OFFICIAL NEWSLETTER OF THE INTERNATIONAL SOCIETY FOR STRUCTURAL HEALTH MONITORING OF INTELLIGENT INFRASTRUCTURES

THE MONITOR

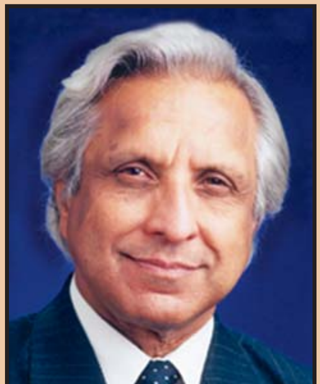
ISHMII

NOVEMBER 2004

IN THIS ISSUE:

PRESIDENT'S MESSAGE

As the design and construction of civil structures continue to evolve, it is becoming imperative these structures be monitored for their health. In order to meet this need, the discipline of Structural Health Monitoring (SHM) has emerged. It involves the application of electronics to civil structures and aims to assist engineers in realizing the full benefits of structural health monitoring. Against this background, a new international organization for promoting SHM, the International Society for Structural Health Monitoring of Intelligent Infrastructures (ISHMII) has recently been established. The aim of the Society is to advance the understanding and the application of SHM in civil engineering infrastructure, in the service of the engineering profession and society.



Prof. Aftab A. Mufti
- President ISHMII

OBJECTIVES

(a) provide a focal point for international sharing of knowledge and experience;
(b) promote collaboration to maximize the benefit of the international research and development effort;
(c) foster international harmonization of data, protocols, design and application standards;
(d) further the acceptance of SHM to establish performance-based codes by the engineering community and beyond as a major performance measuring device;
(e) advocate further innovations, particularly through the interfacing of fibre reinforced polymer composites with other technologies such as intelligent sensing;
(f) encourage owners to build Intelligent Infrastructures (II) that have longer life than the life of present structures;
(g) show the benefits of SHM for strengthening, repair and maintenance and to establish the life cycle cost analysis of innovative infrastructures;
(h) promote innovative structural design solutions with a clear focus to durable and robust structures;
(i) promote and advance the state-of-the-practice in SHM for a rapid post-hazard assessment; and
(j) promote the development of data management and intelligent processing for SHM systems.

HOW TO ACHIEVE THE OBJECTIVES

(a) organization and sponsorship of international conferences, symposiums, workshops, short courses and seminars, including a biennial official conference;
(b) publication of the official newsletter *The Monitor* and other relevant materials;
(c) establishment of Working Groups in selected areas to develop state-of-the-art reports and design recommendations;
(d) development of curriculum and course materials to meet educational needs at different levels; and
(e) other activities consistent with the aim and objectives of the Society.

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FORMATION OF ISHMII

The society is a non-profit organization that does not pursue any commercial objectives. In July 2003, the first step toward the formation of the ISHMII was taken at EMPA in Zurich, Switzerland, followed by a meeting at the International Conference on SHMII in Tokyo, Japan, in November of 2003. The meeting identified the need to form an international organization focused on the understanding and application of structural health monitoring in civil engineering infrastructure. A working group had met to develop objectives and terms of reference, which led to the formation of the International Society for Structural Health Monitoring of Intelligent Infrastructures (ISHMII). The council was formed by invitation and has a membership from several international organizations. At the first council meeting held in conjunction with the SPIE 2004 conference in San Diego, California, on March 18, 2004, the council approved the ISHMII constitution and the Executive Committee.

As the President of this new society, I am pleased to welcome you all as members. With the production of this, our first newsletter, I look forward to the mutual sharing of information for the benefit of all our members, as well as building this important society together. With your assistance, I believe ISHMII will define the future of civil engineering.

Aftab A. Mufti

PERSPECTUS

GOVERNMENT

STRUCTURAL HEALTH MONITORING SEEN AS ESSENTIAL FOR FHWA VISION

It is the Federal Highway Administration's Bridge Reasearch &Development vision to get out in front of the bridge deterioration curve and stay there. To realize this vision, the FHWA will develop and, in partnership with the states and industry, widely implement more durable and longer lasting bridges. Bridges will not only last longer but will have far lower maintenance demands. They will be able to be modified to accommodate changes in traffic or function more quickly and in a far less intrusive manner than current technology allows.

While we re-engineer for the future, we must also effectively manage the existing inventory of bridges. The bridge management systems of the future will be based upon better information, better knowledge, better technology and better decision support tools. These systems will provide decision makers with the ability to select the optimal course of action for a bridge or population of bridges at any point in their life and for any planning horizon.

