Abstract

During earthquakes, pounding of adjacent buildings occurs due to their different dynamic characteristics as well as insufficient separation distance between them. Although earthquake loading is commonly considered in structural design, pounding of adjacent buildings is not usually considered and usually causes highly unexpected damages and failures. Pounding effect was numerically investigated in this study, where adjacent buildings were designed to resist lateral earthquake loads without taking into consideration the additional applied force resulting from pounding. Nonlinear dynamic analysis was carried using the Applied Element Method (AEM). Pounding of buildings of different structural systems, different gravity loading and different floor heights was investigated. Dynamic behavior in terms of additional base shear, base bending moments and pounding forces was investigated for different gap distances.
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less than the safe gap distance specified by the Egyptian Code of Practice (ECP). Effect of gap
distance, building's dynamic characteristics, building's height and gravity loads on
additional straining actions due to impact was discussed.

References

- Rosenblueth, E. and Meli, R. "The 1985 Earthquake: Causes and Effects in
  Mexico City," Concrete International, Vol. 8, No. 5, 1986
- Bertero, V. "Observation of Structural Pounding," Proceedings of the
- Kasai, K. and Maison, B. "Structural Pounding Damage, Loma Prieta Earthquake
  Reconnaissance Report, Chapter 6, Structural Engineers Association of California, 1991
- www.engineeringcivil.com
- Tagel-Din; H. and Meguro; K., "Applied Element Method for simulation of
  nonlinear materials: theory and application for RC structures. In Structural Engineering,
  Earthquake Engineering Japan Society for Civil Engineers (JSCE); 17 (2): pp. 137-148, 2000.
- Meguro; K. and Tagel-Din; H. "Applied Element Method for structural analysis:
  theory and application for linear materials," In Structural Engineering, Earthquake
  Engineering, Japan Society for Civil Engineers (JSCE); 17(1): pp. 21-35, 2000
- Meguro; K. and Tagel-Din; H. "Applied Element Simulation of RC Structures
- Meguro; K. and Tagel-Din; H. "AEM Used for Large Displacement Structure
- Galal K, El-Sawy T. "Effect of retrofit strategies on mitigating progressive collapse of
- Hartmann, D., Breidt, M., Nguyen, V., Stangenberg, F., Hohler, S., Schweizerhof, K.,
  Mattern, S., Blankenhorn, G., Moller, B., and Liebscher, M. (2008), Structural Collapse
  Simulation under Consideration of Uncertainty –Fundamental Concept and Results, Computers
  and Structures, 86, 2064–2078.
- Anagnostopoulos, S. "Pounding of Buildings in series During Earthquakes," Earthquake
- Maison; B. and Kasai; K., "Dynamics of pounding when two Building
- Anagnostopoulos, S. and Spiropoulos, K. "An Investigation of Earthquake
  Induced Pounding between Adjacent Buildings," Earthquake Engineering and Structural
- Jeng; V, Kasai; K. and Jagiasi; a., "The Separation to avoid Seismic
  Pounding," Earthquake Engineering, Tenth World Conference, Balkema, Rotterdam,
- Maekawa K, Okamura H. "The deformational behavior and constitutive equation of
  concrete using the elasto-plastic and fracture model. J Faculty Eng Univ Tokyo (B) 1983;
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Keywords

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