

Static and Dynamic Monitoring of Civil Engineering Structures by Microwave Interferometry

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SUMMARY

The microwave interferometry has recently emerged as an innovative technology, suitable to the non-contact vibration monitoring of large structures. This presentation addresses the application of a non-contact vibrometer, designed for dynamic testing and monitoring of large structures. The new system consists of a radar sensor able to simultaneously measure the (static or dynamic) displacement of several points of a structure with high sensitivity. In the presentation the sensor and its major characteristics are first described; subsequently, application to the measurement of ambient vibration response of a structure is detailed. In order to highlight the reliability and accuracy of the radar technique, the natural frequencies identified from radar data were compared to the corresponding quantities obtained by using more conventional techniques. The results of the investigation highlight the accuracy and the simplicity of use provided by microwave remote sensing, as well as its effectiveness to simultaneously measuring the static and the dynamic response of entire structures such as bridges, towers, building, poles and cables.