ABSTRACT

This research was concerned with the completely collapse of a house constructed on a beach that is prone to tsunami. During such incidents, huge waves travelling at a very fast speed would hit a house thereby causing it to either partial or complete collapse. A system was first designed and built in order to simulate the tsunami. It comprised a steel chamber housing a model sea and beach and a dropping weight that can be freely dropped into the sea to generate the tsunami. Two types of house forms were built to withstand such waves, including normal wall- and hollow wall house. Both had two types of front walls, including plane- and curve walls. In addition, there were two levels of slab experimented, on the ground and 1 m over the ground. To measure the effects of the wave on the house walls strain gauged were installed behind the walls. A total of 16 different house forms were tested in order to obtain a best solution in terms of minimising the wave forces acting on a wall.

Overall, it was found that between the normal wall- and hollow wall houses, the strain level generated by the latter was much lower. In addition, between the houses having the slab on ground and 1 m over the ground, it was observed that the former has lower stain level, owing to the waves could not reach the wall. Of all of the 16 test configurations, it was found that the hollow wall house with wall curves having the slab raised to 1 m above the ground has the best performance in terms of reducing the wave forces generated by simulated tsunamis. This result may be employed for future construction of a house to be constructed close to a beach that is very likely to be hit by a tsunami.

Keywords: tsunami, house form, strain gauge, wave forces, damage