SM25S_12659

XXI International Congress of Theoretical and Applied Mechanics
Warsaw, Poland, August 15–21, 2004

Non-Linear Modelling of Earthquake Induced Pounding of Buildings

Robert Jankowski

Gdańsk University of Technology, Gdańsk, Poland

The aim of the present paper is to analyse earthquake induced pounding between two insufficiently separated buildings with different dynamic characteristics. In the analysis, elastoplastic multi-degree-of-freedom lumped mass models are used to simulate the structural behaviour. In order to model pounding, non-linear viscoelastic impact elements, which become active when contact is detected, are used. The parametric study on structural behaviour is conducted for different values of gap size between structures as well as values of mass, elastic stiffness and damping coefficients of a storey of one of the buildings. The results of the study prove that pounding has a significant influence on behaviour of a more flexible and lighter structure amplifying its response. On the other hand, the behaviour of the heavier and stiffer structure is influenced negligibly. Furthermore, the results confirm the effectiveness of the non-linear, viscoelastic model of collisions, which allows to simulate the pounding phenomenon more precisely.

View the extended summary