Issue 1 November 2001

newsletter

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www.samco.org

SAMCO NEWS

Structural Assessment Monitoring and Control

content

published by VCE

Building the SAMCO Network

Structural Assessment, Monitoring and Control has gained importance in our complex technical environment. The European Union appreciates the development and supports activities in these fields for the benefit of society.

The SAMCO Network is established to concentrate the knowledge and to stimulate further development. A database is being created to provide raw data, free of charge, to researchers and a help desk will exist to answer queries on the subject. The End Users Forum will help to bridge the gap between the developers and users of new technologies in the field.

The purpose of this letter is to attract your interest in becoming a member of this Network. Details about the network can be found enclosed with this letter or at the web page http://www.samco.org.

It is intended to keep this network as open as possible to enable interested parties to join and contribute, but in particular benefit from the activities. The annual workshops will provide a good forum for discussion and new relations. The invitation to join is open to anybody worldwide. Just send an e-mail to vce@atnet.at, with your co-ordinates, and we will keep you informed.

You are invited to join this network as a member, which will provide you with free access to all the available information, contacts to the key European players in this field and the chance to participate in future research projects. This invitation targets owners of structures, as well as operators, maintenance crews, consultants, designers and teachers.

Your Network Co-ordinator
Helmut Wenzel

SAMCO offers you for free:

- **Raw data**
- **Benchmark tests**
- **New codes and standards**
- **Centre of knowledge**
- **State of the art technology**

SAMCO Kick-Off Meeting in Assisi

On the 5th of October the participants of SAMCO met at the Kick-Off Meeting in Assisi, Italy.

1997 a momentous earthquake took place in Assisi claiming many victims. Against this historical background the conference venue Assisi gave SAMCO and thus the Kick-Off Meeting a spezial relevance. 26 Participants of 19 different organisations coming from 10 different countries joined the meeting.

Initially the coordinator outlined the motivation, history and all aspects of the practical work of SAMCO. Next a presentation was devoted to special sections of the SAMCO network, with consideration of the expected development. The session was continued with the partners presentation. The following partners presented their organisations and their prospective scope of duties within SAMCO:

- **VCE** Vienna Consulting Engineers Holding GmbH
- **AUTH** Aristotle University of Thessaloniki Research Committee
- **JRC** Joint Research Centre of the European Commission
- **EMPA** Swiss Federal Laboratories for Materials Testing and Research
- **UNIPV** Universita Degli Studi Di Pavia
- **BRE** Building Research Establishment Limited
- **LCPC** Laboratoire Central des Ponts et Chaussees
- **BAM** Federal Institute for Materials Research and Testing
- **BYTP** Bouygues Travaux Publics
- **LMS** LMS International NV
- **DMI** Danish Maritime Institute
- **Arsenal** Österreichisches Forschungs- und Prüfzentrum Arsenal GesmbH
- **BAST** Bundesanstalt für Straßenwesen
- **FE** FIAT Engineering SpA
- **GEOCISA** Geoctecnica y Cimientos, S.A.
- **TRL** TRL Limited
- **RAMBOLL** Ramboll, Hannemann & Hojlund A/S
- **SPEA** Spea Ingegneria Europea S.p.A.
- **AUTOS** Autostrade Concessioni e Construzioni Autostrade S.p.A.

Following the partners presentations, many other essential items were discussed. For example, the members of the Steering Committee have been decided. The Steering Committee will be responsible for the scientific, networking and dissemination progress in the Network.

The selection of members has also been discussed in depth. According to an agreement with the Scientific Officer, 25 members should be selected within the first 3 months of the contract (before Christmas).

Furthermore the establishment of a summer academy was discussed, which looks like an attractive chance to generate additional funds for the Network. It was expressed that there seems to be a demand for education in the field of the network, which comes from practising engineers in particular.

Other items, like the establishment of the database, the setting-up of the End User Forum, the organisation of the thematic groups and the possibilities of international collaboration, were discussed as well. An introduction was also given to the benchmark tests and a complete overlook on the activities of the bridge management.

Although many issues could only be touched on briefly, the Meeting contributed nevertheless, to a mood of enthusiasm for the project. The Meeting of Assisi was concluded with the motto:

SAMCO is a chance. Let`s take it!

