

## Seismic Assessment of Flat Slab and Conventional Slab System for Irregular Building Equipped with Shear Wall

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**Abstract :** Particular instability of structural building under lateral load (e.g earthquake) will rise due to irregularity in vertical and horizontal direction as stated in SNI 03-1762-2012. The conventional slab has been considered for its less contribution in increasing the stability of the structure, except special slab system such as flat slab turned into account. In this paper, the analysis of flat slab system at Sequis Tower located in South Jakarta will be assessed its performance under earthquake. It consists of 6 floors of the basement where the flat slab system is applied. The flat slab system will be the main focus in this paper to be compared for its performance with conventional slab system under earthquake. Regarding the floor plan of Sequis Tower basement, re-entrant corner signed for this building is 43.21% which exceeded the allowable re-entrant corner is 15% as stated in ASCE 7-05 Based on that, the horizontal irregularity will be another concern for analysis, otherwise vertical irregularity does not exist for this building. Flat slab system is a system where the slabs use drop panel with shear head as their support instead of using beams. Major advantages of flat slab application are decreasing dead load of structure, removing beams so that the clear height can be maximized, and providing lateral resistance due to lateral load. Whilst, deflection at middle strip and punching shear are problems to be detail considered. Torsion usually appears when the structural member under flexure such as beam or column dimension is improper in ratio. Considering flat slab as alternative slab system will keep the collapse due to torsion down. Common seismic load resisting system applied in the building is a shear wall. Installation of shear wall will keep the structural system stronger and stiffer affecting in reduced displacement under earthquake. Eccentricity of shear wall location of this building resolved the instability due to horizontal irregularity so that the earthquake load can be absorbed. Performing linear dynamic analysis such as response spectrum and time history analysis due to earthquake load is suitable as the irregularity arise so that the performance of structure can be significantly observed. Utilization of response spectrum data for South Jakarta which PGA 0.389g is basic for the earthquake load idealization to be involved in several load combinations stated on SNI 03-1726-2012. The analysis will result in some basic seismic parameters such as period, displacement, and base shear of the system; besides the internal forces of the critical member will be presented. Predicted period of a structure under earthquake load is 0.45 second, but as different slab system applied in the analysis then the period will show a different value. Flat slab system will probably result in better performance for the displacement parameter compare to conventional slab system due to higher contribution of stiffness to the whole system of the building. In line with displacement, the deflection of the slab will result smaller for flat slab than a conventional slab. Henceforth, shear wall will be effective to strengthen the conventional slab system than flat slab system.

**Keywords :** conventional slab, flat slab, horizontal irregularity, response spectrum, shear wall

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