World Academy of Science, Engineering and Technology
International Journal of Civil and Architectural Engineering
Vol:14, No:12, 2020

# Study on Flexible Diaphragm In-Plane Model of Irregular Multi-Storey Industrial Plant

**Authors :** Cheng-Hao Jiang, Mu-Xuan Tao

**Abstract :** The rigid diaphragm model may cause errors in the calculation of internal forces due to neglecting the in-plane deformation of the diaphragm. This paper thus studies the effects of different diaphragm in-plane models (including in-plane rigid model and in-plane flexible model) on the seismic performance of structures. Taking an actual industrial plant as an example, the seismic performance of the structure is predicted using different floor diaphragm models, and the analysis errors caused by different diaphragm in-plane models including deformation error and internal force error are calculated. Furthermore, the influence of the aspect ratio on the analysis errors is investigated. Finally, the code rationality is evaluated by assessing the analysis errors of the structure models whose floors were determined as rigid according to the code's criterion. It is found that different floor models may cause great differences in the distribution of structural internal forces, and the current code may underestimate the influence of the floor in-plane effect.

**Keywords :** industrial plant, diaphragm, calculating error, code rationality
**Conference Title :** ICCCBE 2020 : International Conference on Computing in Civil and Building Engineering
**Conference Location :** Auckland, New Zealand
**Conference Dates :** December 01-02, 2020