INTERNATIONAL SOCIETY FOR STRUCTURAL HEALTH MONITORING OF INTELLIGENT INFRASTRUCTURE

ISHMII

The International Society for Structural Health Monitoring of Intelligent Infrastructure

Founded and formed in 2003 on the vision of a
few distinguished members of civil engineering community
(Founding President: Prof. Mufti, Univ. of Manitoba,
Following President: Prof. Ansari, Univ. of IL at Chicago)

Dedicated for Advancement of Structural Health Monitoring Technologies and related Asset Management Methodologies for Engineering Structures

INTERNATIONAL SOCIETY FOR STRUCTURAL HEALTH MONITORING OF INTELLIGENT INFRASTRUCTURE

Proposed objectives to be discussed

Promoting SHM systems alongside NDT/NED methodologies to avoid damage and consequent economical & societal problems

- Mutual presentation of current activities in SHM; structures of interest
- Presentation of the ISHMII's objectives and society structure
- Discussion of possible touch points for a future cooperation between Abendi and ISHMII; networking; key tasks
- Building bridges between the Latin American academia (experts and PhD students) & SHM industry supported by ISHMII; benefits from ISHMII publications (Journal, e-magazine)

INTERNATIONAL SOCIETY FOR STRUCTURAL HEALTH MONITORING OF INTELLIGENT INFRASTRUCTURE

Objectives of ISHMII (see also flyer or website)

- Promoting innovative structural monitoring solutions as an integrated part of designed and exisiting structures
- Providing a platform for engaged and globally interacting members who foster collaboration with national or regional associations
- Respond to technical and societal challenges to manage risks (historical structures, structures in dense urban regions and for large public gatherings)
- Knowledge sharing and experience exchange among international experts and communities
- Multi-disciplinary research for risk management and estimation of the structure's remaining life
- Foster international standardization
- Accelerate the acceptance of SHM as a major performance measurement and evaluation tool by owners and authorities

INTERNATIONAL SOCIETY FOR STRUCTURAL HEALTH MONITORING OF INTELLIGENT INFRASTRUCTURE

Management Team

President : Dr. Wolfgang Habel, BAM Berlin/Germany

Vice-President for Finance:
Prof. Zhishen Wu, Ibaraki Univ. Tokio &
Southeast Univ. Nanjing, China

➔ **Next President** (President-elect)**: 2017 - 2019**

Vice-President for Education:
Prof. Branko Glisic, Princeton Univ. USA

Vice-President for Membership Development:
Prof. George Akhras, Royal Military College of Canada in Kingston/Canada

February 19, 2016

INTERNATIONAL SOCIETY FOR STRUCTURAL HEALTH MONITORING OF INTELLIGENT INFRASTRUCTURE

Constitution and By-Laws
International Society for Structural Health Monitoring of Intelligent Infrastructures (ISHMII)

Amended and Adopted February 2016

Index of Articles

INTERNATIONAL SOCIETY FOR STRUCTURAL HEALTH MONITORING OF INTELLIGENT INFRASTRUCTURE

Members of ISHMII

- Practitioners
- Scientists
- Students and students groups
- Engineers working in the field and academia
- Leading members of governmental and regional authorities
- Infrastructure managers, Consultants


ISHMII
www.ishmii.org
International Society for Structural Health Monitoring of Intelligent Infrastructure
Welcome
News
Log-in
Contact
NEWS
Tuesday, August 4th, 2015
Project Coordination Position – Singapore-ETH Centre
The Singapore-ETH Centre for Global Environmental Sustainability (SEC), a joint effort between ETH Zurich and
more...
Wednesday, June 17th, 2015
Special Issue on Probabilistic SHM
The July 2015 issue of the Journal of Civil Structural Health Monitoring (JCSHM) (Volume 5,
more...
SEARCH
Welcome
Visitors
President's Message
We are ISHMII
Leadership & Management
Corporate Members
Journal of CSHM
Upcoming Conferences & Workshops 2015-2017
SHMII-7 (2015) Sponsors & Exhibitors
Knowledge & Education Center ~ Proceedings
Membership & Benefits
The Monitor & Membership Notes
Aftab Mufti Medal
News & Features
Welcome
ISHMII is a global organization of Civil Structural Health Monitoring practitioners and researchers
Your membership raises the visibility and understanding of our field
Join ISHMII or Renew Your Membership for 2015, Now
: : Features : :
Upcoming Executive Committee Election
The ISHMII Council will elect of three vice presidents to serve on the ISHMII Executive
JCSHM Articles With Impact
We invite you to take a closer look at the Journal of Civil Structural Health
more...
Aftab Mufti Best Paper Competition
ISHMII is pleased to announce that the Aftab Mufti Best Paper Medals for 2013 and
more...
Baidar Bakht Appointed to Order of Canada
ISHMII congratulates member of the ISHMII Council and expert on structural health monitoring, Dr. Baidar
more...
The ISHMII Monitor – Now Available
Read the December issue of The Monitor, ISHMII's electronic magazine, now


