



Dynamic responses and failure pattern of suspended cable tray system through shaking table test

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Abstract

The cable tray system is a kind of non-structural components used in civil and industrial buildings for the distribution of electric cables. A full-scale shaking table test on the suspended cable tray system was conducted in order to study its seismic performance. The floor response extracted by the numerical simulation and the artificially generated sweep wave were input to the specimens with three types of seismic support installed on the steel platform. The dynamic responses of the cable tray system including the displacement and acceleration, and dynamic properties including the fundamental frequency, damping and resonance frequency, are analysed. From the test results it is found that the seismic support can effectively reduce the displacement and acceleration responses. The damage was mainly distributed around the seismic supports. The cracks in the joints between the main- and sub-beam were observed in the experiment, which is the main failure pattern of the cable tray system. Finally, the relationship between the damage state and the relative displacement of the tray component is analysed.

Keywords: Cable tray system; shaking table test; non-structural components; dynamic response; failure pattern

1 Introduction

Cable tray system is a typical non-structural component used to support insulated electric cables used for power distribution and communication. Due to its properties of large span, low redundancy and complex geometric shape, the

cable tray system may experience large response or even collapse when subjected to seismic excitation. During previous earthquakes, a large number of cable tray suffered severe damage, such as buckling and falling down **Chyba! Nenalezen zdroj odkazů..** The cable tray in the high-rise building was damaged while the main structure still