Issue 12 - May 2003

newsletter

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SAMCO NEWS

Structural Assessment Monitoring and Control Issue 12 May 2003

contents

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7th SAMCO Workshop in Rome

The next SAMCO Workshop will be held in Rome an will be hosted by the SAMCO partner Autostrade.

Date:
June 7-8, 2004

Venue:
Centro di Formazione Autostrade
via G.Donati 174
Roma

Registration is possible at the SAMCO website:
http://www.samco.org/workshop

The first day is devoted to the SAMCO annual report. Mr. Wenzel will give an overview of the status of the network.

The rest of the day is devoted to the bridge management workpackage within SAMCO. The session will be leaded by Per Golterman (Ramboll).

The second day the standardization and certification initiatives in SAMCO will be presented and discussed.

The scientific officer George Katalagarianakis will inform the network about the results of the second NMP call.

Afterwards the SAMCO members will present their activities.



5th SAMCO Workshop in January and the Proposals in the 6FP

65 persons participated in the 5th SAMCO Workshop, which took place in Vienna from January 26 to 27, 2004 in order to discuss the possibilities within the 6th Framework Programme and to form consortia for the different project proposals.

Low temperature and much snow outside did not prevent people from holding and lively workshop with a lot of interesting input and discussion around current research activities and ideas for future projects.

The first day was dedicated to the End Users Forum, where some presentations where held on challenges in practice in the range of wind energy offshore, in bridge management, inspection of railway bridges and instrumentation of road bridges for monitoring purposes, etc.

Insight was also given into huge research projects, like the E-DEFENSE project, that are planned or have already started in the United States and Japan. Mr. Wenzel (VCE) stressed the importance of an European research initiative that is able to match these activities from overseas. He also emphasized that such an initiative must happen as soon as possible, otherwise Europe's role in the filed will be negligible in the coming decade.
In the evening the participants enjoyed a guided tour in the Leopold Museum of modern art, where famous Austrian modern paintings are collected.

The second day was devoted to the 6th Framework programme and to the project proposals that are planned within the SAMCO network.

Three proposals were presented by Dr. Wenzel (VCE) that could be submitted in the NMP Call as integrated projects.

Contributions to that proposals were presented afterwards, in the range of structural health monitoring, safety assessment, geotechnical and earthquake engineering and knowledge based systems. The application of the presented research activities starts from huge bridges, overhead power transmission lines, piping systems, high-rise buildings, etc.

The contributions and photos of the SAMCO Workshop can be downloaded from the SAMCO web site:
www.samco.org/workshop

Three proposals have been submitted after the workshop on the second call of the NMP programme on March 3, 2004.

Unfortunately none of proposals for Integrated Projects have been selected for stage 2. However the ideas formed at the Workshop in Vienna have not been given up. The proposed projects have been revised and adapted. Some smaller but streamlined proposals have been submitted to the next NMP Call in May 1 as Specific Targeted Research Projects (STREP).




Bridge Management in the SAMCO Database

Introduction

A large part of the SAMCO network is devoted to the problems connected with the management of bridges as they represent a large part of the capital invested in the infrastructure. The infrastructure, in turn, guarantees the economic development of Europe by favouring the exchange of goods and passengers.

State Of The Art

A bridge manager requires information on the current condition of his structures and how it will change over time as this will help him take decisions on if, when and how maintenance is required.

Monitoring therefore can provide useful information as it ranges from periodic visual inspection of the parts of the structure that are causing concern, to periodic or continuous monitoring using sophisticated instrumentation that has been installed on the structure.

Whereas regular inspection of bridges is mandatory and the frequency and detail of inspections is defined in national standards, instrumental monitoring is usually carried out on an ad-hoc basis and there is no general methodology to follow. Indeed, the work is often hurriedly planned and executed. Examples where monitoring the performance of bridges have been undertaken include:

(a) structures where deterioration or damage has occurred and it is necessary to ensure that there is no further loss in strength,

(b) during construction to check behaviour

(c) after construction as an aid to the future maintenance management and

(d) on structures that do not comply with current standards.