In Preparation: “Samco Database”!

One of the essential targets of Samco is the distrubution of data and information about methodologies, projects and tests in the area of structural assessment, monitoring and control. To achieve this goal a common database will be established, which will provide an overall view of the activities and the available data in this field. The database will not only provide raw data of benchmark and laboratory tests, but also documentation, state of the art reports, examples and references, and useful links and hints. But who will benefit from it? With the help of this database, practising engineers, for example, will be able to compare methodologies. They will even have the possibility to strengthen a technological approach through reference projects and demonstration cases in the database. On the other hand End Users will be able to obtain an overview of the latest state of the art technology. Research communities, which will be able to draw raw data free of charge, will also benefit from the database.

Preparation works have already begun and the prototype of the database is expected to be implemented in January.

The database will have an open structure with the possibility for everyone to easily access data. Of course the structure of the database will be layered so that information can be gathered in greater depth. An important criterion for the data providers is the possibility to define the degree of “sensitivity” of their data: *public* and free of charge, *purchased* or under certain conditions or only *by authorisation* from the user.

Through an extendable structure, the database will be open to further partners, in order that it´s continuation can be guaranteed.

However, the collection of the data requires the definition of certain criteria for the selection of relevant data and the definition of uniform standards. This will be the task for the coming weeks!

News of the Profession & Practice

Ambient Vibration Testing of Europa-Bridge with BRIMOS

Brimos is a method of system identification and damage detection for bridges and other important structures. The system is based on measurements of the dynamic characteristics of structures due to ambient vibrations. Beside the measurements analytic dynamic calculations are carried out. Measurements using very sensitive accelerometers lead to the natural frequencies, mode shapes and damping values of a structure and make system identification and structural integrity assessment possible. Comparison of the results gathered by using this method with those of parallel performed bridge inspections help to recognize valuable information provided by the method.

VCE also used this method in 1997 to assess the famous Europa Bridge in Tirol, Austria, assigned by the Alpenstraßen AG.

Europa Bridge was built between 1959 and 1963 as the tallest steel box-girder bridge in Europe. 820m in length, it is the largest construction on the Kufstein-Brenner Motorway. An important European road traffic connection. 190m above ground, it spans the so called Wipptal within the Alps.

The dynamic investigation of the Europa bridge focused essentially on the following points:

- Determination of current status of fundamental natural frequencies and comparison of the results with the calculated frequencies (system identification).
- Determination of measured mode shapes of the structural system and identification of possible differences to the predicated shapes.
- Determination of the damping ratios of the system.
- Assessment of the vibration intensity with regard to fatigue problems and possible damage.

Due to the ambient acceleration measurements and their analyses the system behavior could be determined. By interpretation of the measurements and comparison with the computer simulations the system identification could be determined.

Contact

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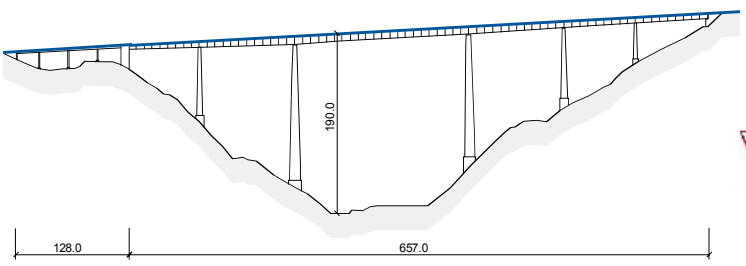

