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Application of Transform Fourier for Dynamic Control of Structures with Global Positioning System

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Abstract : Given the evolution of viaducts, structural health monitoring requires more complex techniques to define their state. two alternatives can be distinguished: experimental and operational modal analysis. Although accelerometers or Global Positioning System (GPS) have been applied for the monitoring of structures under exploitation, the dynamic monitoring during the stage of construction is not common. This research analyzes whether GPS data can be applied to certain dynamic geometric controls of evolving structures. The fundamentals of this work were applied to the New Bridge of Cádiz (Spain), a worldwide milestone in bridge building. GPS data were recorded with an interval of 1 second during the erection of segments and turned to the frequency domain with Fourier transform. The vibration period and amplitude were contrasted with those provided by the finite element model, with differences of less than 10%, which is admissible. This process provides a vibration record of the structure with GPS, avoiding specific equipment.

Keywords : Fourier transform, global position system, operational modal analysis, structural health monitoring
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