



Код: 11006

Hamid Reza Vosoughifar, Seyed Kazem Sadat Shokouhi and Pegah Farshadmanesh

Optimal Sensor Placement of Steel Structure with UBF System for SHM Using Hybrid FEM-GA Technique

Берлин, Германия, 2012 год

12 стр; формат: 23,5 x 16 см; библиографический список: 23 единицы

Unbonded Braced Frame (UBF) system is one of the efficient damping systems. It has been made of a smart combination of steel and concrete or mortar. In this system, steel bears axial force of earthquake-induced as compressive or tension forces without strength decreasing. Concrete or mortar around the steel core acted with decreasing of brace slenderness as a constraint for brace and prevents of brace buckling during seismic axial load as compressive or tension forces. In this paper, a steel structure with UBF system was modeled using Finite Element Method (FEM) which Modal and Nonlinear Time-history Analyses (NTA) were utilized considering the effects of Near-field and Far-field earthquakes. Furthermore, three various Optimal Sensor Placement (OSP) methods were used and Genetic algorithm was selected to act as the solution of the optimization formulation in the selection of the best sensor placement according to structural dynamic response of the UBF system. Results show that with a proper OSP algorithm for Structural Health Monitoring (SHM) in the UBF structures can be detected weak and sensitive points in comparison without utilizing UBF system.

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:

Unbonded Braced Frame (UBF), Finite Element Method (FEM), Optimal Sensor Placement (OSP), Nonlinear Time-history Analysis (NTA), Genetic Igorithm (GA)

Содержание

Abstract

1. Introduction

2. Structural Modeling Description

3. Analysis Procedure

4. Genetic Algorithm (GA)

5. Sensor Placement Optimization Procedure

6. Conclusions

References