehm
3	Structural Dynamics as an Aid to Condition Assessment and Diagnosing Failure	University of Sheffield, Great Britain	Brownjohn
4	Lessons Learnt from Failures	University of Genoa, Italy	Del Grosso
5	Special Monitoring Projects	University of Genoa, Italy	Del Grosso
6	Damage Identification by Vibration Monitoring	K.U. Leuven, Belgium	De Roeck
7	A Contractor's View on Monitoring	Bouygues Travaux Publics, France	Dumoulin
8	Structural Engineering Research Laboratory of EMPA	Swiss Federal Laboratories for Materials Testing and Research, Switzerland	Feltrin
9	Sustainable Bridges, Assessment for Future Traffic Demands and Longer Lives	Swiss Federal Laboratories for Materials Testing and Research, Switzerland	Feltrin
10	Guided Waves for Structural Health Monitoring – Theory, System Development and Applications (Part 1)	IZFP Dresden, Germany	Frankenstein / Schubert
11	Guided Waves for Structural Health Monitoring – Theory, System Development and Applications (Part 2)	IZFP Dresden, Germany	Frankenstein / Schubert
12	SAFE PIPES: Work packages 6 + 8	Fraunhofer-Institute for Nondestructive Testing (IZFP), Dresden Branch	Frankenstein / Schubert
13	Site Installation and Testing of Permanent Acoustic Monitoring	ETH-Zürich, Switzerland	Fricker
14	SAFE PIPES: WP 3: Risk Assessment and Lifetime Investigations	Wölfel Beratende Ingenieure	Friedmann, Henkel
15	Monitoring of Bridges and Transportation Infrastructure	University of Tokyo, Japan	Fujino
16	European Developments in Industrial Research	European Commission, Bruxelles	Katalagarianakis
17	SAFE PIPES: Work Packages with MPA Contribution	MPA Stuttgart, Otto-Graf-Institut	Kerkhof
18	Advanced Bridge Research and Monitoring Activities in Korea	Seoul National University, Korea	Koh
19	Methodology for Damage Identification Based on the Virtual Distortion Method	SMART-TECH Centre, IFTR, Poland	Kolakowski
20	Numerical Modeling and Ground Response Analysis for the Study of Site and Topographic Effects - In the Context of LESSLOSS Project	Aristotle University of Thessaloniki, Greece	Ktenidou
21	SAFE PIPES: Decision Support System Fundamental Considerations	Institute for Applied Knowledge Processing	Küng
22	Benchmark Analysis: A Typical Bridge Structure under Environmental Loadings	University of Genoa, Italy	Lanata
23	Critical Issues in Using the SOFO Measurement System for Structural Health Monitoring	TU-Graz, Austria	Lienhart
24	Variability Characteristics of Confederation Bridge Monitoring Data	Carleton University, Ottawa, Canada	Londoño

25	Bridge Structures Research Laboratory: Field Research Range and Methods, Quality System	Road and Bridge Research Institute, Poland	Mazanek
26	Role of Tidal Phenomenon Measurements for Structural Control of Objects	Hungarian Academy of Sciences, Hungary	Mentes
27	3-D Full-Scale Earthquake Testing Facility (E-Defense)	NIED, Japan	Ohtani
28	Monitoring Applications in Spain	GEOCISA, Spain	Ortega
29	State-of-the Art and State-of-the Practice of Bridge Health Monitoring in the Mainland of China	Harbin Institute of Technology, P.R. China	Ou
30	The George Brown, Jr. Network for Earthquake Engineering Simulation (NEES)	NEES, CMS, NSF, USA	Pauschke
31	European Science Foundation Projects: Cost Action 534	University of Messina, Italy	Proverbio
32	French Testing Facility "TAMARIS": Current Experimental Activities and Future Upgrading of the Test Facility	CEA, France	Queval
33	Large Scale Testing of Passive and Active Vibration Damping Systems Performed at ELSA	JRC / ELSA, Italy	Renda
34	Dynamic Analysis and Long-Term Monitoring of the Brandenburg Gate	BAM, Germany	Rücker
35	Seismic Monitoring System of Unit 6, Kozloduy NPP	CLSMEE, Bulgaria	Stefanov
36	Finite Element Modelling of a Reinforced Concrete Bridge and Comparison with Vibration Measurement	Ruhr-University Bochum, Germany	Stewering
37	Monitoring Activities in the ISIS Network in Canada	ISIS Canada / University of Manitoba, Canada	Thomson
38	Networked 3d Hybrid Simulation Tests of a Full Scale Buckling Restrained Braced Frame	NCREE / NTU, Taiwan	Tsai
39	Data Management and Assessment	VCE Holding GmbH, Austria	Veit
40	External Cables in Bridge Engineering and Their Dynamic Response	TU-Graz / arsenal, Austria	Vorwagner
41	Advanced Bridge Monitoring (Part 1)	VCE Holding GmbH, Austria	Wenzel
42	Advanced Bridge Monitoring (Part 2)	VCE Holding GmbH, Austria	Wenzel
43	Bridge Monitoring	VCE Holding GmbH, Austria	Wenzel
44	Coming Events	VCE Holding GmbH, Austria	Wenzel
45	Decision Support Systems	VCE Holding GmbH, Austria	Wenzel
46	Forensic Engineering	VCE Holding GmbH, Austria	Wenzel
47	SAFE PIPES: Introduction	VCE Holding GmbH, Austria	Wenzel
48	SAMCO Road Show	VCE Holding GmbH, Austria	Wenzel
49	Wavelet Analysis in Structural Health Monitoring and Damage Detection	Bauhaus-University Weimar, Germany	Zabel
50	Dynamic Based Assessment of Bridge N. 3014: Modal Analysis Results after Upgrading	The University of Western Australia, Australia	Zanardo