We will also develop and deliver new rehabilitation, strengthening, repair, maintenance and preservation methods and technologies to effectively and efficiently deal with our extensive as-built system. The research program will build upon prior research and follow through with the development and delivery of totally new and innovative bridge systems that will eliminate the bottlenecks of the future.

FHWA's bridge research and development program has three strategic initiatives:

- developing and delivering the bridge of the future,
- stewardship and management of our existing inventory of bridges as we reengineer for the future, and
- ensuring the safety, reliability and security of the nation's bridges.

Structural Health Monitoring (SHM) is an enabling and essential aspect of each of these three initiatives. FHWA envisions sensing and measurement capabilities as being fully integrated into the design, construction and operation of the bridge of the future.

A very important element of the stewardship and management initiative is FHWA's proposed Long-Term Bridge Performance

Program (LTBP). One part of the LTBP is the use of SHM to collect continuous long-term bridge performance and operational data on hundreds of bridges. This data, when combined with data from other elements of the program, will create the knowledge that will serve as the foundation of the bridge management systems of the future. SHM also has an important role in ensuring the safety, reliability and security of our nation's highway bridges. FHWA is already researching the integration of different sensors, such as cameras and motion detectors, into SHM systems. Structural Health Monitoring will play an important role in helping the Federal Highway Administration in realizing its vision of getting out in front of the bridge deterioration curve and staying there.

Steve Chase, Federal Highway Administration
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INDUSTRY

STRUCTURAL HEALTH MONITORING FROM AN INDUSTRIAL PERSPECTIVE

Progress and innovation in construction technologies have led to the construction of a remarkable number of large-scale and innovative structures, including bridges, dams, tunnels and buildings. In our daily consultancy on fibre optic monitoring systems, we observe how maintenance engineers are increasingly involved in quantifying the effects of aging and possible damages to structures, as well as in the evaluation of safety, material failures and determination of remaining service life.

Although automatic structural health monitoring (SHM), providing quantitative data on structural behaviour, is not yet compulsory even for large-scale structures and corresponding budgets have often been of low priority, we are experiencing a consistent and continuous growth in this market, with very positive feedback from the early adopters. The main markets for our SHM system are existing structures with known structural or service problems and new structures build with innovative materials, techniques or design. In terms of world distribution we are witnessing the largest growth in Asian countries and emerging economies, in particular eastern Europe.

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RESEARCH

CHALLENGES FOR CIVIL AND ENVIRONMENTAL ENGINEERING

In the last decade, many countries experienced earthquakes, hurricanes, tornadoes, floods, terrorist attacks, power blackouts and major traffic accidents leading to damage and destruction of infrastructures, as well as human casualties. These events increased our awareness of how our critical infrastructures, such as transportation, water, power, fuel, communication, government, healthcare, etc., greatly impact our well-being and how the expense of their maintenance greatly strains our economy.

Civil and environmental engineers have made considerable progress in the understanding of this infrastructure problem. We now recognize all infrastructures are complex interconnected systems made up of interacting engineered, natural and human systems. However, knowledge and insight into the actual day-to-day performance, loading environment and behaviours of infrastructures is essential before we may integrate and apply systems-engineering concepts and tools for solving complex infrastructure problems. Observations, measurements and experiments involving actual infrastructures and constructed systems in the field constitute essential steps for acquiring this knowledge. Civil and environmental engineers who are capable of observing and conducting reliable measurements and controlled experiments on actual constructed systems are especially critical for advancing the state-of-practice in infrastructure engineering and management.

Currently, we do not have common terminology and metrics related to most of the concerns outlined previously. We need to learn how to conduct scientific research on actual operating infrastructures before we can formulate meaningful metrics for life-cycle cost and performance. In addition to the identification of performance metrics, the success of this effort will depend upon adopting technology for implementing promising paradigms, such as performance-based engineering and intelligent systems to infrastructures. Since we cannot yet properly simulate infrastructure systems analytically or physically, to be successful research and demonstrations on actual operating infrastructure systems are necessary.

We believe ISHMII has been established to bring together researchers interested in problem-focused, integrative research by taking advantage of actual infrastructure test-beds to be developed into field laboratories. It is anticipated this organization will successfully serve as an international nexus to all renaissance engineers who are concerned about the performance, protection and preservation of our critical infrastructures and who share an interest in taking an active role for bringing effective solutions to this pressing societal problem.

