GeoWatch

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GeoSIG

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Higher Full Scale Range on AC-23 and AC-63, Higher Sampling Rate on CR-5P

GeoSIG innovations are continuing. The latest improvements in our sensor line yielded a higher full scale of +/- 4 g for our top seller sensors, AC-63 and AC-23.

AC-63 and AC-23 have been sold over thousands and have a perfect track record, being used around the world in many monitoring applications.

Figure 1. AC-xx Accelerometer Series

Applications like strong motion networks, structural health and response, dam and nuclear power plant monitoring are the major utilisation areas for the AC-63 and AC-23.

The +/- 4 g full scale will provide the user with a sensor which has a higher clip level and a larger measurement range especially in cases where strong vibrations are expected.

The ongoing technical improvements are not only limited to our sensor line. The modular multichannel seismic recording system CR-5P is now able to sample up to 500 SPS, which will capture motions within a bandwidth of 0 to 200 Hz.

Figure 2. CR-5P Multichannel Recorder in portable configuration

This enhancement will enable the user to utilize the state of the art CR-5P in even more applications such as structural health and response monitoring of special structures such as highly asymmetric buildings, complex bridges or very stiff historical structures, which are exceeding the typical structural frequency response range of up to 100 Hz.

The GMS - An excellent wireless solution for Ambient Vibration Testing on Bridges

The **Boirs Viaduct** is a prestressed concrete highway bridge of twenty-one spans in Belgium. Each span consists of seven simply supported main girders. Cross connection is realized by concrete trusses. Ambient vibration measurements were performed extensively by the Structural Mechanics division of Katholieke Universiteit Leuven on one of the spans where the side girder was severely damaged due to the corrosion of its post-tensioning strands.

Figure 3. A south view of the Boirs viaduct, showing the severely damaged side girder of Span X.

GMS-18 wireless sensor network was applied to the measurements. The wireless sensor network, because of its simple configuration and the associated quick deployment procedure, allowed for the measurement of a large number of nodes within a limited time.

Figure 4. GMS-18 in operation (left) and the master unit with the GPS time synchronization module attached (right) .

The Saaletalbrücke Bridge is a steel-plate-girder bridge in Germany, which is a part of the railway line between Berlin and Munich. It consists of five spans of similar length, about 35 meters. The first span at the north end of the bridge was chosen for investigation by K.U. Leuven and Bauhaus-Universität Weimar, due to the fact that some cracks were found at the connection between the cross girder and the main girder across the pier. In the measurement campaign, both the wireless and the wired measuring system were used. The wireless system took less than half of the time the wired system needed for measuring similar number of nodes.

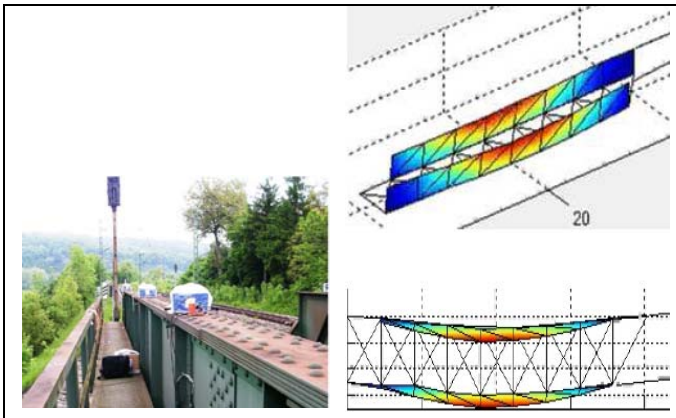
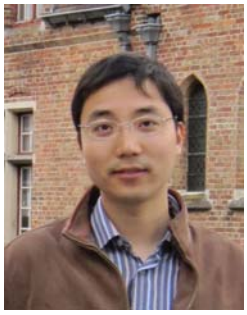


Figure 5. Experimental setup (left) and the identified first mode -lateral bending- with f = 3.62$ Hz, ξ = 0.38 % (right)

Figure 5 shows the experimental setup and the first identified mode shape provided by MACEC.
Further details of the experimental and numerical results regarding these two bridges are available in the source paper.



Dr Leqia He

Dr Leqia He is a post-doctoral researcher at the Structural Mechanics Division of the Department of Civil Engineering at the Katholieke Universiteit Leuven, Belgium. The research group under the leadership of Prof. Guido De Roeck is renowned in the field of vibration problems in the built environment and system identification of civil engineering structures (http://bwk.kuleuven.be/bwm/research).

Dr He received his Bachelor's and Master's degrees from the Tongji University, China, and his doctorate from the University of Trento, Italy. His research interests include Finite Element Method, Structural Health Monitoring and Seismic Testing. He has published three articles in internationally reviewed scientific journals and a number of papers at international conferences.

The interview with Dr Leqia He

GW: Dr He, first of all thank you for sharing this insight into your work with GeoSIG instruments. We hope everything went well during the project. Did the data of these measurements confirm your assumptions or did it surprise you with different outcomes?

Dr He: *Thank you for having me. As mentioned in the reference paper, we have made good progress in our research projects. Recently, we have measured another four bridges, including two railway bridges and two footbridges, and the results are also satisfactory.*

GW: In your abstract, you recognize the "simple configuration and the associated quick deployment procedure" of the GeoSIG GMS recorder which was used for this application. How has your project benefitted from the characteristics of the GMS?

Dr He: *Yes. We were very impressed by the efficiency of the GMS wireless system in comparison to traditional wired measuring systems. Moreover, I want to express my gratitude and appreciation for the efficient and quick service provided by your staff.*

GW: Which features of the GMS did you find most practical and/or helpful?

Dr He: *The GMS system is satisfactory in terms of both the data quality and the operational efficiency.*

GW: What is your overall perception of the versatility of the GMS recorder, and would you recommend using it to your colleagues around the world?

Dr He: *The GMS recorder is excellent. It will be my pleasure to recommend to many other colleagues around the world the GeoSIG measuring systems.*

GW: Dr He, thank you very much for your time and all the best for your future work.

Visit the GeoSIG Booth at the AGU Fall Meeting 2011 in San Francisco!

AGU FALL MEETING 2011
San Francisco, California, USA | 5-9 December

"The AGU Fall Meeting is the largest worldwide conference in the geophysical sciences, attracting nearly 20,000 Earth and space scientists, educators, students, and policy makers. This meeting showcases current scientific theory focused on discoveries that will benefit humanity and ensure a sustainable future for our planet." (www.agu.org/meetings)

As every year, GeoSIG will attend the AGU Fall Meeting as an exhibitor. If you plan to attend the conference, do not miss visiting the GeoSIG booth in the exhibition area at the Moscone Center, level 1, booth number 1429.

This professional bulletin has been prepared by GeoSIG Ltd

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