

2nd September 2010

## Announcement

8th July 2010 – Dynamic testing of the National Physical Laboratory (NPL) test bridge

NPL, as part of an investigation into the application of state-of-the-art technologies being applied to structural health monitoring (SHM), have constructed a test structure. The structure is a reinforced concrete bridge, which was typical of 50's style design, and is situated at a test facility in Teddington, Middlesex. NPL have invited various research groups to visit the structure and to demonstrate their various methods and technologies. The structure is then to be systematically damaged and retested to assess the technologies performance with regard to SHM.

FSDL visited the structure to perform a detailed dynamic analysis. A full vibration test was performed using an electro-dynamic shaker and 19 high quality accelerometers, in vertical and two horizontal directions to obtain vertical, longitudinal and latitudinal modal properties. A shaker test was conducted with a person walking on the bridge to test a novel analysis procedure developed in Katholieke Universiteit Leuven, known as OMAX. Finally, a shaker test focusing on exact resonant frequencies was used to identify amplitude dependant modal properties.

It was found that there was a relatively large participation of the foundation blocks within a number of the mode shapes. In addition, there was a larger displacement of the columns than expected in a number of mode shapes; this is more apparent where there is damage to the structure. It was also identified that the structure had a large degree of amplitude dependant behaviour, with a change in frequency of approximately 10% in one case.