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SMART CABLE STAYED GFRP-BRIDGE: A LABORATORY RESEARCH PLATFORM AT THE SWISS FEDERAL LABORATORIES FOR MATERIALS TESTING AND RESEARCH (EMPA)

Daniel Gsell & Masoud Motavalli

A PROJECT OF THE STRUCTURAL ENGINEERING RESEARCH LABORATORY AT EMPA

In today's bridge design, a trend towards bigger spans and more slender and lightweight structures and structural elements can be observed. This structural development is based on an increased use of high performance building materials. As a consequence of these trends, modern bridges are becoming increasingly prone to vibrations. The same external dynamic excitation energy causes larger vibration amplitudes since the inertia mass of the structures is reduced. Due to the slender design, the stiffness reduction shifts the eigenfrequencies of the structure towards excitation frequencies containing higher mechanical energy. As a result, the structural components are subjected to an increased fatigue loading and the lifetime decreases.

The application of glass fibre reinforced polymer (GFRP) profiles in bridge construction, especially in bridge decks, accentuated the trend to lighter engineering structures. The light and nevertheless, high-strength GFRP profiles in combination with stiff structural elements, such as steel cables or carbon fibre reinforced tendons, enable the design of very slender and lightweighted structures. Compared to conventional building materials, a slightly differentiated dynamical behaviour is being observed in GFRP constructions. Since the material is light, high vibration amplitudes result but the smallest resonance frequencies of the unloaded structure are relatively high. As a result of the high ratio life-load to dead-load, the eigenfrequencies of these constructions are strongly dependent on the actual loading. In the case of high live-loads, the resonance frequencies decrease and the above mentioned dynamic deficiency becomes relevant again. This behaviour is a real challenge for conventional vibration mitigation systems, e.g. for Tuned Mass Dampers (TMD) or common viscous dampers.

In order to avoid these drawbacks, the development of appropriate vibration mitigation set-up's and health monitoring systems become essential. Therefore, at the EMPA-Laboratory, a cable stayed footbridge with GFRP-girder has been built. The main objective of this project is to create an experimental research platform. Different subprojects of our research group and of interested external partners will be integrated into this bridge project.

Because of the limited space in a laboratory, a footbridge was designed with dimensions of 20.0 x 2.5 x 7.5 m^3. In order to get a realistic structure, the bridge was constructed on the basis of the load assumption of the European Union standards. The bridge girder consists of five plate modules, composed of pultruded structural GFRP profiles. Furthermore, a global static system – a cable stayed structure – is chosen. Despite the use of the soft GFRP profiles, suspending the bridge deck by stiff cables in a relatively short span enables the design of a slender girder. The free span is suspended by three pairs of seven-wire steel strands. The total weight of the longitudinal girder amounts to 1.3 tonnes. Compared to an ultimate loading of 15 tonnes, an extremely light structure has been designed.

Currently available in the EMPA-Laboratory is a cable stayed footbridge with GFRP girder. The first rough inspection of the bridge showed this structure is definitely prone to vibration. In the near future the bridge will be dynamically investigated in detail. The emphasis is to receive detailed knowledge in the dynamics of lightweighted structures. As the next step, subproject by subproject will be integrated. Two selected subprojects are outlined below. The developments of these projects are validated experimentally within the footbridge. Some of these subprojects are investigated in collaboration with external research groups of industrial partners. Since the cable stayed footbridge will stay in the EMPA-laboratory for several years, new project partners are welcome to take part in our bridge project.

Adaptive Tuned Mass Damper

TMD's are commonly used as efficient damping systems. Mitigating the lowest eigenmodes of skyscrapers and bridge girders are typical applications of these damping devices, i.e. applications without a fixed reference location to easily attach a viscous damper. TMD's are built of an inertia mass which is connected to the structure by an elastic spring and a damper. The mass is typically in the order of 1% of the structural mass and located in a valley of the mode shape desired to mitigate. The stiffness of the spring and the parameters of the dashpot have to be chosen so the resonance frequency of the subsystems is close to the eigenfrequency of the whole structure. Therefore, kinetic energy of the vibrating structure is transferred to the TMD. This leads to large relative amplitudes between the structure and the additional mass. The intermediate viscous damping element will efficiently dissipate the kinetic energy of the structure. Tuned Mass Dampers will only operate efficiently if their frequency is well tuned. The resonance frequencies of lightweight structures are strongly dependent on their actual loading. In order to mitigate such a construction, an adaptive TMD will be developed within this project. The frequency of this damping system will be permanently adapted to the actual frequency of the structure.