Features that are monitored include movements, strains, crack widths, crack occurrence, loads, stresses, environmental factors (temperature and wind) and corrosion activity.

It was thought that a database containing information on the application of monitoring techniques on bridges would have enabled a bridge manager with a particular problem to determine whether monitoring would be of value and if so, details on the type of monitoring that should be undertaken and details of its application.

Bridge Management Data-Base

The data-base is dedicated to offer know-how and solutions for the problems encountered in bridge management and it is based on a "problem solving" approach. It must be regarded as an "operative tool" that gives a list of solutions to practical cases and specific problems.

The architecture of the data-base should help the user in consulting it.

The first step is represented by the following statement: I have a problem of corrosion on a simply supported concrete bridge and I would like to know in which way I can assess its structural performance and how I can monitor the progress of corrosion.

The first entry to the data-base is from the fields **BRIDGE** or **PROBLEM**. The next step is to examine the **MONITORING** assessment and monitoring objectives and for each MONITORING objective, different **METHODS**-assessment methods and/or monitoring techniques may be available.

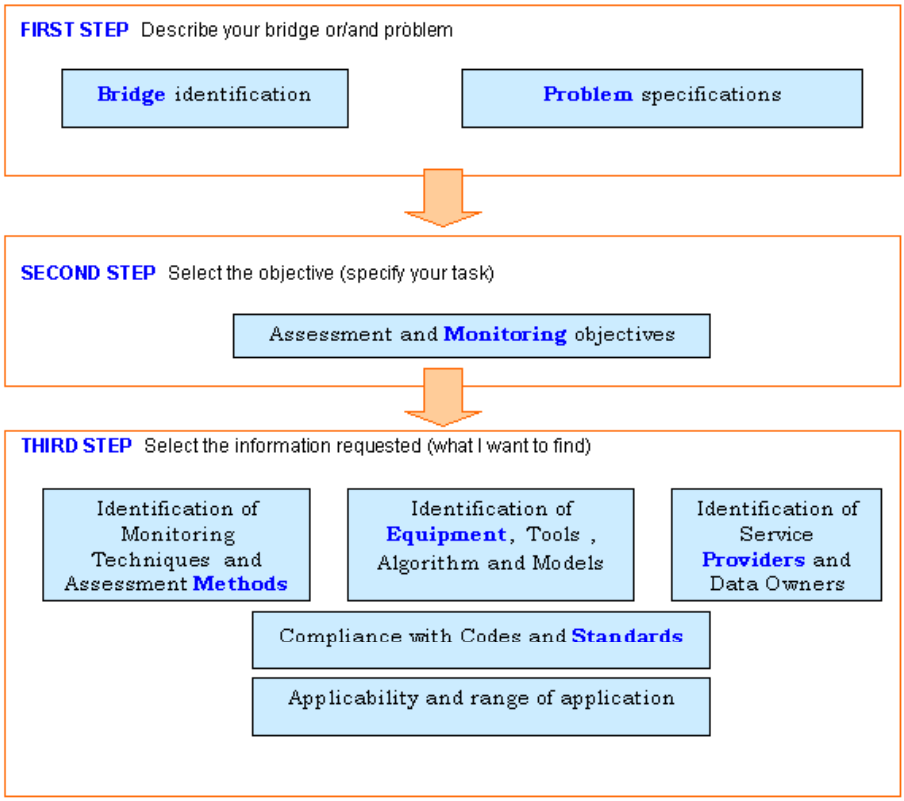
Each of these METHODS may use an **EQUIPMENT**-tools and equipment and/or models and algorithms.

To help in favouring a wide application of the solutions ,loaded in the data-base, the two aspects of "range of application" and "applicability" have been included as it important to know the limits and advantages of the proposed solutions.

Furthermore, the manager may be interested in knowing whether methods, models, procedure are certified and/or applied according to specific **STANDARDS**.

Finally, **PROVIDERS** may be contacted for further information and assistance. They may be owners of structures, consultants, suppliers, etc (we have at least one PROVIDER for each of the fields from BRIDGE to STANDARD).