ISHMII Conferences – SHMII-x
SHMII-6 2013 Hong Kong, China
SHMII-7 2015 Torino, Italy
SHMII 7 Torino 2015
> 300 Participants from 30 countries

ISHMII Workshops – CSHM-x

SHM Systems Supporting Extension of the Structures' Service Life

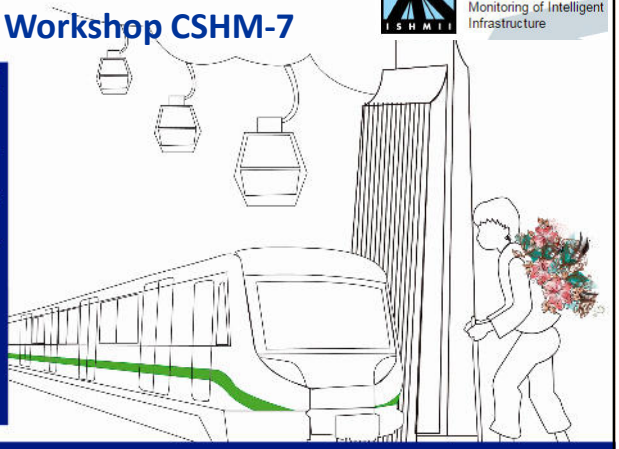
SHM and Maintenance of Short & Medium Span Bridges

Structural Health Monitoring of New and Ageing Infrastructure to Extend Life

Upcoming ISHMII Workshop CSHM-7

International Society for Structural Health Monitoring of Intelligent Infrastructure

7th Workshop on Civil Structural Health Monitoring



June 1 - 2, 2017
Universidad EAFIT, Medellín - Colombia

MEDELLIN CONVENTION & VISITORS BUREAU · Medellín todos por la vida · Alcaldía de Medellín · UNIVERSIDAD EAFIT

Organized by Prof. Juan Carlos Botero

7th Workshop on Civil Structural Health Monitoring
June 1 - 2, 2017
Universidad EAFIT,
Medellin - Colombia

ADVANCED MEASUREMENT SYSTEMS AND SIGNAL PROCESSING METHODOLOGIES TO DETECT UNUSUAL BEHAVIOUR

The civil structural health monitoring **CSHM-7 Workshop** will discuss five **topics associaded with the monitoring**:

- Topic 1: The new technologies and equipment
- Topic 2: Geotechnical instrumentation
- Topic 3: Structural instrumentation
- Topic 4: Infrastructure instrumentation
- Topic 5: Signal processing techniques

http://www.eafit.edu.co/cec/congresos/CSHM-7-2017

Upcoming ISHMII Conference SHMII-8

SHMII-9, July/Aug. 2019 in St. Louis / USA

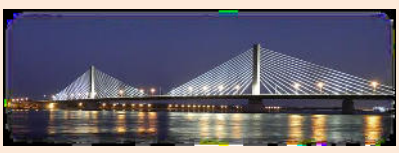
http://shmii2017.org/
Organized by Prof. Tommy Chan & Dr. Saeed Mahini

Institutional sponsorship of SHM events

Scientific events endorsed and promoted by ISHMII

Joint conferences

2. International Conference on Bridge Testing, Monitoring & Assessment in Cairo / Egypt, 27-29 December 2015

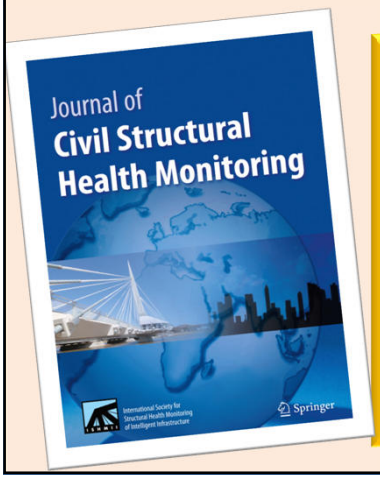


Sharing Knowledge

Best Paper Award

INTERNATIONAL SOCIETY FOR STRUCTURAL HEALTH MONITORING OF INTE

WWW.ISHMII.ORG



Invitation to submit papers and research results

to the

Journal of Civil Structural Health Monitoring (JCSHM)

at

www.ishmii.org/jcshm/

ISHMII members receive a free subscription

Sharing Knowledge

INTERNATIONAL SOCIETY FOR STRUCTURAL HEALTH MONITORING OF INTELLIGENT INFRASTRUCTURE

***The Monitor*, The ISHMII e-Magazine**

to share experiences

Technical reports and case studies from researchers and practitioners around the world focusing on applications, research & best practices in the SHM field.