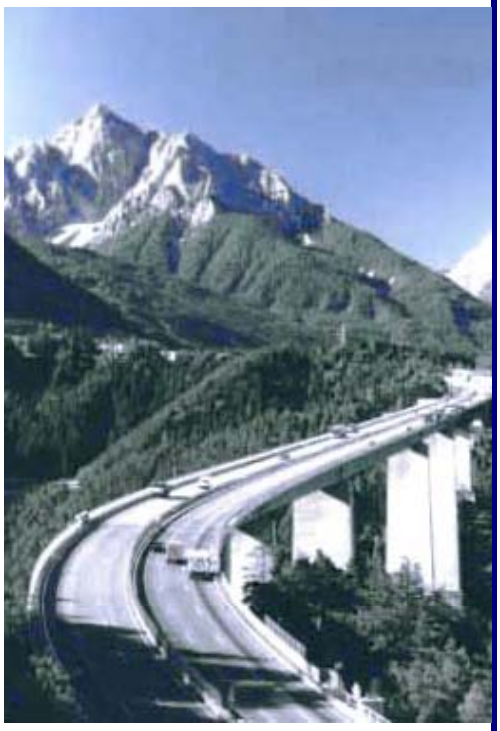

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Risk Management of Latent Defects

Latent defects in buildings form a considerable fraction of instances of disagreement and often litigation between varying parties. UK Government initiatives have set out to reduce this but the overall experience of latent defects is not well understood, in particular the risk management options available. A project has been set up to help develop combined technical and commercial approaches to the management of risk associated with latent defects.

A project being undertaken by the Building Research Establishment on behalf of the Foundation for the Built Environment is currently looking at both the incidence of, and risk management options for, latent defects in construction projects. To get the most accurate, in-depth and up-to-date information, a questionnaire has been prepared for circulation to as wide an audience as possible. If you have something to contribute to this project, and would like to complete a questionnaire, it can be obtained from the Project Manager, Anna Kingsmill-Vellacott, at BRE. Contact details are vellacottka@bre.co.uk or +44(0) 1923-664925.

As it is essential to receive as broad a response as possible, the questionnaires are not electronic and will need to be received by BRE before the end of November. If you would like to contribute information, but do not wish to complete a questionnaire, then please e-mail your contribution to Anna Kingsmill-Vellacott at the address shown.

It is intended that the output of the project will provide professionals in construction and other industries, as well as their insurers, with guidance and initial risk management tools and options to aid in the effective management of risk from latent defects. The review of risk management options available for latent defects will provide the basis for a more informed risk management of, and decisions in respect of, latent defects.

It is hoped that, as a result of this project, combined technical and commercial approaches will be developed to manage the risk associated with latent defects.

Contact

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Building Research Establishment Limited
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BRE

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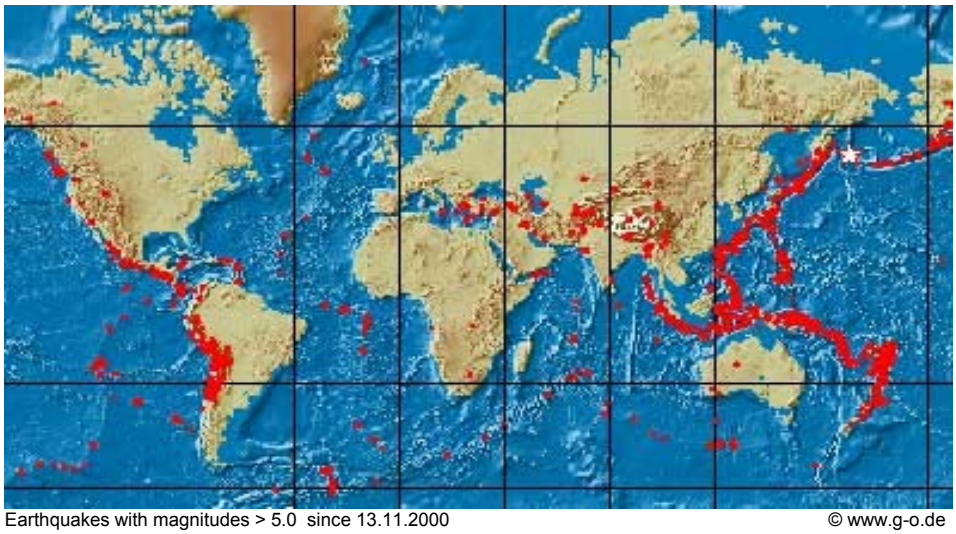
A Glance at the World

Earthquakes happen everywhere and any time

Apart from the human tragedies earthquakes cause huge damage to agriculture and infrastructure. The most endangered areas in the world are situated on the West coast of North- and Southamerica, as well as in Japain and the Philippines. The map below, shows the earthquakes that have occurred during the last 12 months (since 13.11.2000) with magnitudes of *5.0 or more*!