Fault Detection by Curvature Estimation with Fibre Optic Sensors

Today, structural assessment of bridges is often done by modal analysis. As a result, translational degrees of freedom, typically acceleration amplitudes, are measured. From these measurements the eigenfrequencies and the mode shapes are determined. Since structural damages can be interpreted as stiffness reductions of the constructional elements, they have an influence on the modal parameters. Therefore, changes in these parameters are used as damage indicators. This approach is applied to real structures with rather moderate success because the influence of local stiffness reductions on the modal parameters is moderate, whereas environmental temperature changes have a strong influence on the estimated frequencies and mode forms. In this project the structural assessment is based on directly measured curvatures. This approach is based on the fact structural curvatures are much more sensitive to damages than displacements are. The measurement of the curvatures will be done by fibre optic sensors. Sensors with moderately long gauge length will be used to measure averaged strains. The sensors are located at the top and at the bottom of the element to assess so the curvature can be determined. These fibre sensors will be integrated into the structural elements.

Smart Wireless Sensing

Dynamic investigations of large structures require a lot of measurement points. Since each sensor has to be connected individually and a large amount of measurement data is acquired, such inspections are time- and cost-intensive. Therefore, for this project a wireless measurement system has been established, consisting of a base station and several satellites. The satellite includes the sensor itself, its electrical supply, a digital signal processing unit which pre-processes and reduces the data in an intelligent way and a radio transmitter. The basis station controls the communication within the sensor network, synchronizes the measurements, stores the digitized data from the satellites, is able to recognize structural safety problems and can react adequately.

Acknowledgement

This project is financially supported by the Gebert Rüf Stiftung and the ETH council. The companies Fiberline S/A in Denmark (www.fiberline.com) and Maagtechnic AG in Switzerland (www.maagtechnic.ch) are supporting the project with structural GFRP profiles and their know-how. Additionally the project is integrated into the 6th European Union Framework Programme for Research and Technological Development (Sustainable Bridge).

WWW Link: http://www.empa.ch/plugin/template/empa/93/2201/---/l=2

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STRAIN PROFILE WITH DISTRIBUTED BRILLOUIN SENSOR:

A STEP TOWARD ANTICIPATIVE DETECTION OF LOCAL DEGRADATION OF STRUCTURES

Distributed sensors based on Brillouin scattering are attractive candidates to monitor structural health of linear structures such as pipelines and beams. These sensors measure strain due to local deformations such as buckling, and, at the same time, allow real-time control over lengths ranging from metres to tenths of kilometres.

We conducted an experiment reproducing the buckling of a one-metre-long steel beam. Its inner wall was intentionally thinned at 40cm from the beginning of the specimen. The thinned section length was 10cm. An optical fibre was laid along the external wall. Strain gauges were glued in the thinned wall area. An axial load was applied until the buckling occurred. Simultaneous strain measurements were carried out with Brillouin sensor and strain gauges. Both techniques show compression follows the load increase with a dip in the strain profile corresponding to the induced weakness. The dip deepening started to be unambiguously observed for a load of 780kN. The buckling happened after the 890kN load and was monitored with the Brillouin sensor system.

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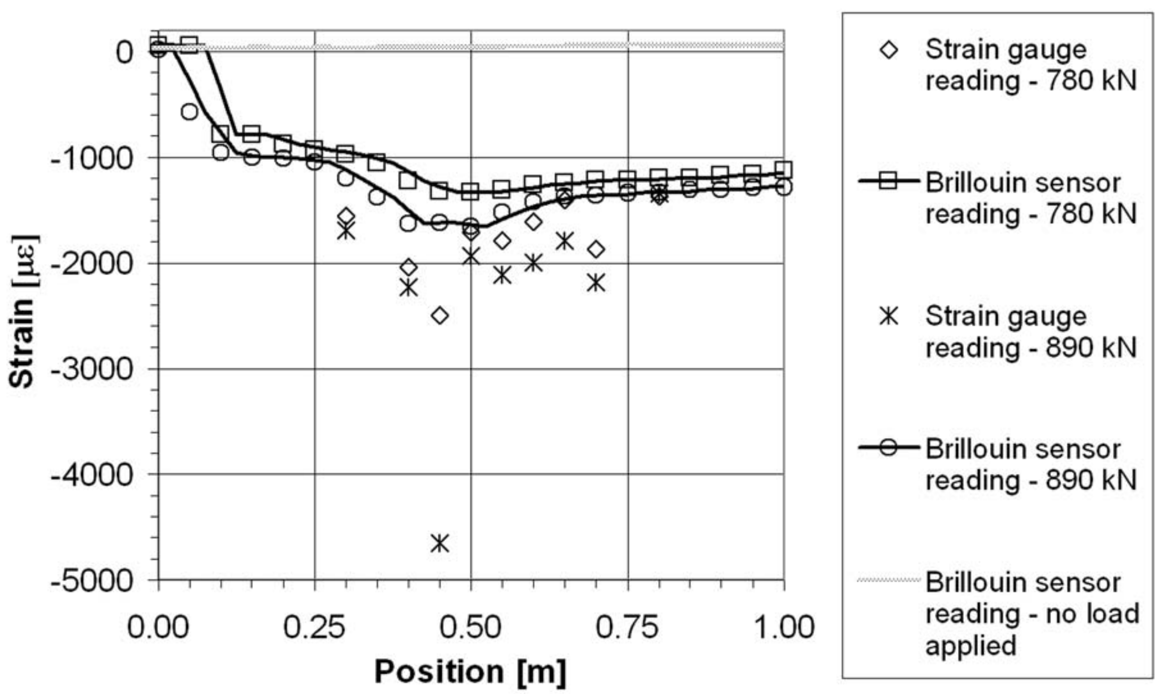
COMPARISON OF STRAIN GAUGE AND BRILLOUIN SENSOR



