Amphibious House Modeling to Overcome Flash Flooding Problem (Noah's Ark 2.0)

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The flood problem affects us globally. Presently due to climate change, this problem occurs more frequently and unexpectedly. Those living in flood prone areas constantly worry when it rains heavily for a few hours. Flash floods occur without warning and victims cannot be evacuated in time, causing death to some family members and destroying properties. Inspired by Noah's Ark, we propose to solve this problem by making houses which can rise during floods to keep the victims safe. Experiments were conducted to test the floatation and stability of a model amphibious house. We compared the buoyancies of the model house with basement-compartment to that without basement-compartment. The relationship between the volume of basement-compartment and the weight of the house was investigated. The rolling test was used to determine the stability of the model house. Our findings showed that the immersion depth of the model house was directly proportional to its weight. With a 5-litre basement-compartment, the buoyancy of the model house improved by 20%. To accommodate an increase of 1 N (100g) for the model house, the volume of basement-compartment had to be increased proportionally by 1.0 litre. The rolling time of the model house also increased with its height. The model with basement-compartment had its rolling time reduced by approximately 22%. In conclusion, the proposed model amphibious house with a basement-compartment increased its buoyancy and stability. This is a viable and sustainable solution which can be adopted for real-size houses to keep residents safe during floods.