Although Europe rarely experiences such powerful incidents, earthquakes take place nonetheless. To mention only the recent ones, the Austrian Civil Earthquake Service reported about 11 seismic incidents in the last 4 months, with magnitudes between 1.8 and 5.2. The latest earthquakes happened in November in the West of Austria. In Italy 2 earthquakes also took place in November, according to the Quake Info Service. Both in South Italy, with magnitudes of about 3.4. When we look at Germany and neighbouring areas (see below), we can see that many seismic incidents with magnitudes of between 2.5 and 4.0 took place in the last 12 months. The yellow dots in the map show the latest incidents. These occurred in the last 30 days.



Earthquakes with magnitudes > 5.0 since 13.11.2000 © www.g-o.de

Incidents in Germany © www.g-o.de

Collapsed Ente-os-Rios bridge in Portugal
© www.dossiers.publico.pt

Collapsed Queen Isabella Causeway in Texas
© www.disaseternews.net

Collapsed Queen Isabella Causeway in Texas
© www.disasternews.net

Bridge Collapses – A Short Review of the Last 5 Months

Millions of people trust day after day that the bridge they pass over is stable. Though in the USA alone, 150 to 200 bridges collapse every year (Geo-Magazine, February 95). The review of the last 5 months shows catastrophic bridge collapses, nearly all with fatal consequences. Recent publications reported about the following cases:

- At the beginning of March a bridge (Entre-os-Rios) over the Duoro river in Portugal collapsed. A bricked pier of the metal construction, which was built in 1886, could not resist the flood of the Duoro river. Many security standards were not observed. The 50 metre high bridge, a coach with 67 passengers and two cars were swept into the river. More than 70 people died.
(Der Standard, March 01).

- Fifteen people were injured in April when a bridge construction project on the central section of the Second Freeway, between Nantou and Changhua (Taiwan), collapsed. Investigators believe that heavy rains the night before the accident may have caused one of the bridge's cement pillars, which is in the middle of a river bed, to collapse. That may have triggered a domino-like collapse of other portions of the bridge.
(Taiwan Headlines, April 01).

- In Kerala (India) the 115 year old Kadalundi railway bridge collapsed in June. A train was crossing the bridge when the piers gave way. The first 11 bogies of the train went through safley but six coaches plunged into the Kadalundi river. More than 200 people were injured, 51 persons lost their lives.
(BridgeUpDate, July 01).

- Only one month later in July the Typhoon Toraji swept across Taiwan leaving as many as 61 people dead. A flash flooding, caused by the Typhoon, caused high agricultural losses and enourmous damage to infrastructure. The flood knocked down the Hsinyi bridge and Aikuo bridge. The traffic in Nantou Country was completely disrupted.
(Taiwan Headlines, July 01).

- Eight people were killed in September in Texas, after four barges slammed into a piling of the Queen Isabella Causeway, the only link between the village of Port Isabel on the mainland and South Padre Island. Several cars plunged 85 feet into the water. At least 13 people were pulled from the water. Several of them were hospitalized. Two spans of the causeway, the state's longest bridge, collapsed after the pre-dawn crash.
(Disasternews, October 01)

Flood caused by Typhoon Toraji
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Flood caused by Typhoon Toraji
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Collapsed Freeway bridge in Taiwan
© www.taiwanheadlines.gov.tw

Model of the collapse of the Kadalundi railway bridge in India
© www.the-week.com

Collapsed Kadalundi railway bridge in India
© www.the-week.com

Company Profile

Vienna Consulting Engineers

VCE is an independent, high tech oriented consulting firm with its head office in Austria. The company operates in three principal lines of business:

- The transportation sector (including bridges, tunnels and railways)
- The building and industrial sector (as well as general design and management as well as specialized technological expertise)
- The development sector (from research and development to feasibility and environmental studies, financial engineering, to development aid).