DISTRIBUTED BRILLOUIN SCATTERING SENSOR FOR SHM OF PIPELINES

Pipeline integrity and disturbance are generally not monitored due to the lack of reliable and durable techniques. Unfortunately, the lack of information available on the type and location of pipeline faults has created inefficient and potentially costly situations. A distributed Brillouin fibre sensor provides an excellent opportunity for SHM of civil structures

by allowing measurements to be taken along the entire length of the fibre, rather than at discrete points, by using fibre itself as the sensing medium. Currently, Dr. Bao's group at University of Ottawa applied their sensor to identify several inner wall cutouts of 1-5cm sizes in an end-capped steel pipe by measuring the axial and hoop strain distributions along the outer surface of the pipe under the pressure of <550psi. The locations of structural indentations comprising 50 and 60% of the inner pipe wall are found and distinguished using strain-pressure slope. These results are quantified with fibre orientation, defect size and depth relative to unperturbed pipe sections.

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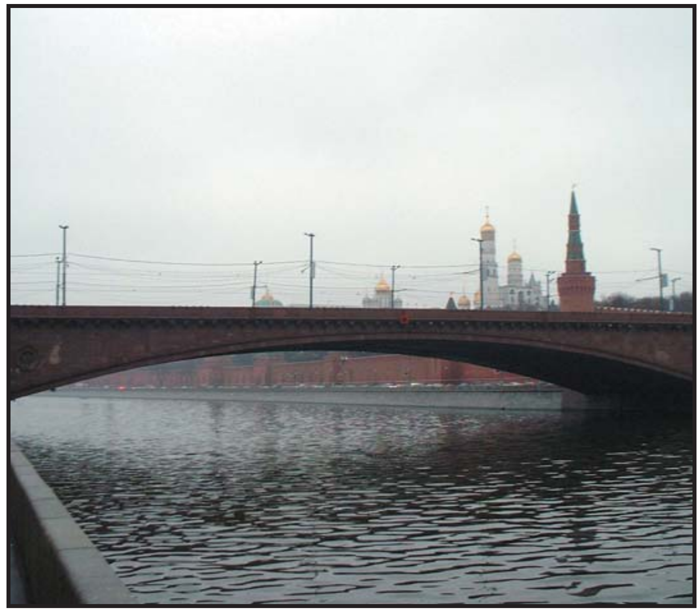

APPLICATION OF SOFO® SYSTEM IN THE CITY OF MOSCOW

Visible Signs of Degradation of Bolshoj Moskvoretsky Bridge Required New Decisions in Structural Health Monitoring

To increase knowledge of the structural behaviour of this traffic loaded bridge, which is one of the main lines in to the city to the Red Square, it had been decided to observe the bridge curvature in both horizontal and vertical direction using the innovative SOFO® Fibre Optic Monitoring System designed by Smartec SA.

Bolshoj Moskvoretsky Bridge consists of three spans (43 m, 92 m, 43 m) and is structured as follows: the bridge consists of three parallel arches. The cross-section of each arch contains three boxes separated by partitions 350-450 mm thick (along the axis of the bridge) and diaphragms with openings for maintenance purposes. The superstructure consists of the bridge deck, supported by columns resting on the above-mentioned separating partitions.

