

Study of the Relationship between the Civil Engineering Parameters and the Floating of Buoy Model Which Made from Expanded Polystyrene-Mortar

Authors : Panarat Saengpanya

Abstract : There were five objectives in this study including the study of housing type with water environment, the physical and mechanical properties of the buoy material, the mechanical properties of the buoy models, the floating of the buoy models and the relationship between the civil engineering parameters and the floating of the buoy. The buoy examples made from Expanded Polystyrene (EPS) covered by 5 mm thickness of mortar with the equal thickness on each side. Specimens are 0.05 m cubes tested at a displacement rate of 0.005 m/min. The existing test method used to assess the parameters relationship is ASTM C 109 to provide comparative results. The results found that the three type of housing with water environment were Stilt Houses, Boat House, and Floating House. EPS is a lightweight material that has been used in engineering applications since at least the 1950s. Its density is about a hundredth of that of mortar, while the mortar strength was found 72 times of EPS. One of the advantage of composite is that two or more materials could be combined to take advantage of the good characteristics of each of the material. The strength of the buoy influenced by mortar while the floating influenced by EPS. Results showed the buoy example compressed under loading. The Stress-Strain curve showed the high secant modulus before reached the peak value. The failure occurred within 10% strain then the strength reduces while the strain was continuing. It was observed that the failure strength reduced by increasing the total volume of examples. For the buoy examples with same area, an increase of the failure strength is found when the high dimension is increased. The results showed the relationship between five parameters including the floating level, the bearing capacity, the volume, the high dimension and the unit weight. The study found increases in high of buoy lead to corresponding decreases in both modulus and compressive strength. The total volume and the unit weight had relationship with the bearing capacity of the buoy.

Keywords : floating house, buoy, floating structure, EPS

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