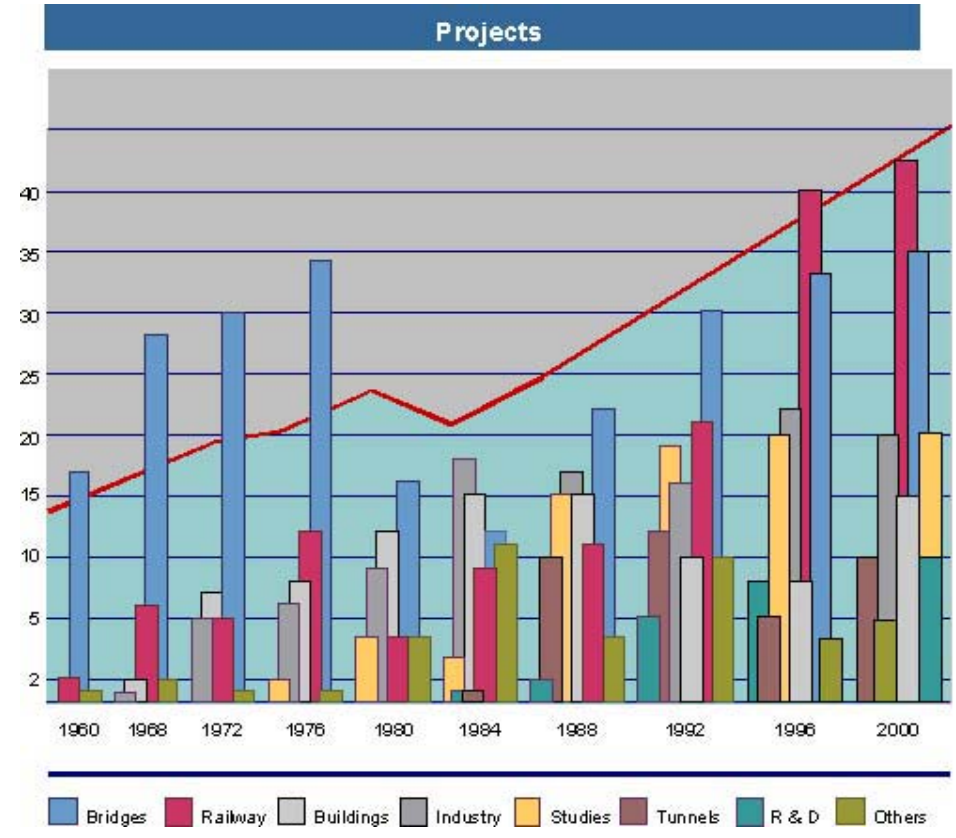
VCE has major operations in Austria, Taiwan, Korea, Eastern Europe, the Middle East and Africa. To date, over 2200 contracts have been successfully completed in 62 countries world-wide with larger, more exciting projects currently under way.

The key personnel at VCE consist of experts in many highly specialised fields with long experience records. Close cooperation by the firm with major Austrian universities provides additional expertise to the company when required.

VCE has a proud heritage. The firm was founded by Professor K. Wenzel, and has made a major contribution to the technical advancement and aesthetic evolution and refinement of modern bridge design in Austria, and around the world. And since the formation in 1980 of VCE that contribution has expanded to an international level.

Since 1960 VCE designs, supervises or tests bridges of all kind and has developed it's expertise to the highest possible level.

A project example is the Kao Ping Hsi bridge (see right) in Taiwan. This building is a cable-stayed bridge with a front part of 330 meters. The bridge deck is 3.20 metres high and 34.50 metres broad. The whole conception of the bridge is innovative and sets new standards for the bridge construction.



During the whole construction time accompanying vibration tests were done with BRIMOS to check the tension forces of all cables. So the effective cable force could be determined.

Contact

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Introduce your company in the text issue of the newsletter!