▼ Flow-chart: Information query in the bridge management database



Alternatively, it is always possible to enter the data-base by clicking directly one of the following fields:

- BRIDGE-bridge
- PROBLEM-problem
- MONITORING-assessment and monitoring objectives
- METHODS-assessment methods and/or monitoring techniques
- EQUIPMENT-tools and equipment and/or models and algorithms
- STANDARDS-standards and certification
- PROVIDER-service provider

For each of the above-mentioned search fields a list of possible options is provided, both for loading and downloading.

The data-base is intended to contain only practical information. It is therefore not possible to load details on providers, methods, equipment without a corresponding bridge/problem.

The test version of the data-base has already been implemented and the data-base will be soon open to the general public.

Everybody is therefore kindly invited to load its own experience in the field of monitoring of structures.

Contact

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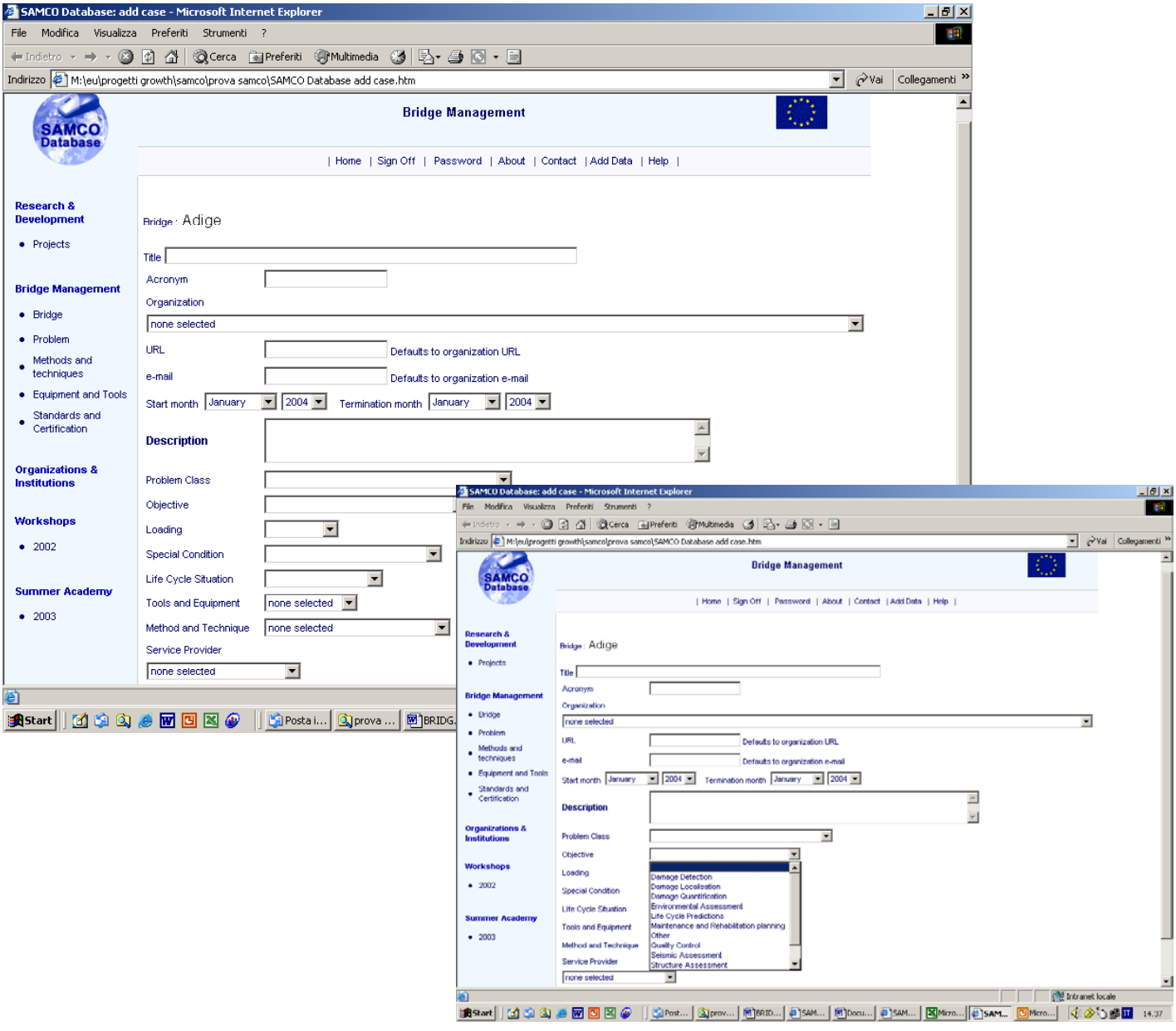
SAMCO Database
http://samco.jrc.it



