

## SUMMARY

**Chrysantia Amriani**, Department of Civil Engineering, Faculty of Engineering, University of Brawijaya, February 2018, *Dynamic Simulation of One-Storey House with Different Types of Clay Brick*, Academic Supervisor : Agoes Soehardjono MD and Wisnumurti.

Indonesia is located in an active seismic region and many masonry building were badly damage or collapsed during recent earthquakes. Some studies suggest that the most crumbling buildings are in non engineered building structures of clay brick walls. In general, the clay brick is divided into two types: handmade clay brick and clay brick made by machine. By using a dynamic simulation of single-storey dwelling house, it can be seen how the stress and displacement values occurring on the masonry wall with that handmade clay brick and clay brick made by machine.

This dynamic simulation uses SAP2000 student version that is modeled in 3D. The parameters used to distinguish the two types of the clay brick are dimension of clay brick, modulus elasticity, Poisson ratio and density. This simulation is done by using the earthquake spectrum response with a combination based on SNI. The object under study is a one-storey dwelling house with type 36 and located in Malang City.

The results of this analysis indicate that the displacement value occurring as a result of the combination of  $U = 1,2DL + 1EQ_x + 0,3EQ_y + 1LL$  on the structure of masonry wall with handmade clay brick is bigger than the masonry wall with clay brick made by machine. In detail, the displacement of the masonry wall with handmade clay brick is  $u_x = 0,0902$  cm,  $u_y = 0,0283$  cm dan  $u_z = -0,0008$  cm whereas the displacement on the masonry wall with clay brick made by machine is  $u_x = 0,0803$  cm,  $u_y = 0,0237$  cm dan  $u_z = -0,0007$  cm. In addition to the displacement value, the results of this analysis also show that the principal stresses occurring on the masonry wall with clay brick made by machine are larger than the main stresses occurring in handmade clay brick. The maximum of principal stress on the masonry wall with clay brick made by machine is  $\sigma_{maks} = 1,9225$  kg/cm<sup>2</sup> and masonry wall with handmade clay brick  $\sigma_{maks} = 1,3618$  kg/cm. The maximum shear stress on the masonry wall with clay brick made by machine is  $\tau_{maks} = 0,7225$  kg/cm<sup>2</sup> and on the masonry wall with handmade clay brick is  $\tau_{maks} = 0,5418$  kg/cm<sup>2</sup>.

**Keywords:** clay brick, masonry wall, displacement, shear stress, principal stress.

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