The bridge has been monitored since 2003 by ZAO "Triada-Holding" Moscow using 16 SOFO® Standard Sensors and six thermocouples. The data showed linear deformations of the bridge structure were due to changes of structural concrete temperature. These results prove, in general terms, the state of the bridge structure can be estimated as stable.

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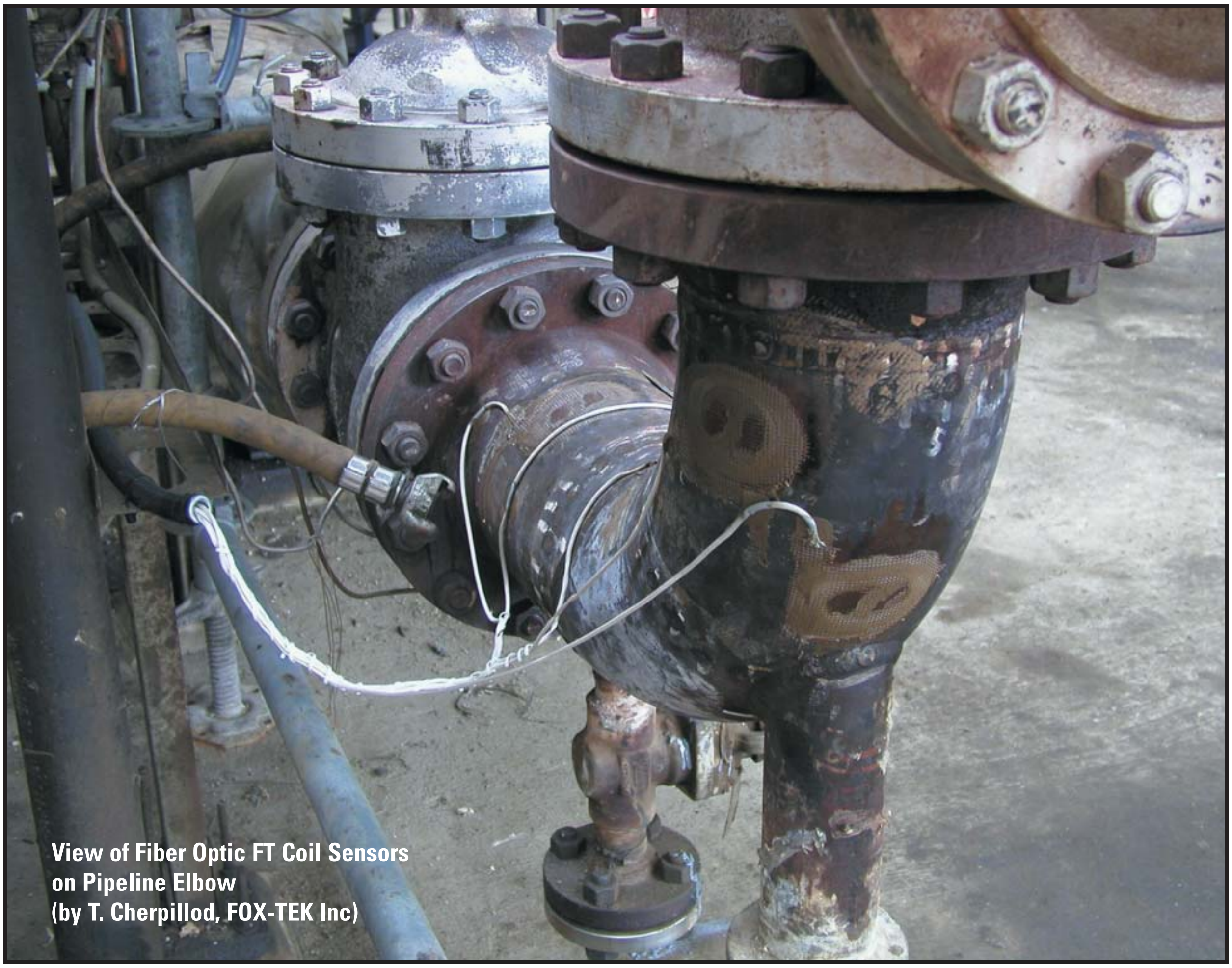
FIBRE OPTIC SHM SYSTEM FOR MONITORING INTERNAL PIPELINE CORROSION



View of Fiber Optic FT Coil Sensors on Pipeline Elbow (by T. Cherpillod, FOX-TEK Inc)

FOX-TEK Inc, located in Toronto, Ontario, Canada, manufactures fibre optic sensors for monitoring the effects of internal erosion and corrosion in pipelines. These FT sensors were successfully employed on an oilsands plant tailings line in Fort McMurray, Alberta to detect wall thinning over a period of several months.