Submission of articles at www.ishmii.org/the-monitor/

ISHMII Task Force "SHM Standardization"

Chair team:

Chair: Zhishen S.Wu (Japan, China)
Co-chairs, Y.Q. Ni (Hong Kong, China), J. Brownjohn(UK)

Key Members:

F. Ansari (USA), B. Glisic (USA), P. Furtner *(Austria),*
W. Habel (*Germany*), Y. Lei (China), H.N. Li (China),
H. Li (China), Y. Lu (UK), A. Mufti (Canada), J-T Kim (South Korea),
J. Newhook (Canada), B. Shi (China), H. Wenzel *(Austria),*
Douglas Thomson (Canada), J. Zhang (China), Y.F.Zhang (China)

Co-operating countries and regions:

Austria ,Canada, China(Mainland, Hong Kong) , Germany , Japan,
South Korea, USA

ISHMII Task Force "SHM Standardization"

Goals and tasks:

- Develop international model codes (ISHMII code series) for SHM of infrastructure;
- Establish the architecture of intelligent infrastructure;
- Maintain the state-of-the-art and the state-of-practice knowledge database on SHM and intelligent infrastructure;
- Promote the exchange of information and harmonization on SHM documentations, specifications, and guidelines from different counties and regions.

Deliverables:

- Survey and State-of-the-art report on SHM standardization activities from different counties and regions by Sommer 2015;
- ISHMII code series (ISHMII SHM code: is being completed) including concept and framework of intelligent infrastructure

ISHMII Task Force "SHM Standardization"

www.ishmii.org

Structure of ISHMII series codes on SHM of Civil Infrastructures as international model codes

Level 1 - ISHMII Code : General Principles, Definitions and Approaches

The guide should be sufficiently broad and also accessible (i.e. intelligible) to a range of stakeholders in SHM, from the structure operator to the academic expert.

Level 2 - ISHMII Code : For Different Major Structures or Major Sensing Technologies

Under consideration:
- Guideline for the Design of SHM for Bridge Structures
- Guideline for the Design of SHM for Geotechnical Engineering
- Guideline of Fibre-Optic Sensors based SHM for Civil Infrastructures

Level 3 - ISHMII Code : Recommended SHM guidelines (or standards) of different countries or regions

ISHMII Task Force "SHM Standardization"

Level 1-ISHMII Code: General Principles, Definitions and Approaches

1. Introduction
- 1.1 Scope of the standardization
- 1.2 Basic concepts
- 1.3 Category of structures/structure crowds(network): *Structure category, Monitoring type, Demands, Monitoring period, Signal transmission and Acquisition type*
- 1.4 Objectives of SHM
- 1.5 Relations among routine inspection, NDE inspection and SHM

2. Definitions for Damage, Performance, Health, and SHM
- 2.1 Structural Damages
- 2.2 Structural Performances
- 2.3 Structural Health
- 2.4 SHM

3. Composition of SHM and Monitoring Strategies
- 3.1 Composition of SHM: *SHM functions and SHM systems*
- 3.2 Monitoring Strategies

4. Sensors/sensing System
- 4.1. Sensors: *Strain, Displacement, Acceleration, Pressure, Velocity, Corrosion, Temperature, Wind, etc.)*
- 4.2 Implementation Methods: *Monitoring system design, Sensor installation, Signal transmission, Data collection*
- 4.3 Performance Requirement and Evaluations: *Sensor performance, Environmental conditions, and Economic considerations*

ISHMII Task Force "SHM Standardization"

Level 1-ISHMII Code: General Principles, Definitions and Approaches

5. Data Acquisition and Management Systems

5.1 Data Acquisition System: *Components of data acquisition systems, Types of data acquisition systems, Data Acquisition Modes*

5.2. Data Management System: *Functions of data management system, Components of data management system, Key Operation Items in DMS*

6. Networking, Communication, and Control

6.1 Networking

6.2 Data Communication: *Communication Protocols, Modes of Communication*

6.3 Data Processing and Control system

7. Measurement Calibration and Data Interpretation

7.1 Types and Sources of System Errors: *Systematic or Bias Errors, Random Errors*

7.2 Calibration of analysis errors

8. Structural Diagnosis and Prognosis

8.1 Algorithms of structural condition parameters and damages: *Deformation, Stiffness, Dynamic responses, Finite element modeling modification, Damages, Support degradation, etc.*

