Код: 10998

Dongyu Zhang, Hui Li

Substructure Identification for Shear Buildings Using Ambient Vibration

Берлин, Германия, 2012 год

8 стр; формат: 23,5 x 16 см; библиографический список: 10 единиц

Due to the aging of materials and environment corrosion, important civil infrastructures, like high-rise buildings, gradually lose their carrying capacity. Such structural deterioration, if developed to severe extent and not detected in time, will post a great threat to structural safety. In recent years, there have been several tragic accidents around the world, in which old buildings suddenly collapsed without any early warning, resulting in significant casualties and property losses. In this paper, an innovative parameter identification and damage detection method is proposed for shear buildings using structural ambient vibration responses. A shear structure is partitioned into many two-story substructures; an inductive substructure identification procedure is then proposed, using the cross power spectral densities of structural responses, to estimate structural parameters from top to bottom iteratively. Because of inductive identification nature of the proposed method, an error analysis can be performed, which gives a simple analytical result, showing that the identification accuracy is greatly affected by some structural responses within a narrow frequency range. Based on this result, a reference selection rule is proposed which chooses the optimal reference response to improve the identification accuracy. Finally, a 6-story shear structure is used to verify the effectiveness of the proposed substructure method. Simulation results demonstrate that the proposed substructure method could very accurately identify the structural parameters even with quite large measurement noise disturbance.

Доклад. Конференция по мониторингу технического состояния гражданских сооружений (CSHM-4), «Системы мониторинга технического состояния сооружений, обеспечивающие продление срока службы сооружений». Ноябрь, 2012. Берлин. Германия.

Ключевые слова:

Содержание