Please send your company profile to:

vce@atnet.at

News in Brief

Useful Conferences

First International Conference on Bridge Maintenance, Safety and Management

The international Association for Bridge Maintenance and Safety (IABMAS) encompasses all aspects of bridge maintenance, safety, and management. Specifically, it deals with: bridge repair and rehabilitation issues; bridge management systems; needs of bridge owners, financial planning, whole life costing and investment for the future; bridge related safety and risk issues and economic and other implications. The objective of IABMAS is to promote international cooperation in the fields of bridge maintenance, safety, and management for the purpose of enhancing the welfare of society. The conference will take place in Barcelona, on July 14-16, 2002. For more information:
http://civil.colorado.edu/IABMAS

First European Workshop on Structural Health Monitoring

Structural Health Monitoring (SHM) is promising in the fields of the development of smart materials and structures. SHM has a wide potential of applications, especially for aircraft and aerospace and civil infrastructures. Since 1997, an International Workshop on SHM takes place every two years in Stanford. Considering the increasing activity of the field, it appears that a similar workshop, could take place in Europe. It was decided to start the process by organising this First European Workshop on SHM in Paris. It will take place in July 10-12. 2002, organised by ONERA, ENS-Cachan and LCPC. The purpose of the workshop is to assess state-of-the-art technologies in the field and to discuss key issues in research and development. The workshop is also intended to promote exchange and cross - fertilisation among many disciplines. For more information: www.onera.fr/ shm2002

Urban Earthquake Risk – 7th U.S. National Conference on Earthquake Engineering

The Seventh National Conference on Earthquake Engineering, to be held in Boston, Massachusetts in 2002, will provide an opportunity for both researchers and practitioners to share the latest knowledge and techniques for understanding and mitigating the effects of earthquakes. Organized by the Earthquake Engineering Research Institute (EERI), this quadrennial conference will bring together professionals from the broad range of disciplines committed to reducing the impact of earthquakes on the built and natural environment: geology, seismology, geophysics, geotechnical engineering, soils and foundatio engineering, structural engineering, architecture, social response, regional planning, emergency response planning, and regulation. For more information:
www.eeri.org

Building for the 21st Century

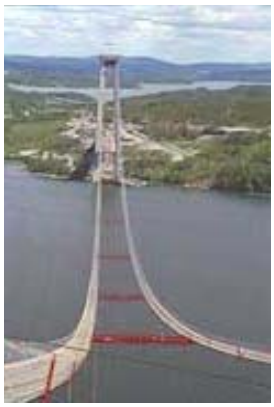
In December 2001 the Building for the 21st Century conference is planned. Held in the Queen Elizabeth II Conference Centre, the purpose of the conference is to bring a select group of interested professionals together to share knowledge, experience and ideas. The conference will assess the state of the art, provide a vision for the future and help disseminate the information to a wide audience. The program will attempt to integrate the major important themes of technology, liveability and productivity dealing with the main issues facing planners, architects, financiers, engineers, designers, building operators and users. For more information: www.buildingforthe21stcentury.com

SAMCO Quiz

Who knows this bridge?

If you know the answer, send it to vce@atnet.at! The first person, who sends the right answer is the winner! The first three will be published in the next issue.

**The winners will be published!
So we shall see who has the best overall view in this field!**



Notable Dates

2001

DECEMBER

9–11. Building for the 21st Century-Conference, London, UK
www.buildingforthe21stcentury.com

2002

JANUARY/ FEBRUARY

31-2. IMAC Preconference Course Modal Analysis: Theory and Application, Los Angeles, CA.
www.sem.org

4-7. IMAC-XX: A Conference and Exposition on Structural Dynamics, Los Angeles, CA.
www.sem.org

MARCH

11-15. Measurement System Engineering Short Courses, Fort Worth, TX.

APRIL

7-12. World Conference on Structural Control, Como, Italy.
congress@icil64.cilea.it

APRIL/ MAY

28-1. Seismic Conference on Highways and Bridges, Portland, OR. mceer@acsu.buffalo.edu

21-25. Seventh U.S. National Conference on Earthquake Engineering, Boston, MA.
www.eeri.org/7nceesubmit

SEPTEMBER

2-5. Fifth European Conference on Structural Dynamics - eurodyn 2002, Munich, Germany.
www.eurodyn2002.de

OCTOBER

9-12. Structural Engineers World Congress, Yokohama, Japan.
www.sewc2002.gr.jp

SAMCO related dates

prospective
(subject to change)

2002

APRIL

Steering Committee Meeting at the COMO Congress

1st SAMCO workshop at the COMO Congress

2003

JULY

14-18. SAMCO Summer Academy, Cambridge, UK.

Impressum

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