The sensors were bonded to the external pipe surface in spiral and hoop wrap configurations to provide monitoring over pipe lengths of many metres. The sensors were connected to an FTI-3300 FT Sensor Scanner, and continuous remote monitoring was provided at the FOX-TEK offices in Toronto through a wireless internet connection. Recently, an FT coil sensor was developed to monitor local corrosion over a small surface area on "hot" elbow pipes in refineries.

The coil sensor is fabricated with an adhesive mesh for easy installation and is bonded to a pipe, at ambient temperature, using a high temperature adhesive. In a typical application, several coil sensors are also used to monitor temperature (to 260°C) and line pressure fluctuations. Using software developed by FOX-TEK, threshold thickness limits are set by the user to provide a baseline reference for the SHM system. By managing the pipeline integrity, operational maintenance schedules can be optimized to reduce costs.

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ISHMII APPLICATION FOR MEMBERSHIP

INTERNATIONAL SOCIETY FOR STRUCTURAL HEALTH MONITORING OF INTELLIGENT INFRASTRUCTURE

RETURN TO: **INTERNATIONAL SOCIETY FOR STRUCTURAL HEALTH MONITORING OF INTELLIGENT INFRASTRUCTURE**
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Date of Receipt: ______________________

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Date of Approval: ______________________

Membership Number: ______________________

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PLEASE PRINT

Title	First Name	Mid. Name / Initials	Last Name

Employer

Correspondence Address

Bus. Telephone	Fax	E-Mail

EDUCATION

Major	College / University	Graduation Date	Degree

EXPERIENCE (If space is insufficient, attach pages or short CV. List personal home page address here, if applicable.)

I / We wish to join the ISHMII as a (please mark one) (Note: Developing countries will be given a discount of 50%)

☐ Full Member ($100 US) ☐ Student Member ($25 US) ☐ Corporate Member ($250 US)

If applying for corporate membership, please nominate three additional representatives to receive privileges.

1.
Title	First Name	Mid. Name / Initials	Last Name

2.
Title	First Name	Mid. Name / Initials	Last Name

3.
Title	First Name	Mid. Name / Initials	Last Name

METHOD OF PAYMENT (in US funds) (Please make cheques and money orders payable to ISHMII)

☐ Check / Money Order ☐ Visa ☐ Master Card ☐ Bank Draft*

*For details on process for bank draft, e-mail central@isiscanada.com

Credit Card No.: ______________________ Expiry Date (mm/yy): ______________________

Name on Credit Card: ______________________ Amount $: ______________________

Signature: ______________________ Date: ______________________

First Announcement and Call for Papers: **www.hit.edu.cn/ishmii-2**

THE 2ND INTERNATIONAL CONFERENCE ON STRUCTURAL HEALTH MONITORING OF INTELLIGENT INFRASTRUCTURE

(SHMII-2'2005)
Nov. 16 -18 (Wed. – Fri.), 2005
Shenzhen, P. R. of China

SPONSOR: International Society for Structural Health Monitoring of Intelligent Infrastructure (ISHMII)

CO-SPONSORS:
The National Natural Science Foundation of China (NSFC), China
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The European Science Founation (ESF), Europe

Chinese Society of Civil Engineering (CSCE), China
American Society of Civil Engineers (ASCE), USA
Japan Society of Civil Engineers (JSCE), Japan
Canadian Society of Civil Engineers (CSCE), Canada

Harbin Institute of Technology, China

BACKGROUND AND OBJECTIVES

Structural health monitoring is becoming an attracting and challenging area of intelligent infrastructure. It is a well symbol integrating high-tech technologies such as smart sensors, wireless sensor networks, signal acquisition and processing, real-time data transferring and management. It is a concrete embodiment of modern testing technology so that a monitored infrastructure is in fact a long-term, full-scale and real-time testing system for the infrastructure. And more, it is a trend representing the integration, multi-disciplines cross and innovation of civil engineering such as development of "real-time monitored state" based damage identification and localization, model updating, safety evaluation and reliability forecast and also feedback on "state of the health" based damage control, maintenance and retrofit decision-making for realization of life-cycle performance-based design of infrastructure.

SHMII-2'2005 is the 2nd International Conference on Structural Health Monitoring of Intelligent Infrastructure after the 1st International Conference was held with very great success in Tokyo, Japan (November 13-15, 2003). SHMII-2'2005, SHMII-3'2007, … , are determined as the series of official academic conferences of International Society for Structural Health Monitoring of Intelligent Infrastructure (ISHMII) by the ISHMII Council Meeting on March 18, 2004, San Diego, CA., USA when and where ISHMII was founded.

