SENSKIN Workshop

Monitoring Systems for Resilient and Sustainable Bridges

Date: Wednesday, 8 November 2017

Venue: BluePoint Brussels (formerly DIAMANT Centre)
80 Bd. A. Reyers, 1030 Brussels

Structural Health Monitoring (SHM) is expected to play a predominant role in the management of the transport infrastructure nowadays mainly because much of the expected growth in traffic demand will have to be accommodated on existing infrastructure with widespread signs of deterioration.

Although instruments (such as resistance strain gauges and displacement transducers) have been installed on some structures, such devices only provide measurements at discrete points, and in most devices, have a limited working range.

Current SHM techniques require a dense network of such point-sensors, which is costly, if practicable. Furthermore, the technology of collecting and transferring the information from such devices cannot overcome problems of data congestion and network availability that arise during and following major accidents. Thus, current methods to access structural stability and the rate of deterioration can overlook structural problems or fail to detect them in time to permit effective and efficient intervention works. Over the past few years, a number of new and innovative systems have been developed to address these short comings. One of these, the SENSKIN system, will develop a sensing device capable of measuring strains in a surface area (as opposed to discrete points) as well as a reliable communication system that will ensure a robust and reliable delivery data between sensing nodes and base station. The SENSKIN ('Sensing Skin' for Monitoring-Based Maintenance of the Transport Infrastructure) H2020 project's main features include:

- A micro-electronic, skin-like, sensor for monitoring transport infrastructure, with a spatial sensing of reversible (repeated) strains in the range of 0.012%,
- A delay (or disruption) tolerant communication system that will guarantee the delivery, availability and integrity of the sensor data even during hostile communication conditions.
- A Decision Support System (DSS) for proactive condition-based structural intervention under operating loads and intervention after extreme events.

The workshop will analyse the functional and operational requirements of the SENSKIN system based on the needs of bridge owners and operators as well as the methodology of the SENSKIN monitoring system. To facilitate and enhance knowledge exchange between practitioners in the field of SHM, a number of monitoring systems already being used (e.g. BRIMOS) as well as those currently being developed (e.g. AEROBI) will be presented. This will provide input into the panel discussion which will discuss among others, the latest trend in SHM, how to make SHM more prominent in bridge monitoring etc.

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Final Programme

9h00 - 10h00	Registration and Coffee	
10h00 – 10h05	Welcome and aim of workshop	**Adewole Adesiyun** (FEHRL, Belgium)
Session1: Setting the Scene Moderator: Adewole Adesiyun (FEHRL)		
10h05 – 10h15	Opening speech	**Sergio Escriba** (SENSKIN Project Officer, EC/INEA, Belgium)
10h15 – 10h35	The SENSKIN project	**Konstantinos Loupos** (Institute of Communication and Computer Systems, ICCS, Greece)
10h35 – 10h55	Latest trend in SHM	**J.R. Casas** (Technical University of Catalonia, Spain)
Session2: Bridge Monitoring Systems – Users' Needs and Challenges Moderator: Panagiotis Panetsos (EOAE)		
10h55 – 11h15	Egnatia Motorway, Greece	**Panagiotis Panetsos** (Egnatia Motorway, Greece)
11h15 – 11h30	KGM, Turkey	**Rahşan Yıldırım** (General Directorate of Highways (KGM), Turkey)
11h30 – 11h45	Road and Bridge Research Institute, Poland	**Piotr Olaszek** (Road and Bridge Research Institute, Poland)
11h45 – 12h00	Discussions	
12h00 – 13h30	Lunch	
Session3: The SENSKIN Monitoring System Moderator: Konstantinos Loupos (ICCS)		
13h30 – 13h45	Prototype of Sensing Elements	**Dmitry Rychkov** (University of Potsdam, Germany)
13h45 – 14h00	Integrated Monitoring System	**Konstantinos Loupos** Institute of Communication and Computer Systems (ICCS, Greece)
14h00 – 14h15	Laboratory Tests on Prototypes	**Peter Jones** (TRL, UK)
14h15 – 14h30	Structural Assessment Modules and DSS	**Sanna Corrado** (TECNIC SA, Italy)
14h30 – 14h45	Evaluation and Benchmarking of the SENSKIN system	**Panagiotis Panetsos** (Egnatia Motorway, Greece)
14h45 – 15h00	Discussions	
15h00 – 15h15	Coffee break	
Session4: Monitoring Systems of Civil Infrastructure Moderator: Adewole Adesiyun (FEHRL)		
15h15 – 15h30	Acoustic Emission for Structural Health Monitoring	**Nassos Anastasopoulos** (Mistras)
15h30 – 15h45	Predicting strength changes in bridges from frequency data safety, hazard, and poly-harmonic evaluation – SHAPE Project	**Andrea Benedetti** (Universita di Bologna, Italy)

15h45 – 16h00	AErial RObotic System for In-Depth Bridge Inspection by Contact	**Philippe Chrobocinski** (AIRBUS DS, Spain)
16h00 – 16h15	Safety of Transport Infrastructure on the TEN-T Network	**Alan O'Connor** (Trinity College Dublin, Ireland)

Session5: Panel Discussion
Moderator: J.R. Casas (Technical University of Catalonia, Barcelona)

16h15 – 17h00
Panellists: Panagiotis Panetsos (Egnatia Motorway, Greece), Dimitrios Anggelis (VUB Brussels), Alan O'Connor (Trinity College Dublin, Ireland), Konstantinos Loupos (ICCS)

17h00 – 17h10 Closing Remarks (ICCS)