8.2 Assessment on Environmental Conditions and Loads

8.3 Performance Evaluations: *Performance Limits for Evaluation (bridge, tunnels), Applications of structural health evaluation*

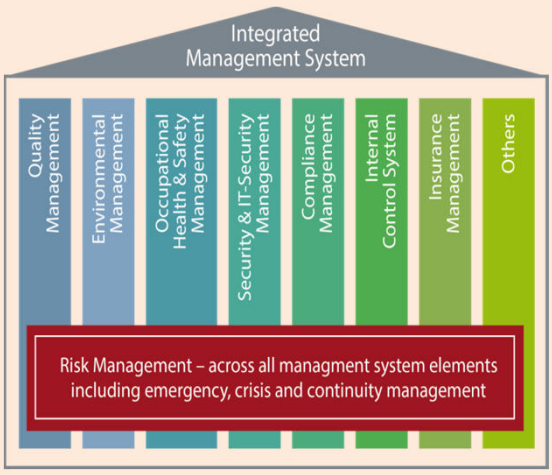
8.4 Evaluations of Residual Life

9. Examples (*10 examples including: Bridge health monitoring system of Tsing Ma Bridge, Distributed Long-gauge Sensing of Sutong Yangtze River Highway Bridge*)

10. Appendix: Commercially Available Sensor Technologies

Integrated assessment and management system (IMS)

- Interaction of all structure components during their life cycle
- Critical lifecycle cost-benefit analysis
- Combining the vertical elements of the IMS with the risk management elements



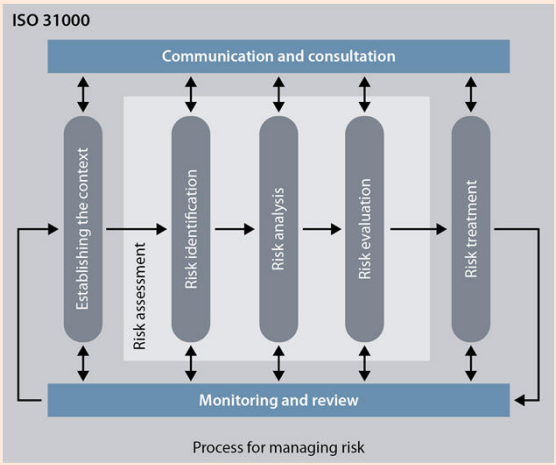
Graphics: Prof. Wenzel VCE

Presumption:

- Harmonization of existing approaches
- Development of international model codes for SHM of infrastructure

Risk management principles, framework and process

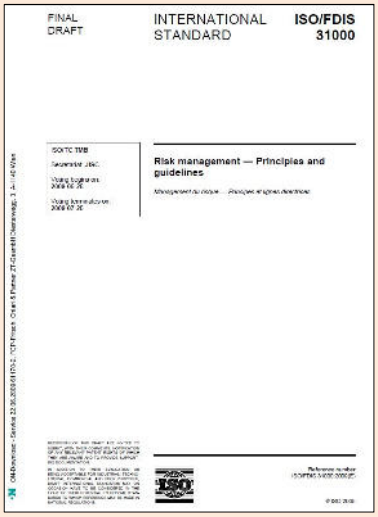
ISO 31000



Graphics: Prof. Wenzel VCE

Risk-based management approach

ISO 31000:2009


FINAL DRAFT
INTERNATIONAL STANDARD
ISO/FDIS 31000
Risk management — Principles and guidelines

To provide orientation for an effective risk-based management, several standards have been developed in the past five years.

Managing risk effectively helps organizations to perform well in an environment full of uncertainty.

ISO 31000 provides principles, framework and a process for managing risk. It can help organizations increase the likelihood of achieving objectives, improve the identification of opportunities and threats and effectively allocate and use resources for risk treatment.

ISO 31000 provides guidance for internal or external audit programmes. Organizations can compare their risk management practices with an internationally recognised benchmark, providing sound principles for effective management and corporate governance.

Asset management

ISO 55000:2014

Asset management - Overview, principles and terminology

ISO 55000:2014 provides an overview of asset management, its principles and terminology, and the expected benefits from adopting asset management.

ISO 55000:2014 can be applied to all types of assets and use by all types and sizes of organizations.

