

Detect Cable Force of Cable Stayed Bridge from Accelerometer Data of SHM as Real Time

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Abstract : The cable-stayed bridge belongs to the combined system, in which the cables is a major structural element. Cable-stayed bridges with large spans are often arranged with structural health monitoring systems to collect data for bridge health diagnosis. Cables tension monitoring is a structural monitoring content. It is common to measure cable tension by a direct force sensor or cable vibration accelerometer sensor, thereby inferring the indirect cable tension through the cable vibration frequency. To translate cable-stayed vibration acceleration data to real-time tension requires some necessary calculations and programming. This paper introduces the algorithm, LabVIEW program that converts cable-stayed vibration acceleration data to real-time tension. The research results are applied to the monitoring system of Tran Thi Ly cable-stayed bridge and Song Hieu cable-stayed bridge in Vietnam.

Keywords : cable-stayed bridge, cable force, structural health monitoring (SHM), fast Fourier transformed (FFT), real time, vibrations

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