SHMII-2'2005 is planned to provide the international scientists, engineers, enterprisers and young researchers with a forum to exchange the recent advances, explore the potential of possible international cooperation, promote the multi-disciplines cross and share the bright ideas on the state-of-the-art, state-of-the-practice and future trends of smart sensors, advanced sensor networks and integrated systems for structural health monitoring of intelligent infrastructures, and "real-time monitored state" based damage identification and localization, model updating, safety evaluation and reliability forecast and also damage control, maintenance and retrofit decision-making and life-cycle performance-based design of infrastructures.°

SCOPE OF THE CONFERENCE

The conference will focus on aspects such as:

- Smart and other advanced sensors
- Wireless and other advanced sensor networks
- Data acquisition, processing and management
- Damage identification and localization
- Model updating, safety evaluation and reliability forecast
- Damage control, repair and strengthening
- Life-cycle performance-based design
- Smart materials and structures
- Global position system (GPS) and related systems for wind and earthquake hazard mitigation of civil infrastructure
- Remote monitoring systems
- Integrated systems and implementation of SHM
- Design guidelines and codes of SHM
- Standardization of SHM systems
- Critical issues for SHM

IMPORTANT DATES

Abstract Submission (100-300 words)
February 28, 2005

Abstract Acceptance
March 15, 2003

Submission of Camera-Ready Manuscripts
May 15, 2005

Paper Acceptance
June 15, 2005

Submission of Final Camera-Ready Manuscripts
July 15, 2005

Pre-registration
October 31, 2005

All abstracts and full papers should be submitted to: **shmii-2@hit.edu.cn**
Electronic submission strongly recommended.

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REGISTRATION FORM

SHMII-2'2005 THE 2ND INTERNATIONAL CONFERENCE ON STRUCTURAL HEALTH MONITORING OF INTELLIGENT INFRASTRUCTURE

Last Name: ______________________ First Name: ______________________

Title: ______________________

Organization: ______________________

Address: ______________________

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Phone: ______________ Fax: ______________ E-mail: ______________

☐ I intend to participate. Please keep me informed. ☐ I intend to give a presentation. an abstract will follow.

☐ An abstract is attached.

PUBLICATIONS

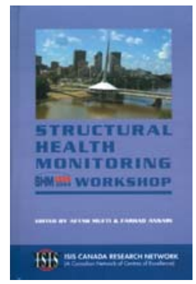
Structure and Infrastructure Engineering : An International Journal

ISHMII members will receive a 50% discount on a subscription to Structure & Infrastructure Engineering. The 2005 subscription rate for ISMII members is $49 USD, or 30 pound Sterling or 45 Euro. Stucture & Infrastructure Engineering - Management and Life-Cycle Design and Performance is an international journal dedicated to recent advances in maintenance, management and life-cycle performance of a wide range of infrastructures. The aim of this journal is to present research and developments on the most advanced technologies for analyzing, predicting and optimizing infrastructure performance.

For further information, please go to **www.tandf.co.uk/journals/titles/15732479.asp**

Structural Health Monitoring Workshop 2004 Proceedings

The Second International Workshop on Structural Health Monitoring of Innovative Civil Engineering Structures was held in Winnipeg, Canada on September 21-22, 2004. The Workshop's Goal was to provide a state-of-the-art report on recent research activities, technological utilization and commercialization activities in structural health monitoring technologies that will strongly support the introduction of innovations in civil structural engineering. The Proceedings from the workshop are available for $100 CDN. To place an order for a copy of the Proceedings, please email Charleen Choboter at choboter@ms.umanitoba.ca.



CONFERENCES

Second SAMCO Summer Academy 2005 September 5-9, 2005 2005Zell am See, Austriahttp://www.samco.org/academy05/

The academy is an initiative of SAMCO, an EU funded European network on structural assessment, monitoring and control, coordinated by Dr. Helmut Wenzel (VCE Holding GmbH). The 1st SAMCO Summer Academy 2003 took place in July 2004, at Cambridge University, UK. The 2nd Summer Academy 2005 will take place from September 5-9, 2005 in Zell am See, directly on the lake in the beautiful Salzburg region of Austria. This four-day event aims at dissemination of the state-of-the-art in structural assessment, monitoring and control, at training on applications and at providing access for the participants to the international community. Subjects include monitoring & monitoring processes, data management & decision support, natural disaster mitigation & risk management.