Quality management

ISO 9001:2014/2015

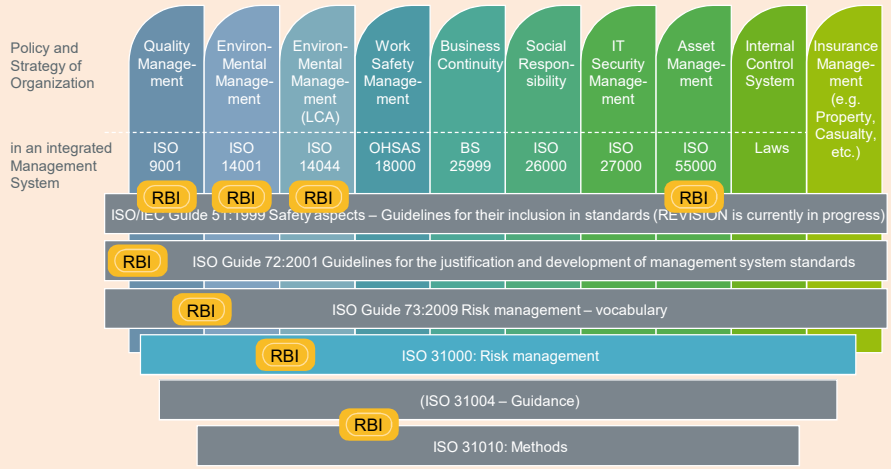
Quality management systems - Requirements

Revised ISO 9001 considers a proposal for a new Eurocode (EN) on Risk-based inspection (RBI)

RBI can be seen as a link between a standardized framework, i.e. ISO 55000 and ISO 31000, an the practical application to various industries and sectors.

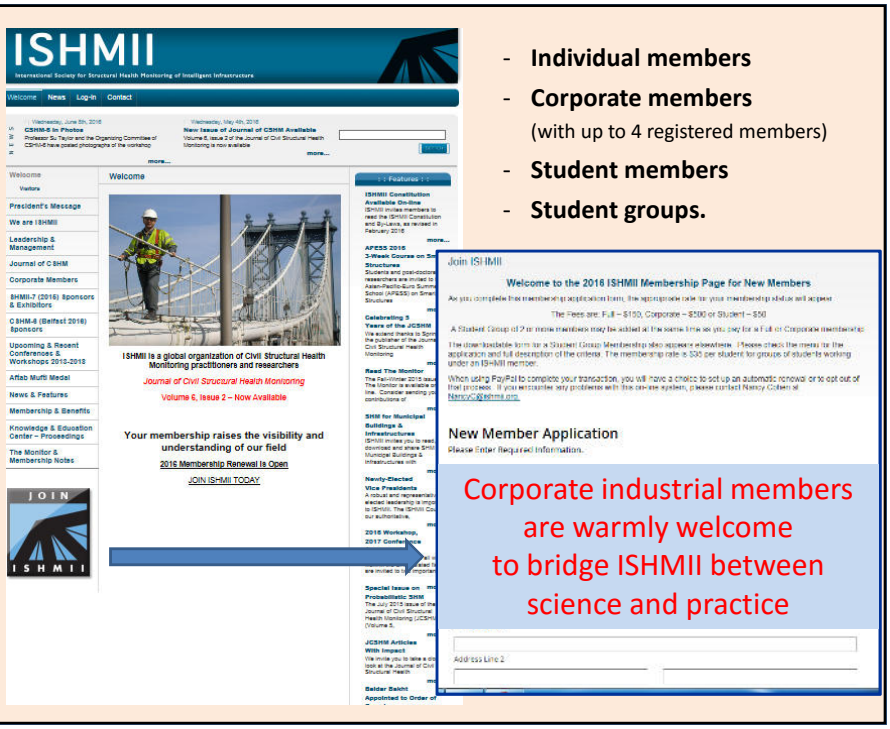
Challenge:
Harmonization of standards (the term "risk") and SHM strategies

Risk-based motivated inspection overcome the rigid framework of inspection intervals



Positive effects when applying ISO 31000 and ISO 55000

- increases the likelihood of achieving objectives of the specific industry or user
- proactive management will be beneficial to the balance sheets,
- ISO 31000 improves the identification of opportunities and threats,
  the need to identify and treat risk throughout the organisation (integrated management concept) can be recognized
- establishes reliable basis for decision making and planning
- helps to allocate and use resources for risk treatment (mitigation)
- improves controls (operational effectiveness and efficiency)
- enhances health and safety performance as well as environmental protection
- supports financial reporting, governance, stakeholder confidence, and trust in the objectives will be improved
- minimises losses, improves loss prevention and incident management



- **Individual members**
- **Corporate members**
  (with up to 4 registered members)
- **Student members**
- **Student groups.**

Latin American SHM community
is invited to cooperate with ISHMII
and promote SHM
to make structures intrinsically intelligent

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