News from the Profession & Practice

Prognosis of Train Traffic Induced Vibrations by Means of in Situ Train Simulation

Vibrations near railway lines are often a problem in urban areas. Provided that a good estimate of the vibration propagation is available, the vibration prognosis can already be considered during the construction of the track bed instead of subsequent amendments. The experimental determination of the dynamic response of buildings near future railway lines is the only way to make reliable prognoses due to the unclear propagation conditions in the surrounding soil.

In situ "train simulations" can be accomplished by means of a hydraulic reaction mass exciter developed within the frame of our research activities. The excitation of vibrations takes place by a hydraulic actuator through feet. The passing-by of a train is simulated by an impulse series, which represents the individual axles of the train. The excitation can be arranged according to different axle set-ups of different train types and different speeds. Vibration sensors have to be placed in surrounding buildings and on the ground. Unfiltered time histories are measured, from which any desired value can be determined later. By using this technique it is possible to compare the dynamic response of the soil and the surrounding buildings produced by the exciter with the vibrations caused by passing trains.

The reaction mass exciter is fixed on a trailer and cannot be positioned directly on the tracks. It is situated between the existing railway track and the buildings that have to be examined. Consequently the point of excitation is closer (or further) to the measurement points than the passing trains. Arsenal research has determined the decay curves of the soil vibration through oscillation sensors, which are situated in one line with growing distances from the point of excitation. Thus the vibration immission is known for objects at any distance. The recorded immissions in the buildings from the train simulation can be adjusted to any adequate distance.

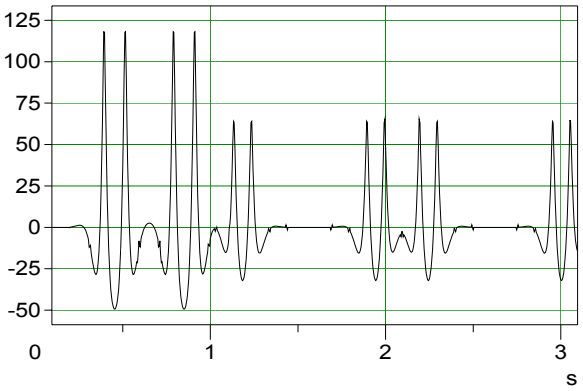
The achievable force of the reaction mass exciter is strongly influenced by the soil conditions at the site of excitation. The actual applied axle loads are measured via force sensors.

The ratio of the applied force to the real axle load is considered in the data evaluation.

The single point excitation produces different kind of oscillations than real passing trains. The practical problem with simulating a line-shaped transient excitation source can be dealt by computational methods that can synthesize the effects of a series of point excitations. More work will have to be done on this topic.

With the in situ train simulation arsenal research has invented a tool for a vibration prognosis. It presents one way to forecast vibration immissions when train traffic induced vibrations do not exist. A specific planning of the railway construction is possible with the help of the prognosis data. Applying the immission standards the exact impact on abutters and their buildings are known. The permanent way can be adjusted and furthermore expensive vibration-reducing measures can be avoided afterwards. The train simulation is not only a great invention to the research forum, but it also contributes to the understanding of transmission of vibrations and design of railway tracks.

