Structural Parameter Identification of Low- and Mid-rise Buildings subjected to Earthquakes

*J.Y. Zhang[1] and T. Aoki[1]

[1]School of Design and Architecture, Nagoya City University, 2-1-10, Kita Chikusa, Chikusa-ku, Nagoya, Japan.

*Corresponding author: zhang@sda.nagoya-cu.ac.jp

It is important to detect any possible damage in a building, especially for which located in earthquake-prone areas. Damage detection is usually carried out by (a) visual inspection, or (b) observation of mechanical properties. The latter one relies on system identification techniques.

In this study, we consider the structural parameter identification problem of low- and mid-rise buildings, which can be modeled as shear buildings. Under the assumption that mass of each floor is known *a priori*, we present the formulations for identification of stiffness and viscous damping coefficients of each story, by using the recorded accelerations.

Numerical examples show that the proposed approach is of high accuracy for identification of stiffness, although it is less accurate for damping coefficients. Thus, it is considered to be a promising technique for practical damage detection for low- and mid-rise buildings.

Keywords: System identification, Stiffness, Damping coefficient, Shear building