

عنوان مقاله:

Tuned Mass Dampers for Earthquake Oscillations of High-rise Structures Using Ant Colony Optimization Technique

محل انتشار:

هجدهمین کنفرانس سالانه مهندسی مکانیک (سال: 1389)

تعداد صفحات اصل مقاله: 6

نویسندگان:

Saeed Soheili - *PhD Candidate, Mechanical Engineering Department, Ferdowsi University of Mashhad*

Mahdi Abachizadeh - *PhD Candidate, Mechanical Engineering Department, University of Tehran*

Anoushirvan Farshidianfar - *Associate Professor, Mechanical Engineering Department, Ferdowsi University of Mashhad*

خلاصه مقاله:

This paper investigates the optimized parameters for the tuned mass dampers to decrease the earthquake vibrations of high-rise buildings. Considering soil effects, the soil-structure interaction (SSI) is involved in this model. The Tuned Mass Damper (TMD) is also utilized on the roof of the building. The time domain analysis based on Newmark method is employed to obtain the displacement, velocity and acceleration of different stories and TMD. To illustrate the results, Tabas earthquake data is applied to the model. In order to obtain the best parameters for TMD, AntColony Optimization (ACO) method is utilized. Mass, damping and spring stiffness quantities of TMD are assumed as the design variables for the optimization. The objective is to reduce the maximum displacement as well as Root Mean Square (RMS) of the total displacement of stories during earthquake vibration. The results show that the TMDs are very effective and beneficial devices for decreasing the oscillations of high-rise buildings. It is indicated that the soil type highly affects the time response of structures subjected to the earthquake oscillations. It is also shown that how the ant colony optimization technique can be effectively applied to design the optimum TMD device. This study helps the researchers to the better understanding of earthquake vibration of the structures, and leads the designers to achieve the optimized TMD for the highrise buildings.

کلمات کلیدی:

High-rise Structures, EarthquakeOscillations, Tuned Mass Dampers, Ant ColonyOptimization, Soil-Structure Interaction

لینک ثابت مقاله در پایگاه سیویلیکا:

<https://civilica.com/doc/95984>