▲ Figure 1: The reaction mass exciter



▲ Figure 2: The force signal of a train [kn]

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Announcements

The Third European Conference on Structural Control (3 ECSC) Exhibition

This conference aims at fostering scientific interactions among the vast community of researchers contributing to structural control in a broad sense, and at strengthening the European research and professional community of structural control. Cross-fertilization between the different scientific disciplines and interactions with professional engineers will be encouraged.

Active, passive, semi-active or hybrid control in both, linear and non-linear structural problems will be considered. As important branches of structural control, non-destructive testing, health monitoring, damage detection and life-line assessment will be addressed as major topics. Civil engineering, mechanical and space structures interacting with their environment and undergoing various dynamic loads such as wind, earthquakes or traffic are main targets of this conference.

For more details please visit the conference website at:
http://www.samco.org/3ecsc

For this important venue there is still the possibility to exhibit for interested companies and organisations. As exhibitor you will have the opportunity to present your products and services and to contact the interested participants as the exhibition area is located in close vicinity of the lecture rooms.

Therefore the exhibition will be the ideal forum for the presentation of your company and products to a broad audience.

For the exhibition orders beginning from from 6 m² floor space will be accepted. We are looking forward to welcome you as exhibitor in Vienna. In order to ensure your participation in the exhibition and the best possible location of your booth we are looking forward for your reservation as soon as possible

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I-SAMCO Kick-Off Meeting

The Specific Support Action I-SAMCO submitted by VCE has been accepted by the Commission. The contract preparation is now finished and the Kick-Off-Meeting is planned for **July following the 3ECSC Conference in Vienna.**

SAMCO covers participant from nearly whole Europe with strong participation of partners from the New Member States. During SAMCO it has been recognized that there are interest groups, important in global context, being created which are acting along the same lines as SAMCO. The standardisation initiative embedded in SAMCO quickly identified the international demand for global cooperation.

SAMCO has the advantage to be an industry driven initiative and could benefit from the research driven initiatives in the US and Asia.

The objective of I-SAMCO is to put the SAMCO achievements into a global level and to form cooperation with overseas partners. This will include an exchange program for researchers, mutual participation in research projects and an strong international standardisation initiative.

Calendar Of Events

June 2004

■ **2.-4.** ICCCBE, Conference on Computing in Civil and Building Engineering; *Weimar, Germany.*
URL: http://www.uni-weimar.de/icccbe/index.html

■ **24-26.** 'International Conference on Bridges across the Danube - Bridges in the Danube Bassin; *Novi Sad, Serbia.*
Contact: office@eurogardigroup.co.yu

July 2004

■ **5-7**. SEMC 2004 Conference, Second International Conference on Structural Engineering, Mechanics and Computation, *Cape Town, South Africa.*
URL: http://www.ebe.uct.ac.za/~semc2004/

■ **12-15.** 3ECSC, 3rd European Conference on Structural Control; *Vienna, Austria.*
URL: http://www.samco.org/3ecsc

August 2004

■ **1-6.** World Conference on Earthquake Engineering, Vancouver, Canada.
URL: www.venuewest.com

■ **15.-21.** ICTAM, 21st International Congress of Theoretical and Applied Machanics; *Warsaw, Poland.*
URL:http://ictam04.ippt.gov.pl

Imprint

SAMCO News

SAMCO News is a digital newsletter accompanying the SAMCO Network. It is funded by the European Commission in the frame of the GROWTH project SAMCO CTG2-2000-33069. It is an information and communication platform for the participants of SAMCO. It is issued periodically every second month.

SAMCO News is available at http://www.samco.org/news

Funding

The SAMCO Network is funded by the European Commission (http://europa.eu.int) within the *"Fifth European Framework Programme",FP5,* (http://www.cordis.lu/fp5) which covers Research, Technological Development (RTD) and Demonstration activities. FP5 has a multi-theme structure, consisting of Specific Programmes. These Specific Programmes are further divided into Horizontal Programmes and Thematic Programmes. One of these Thematic Programmes is the *"Competitive and Sustainable Growth"* Programme (http://www.cordis.lu/growth/) under which SAMCO is running.

SAMCO is running under the exact term:
CTG2-2000-33069
Shared-cost RTD and Demonstration project, Concerted Action/Thematic Network
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