The Effectiveness of Man-Made Structures in Reducing the Amount of Flooding Caused by a Tsunami

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In an experiment testing which man-made structure would minimize the amount of flooding caused by a tsunami, it was hypothesized that hollow cylindrical PVC pylons placed between an artificially generated wave and a simulated shoreline would be most effective. The other levels of independent variable were a concrete breakwater, triangular aluminum posts, and the control, no structure. A wooden tank with an inclined board as a simulated shoreline inserted at one end was filled with water. A paddle assembly was used to generate a wave. A basin was placed at one end of the tank to catch the over-wash. The independent variables were tested individually. A wave was generated, and the amount of water caught in the basin, the dependent variable, was recorded. This process was repeated five times for each level of independent variable. The data was recorded, averaged, analyzed to determine which structure was most effective, and the analyzed data was inserted into a bar graph. The triangular aluminum posts were least effective, reducing the flooding by 30.9%. The hollow cylindrical PVC pylons were the next most effective, reducing the flooding by 37.9%. The concrete breakwater was most effective, reducing the amount of over wash by 58.2%. Although the concrete breakwater was most effective, it also poses several problems. As well as being expensive due to its size, when placed in a harbor, a breakwater standing high enough in the water to reduce the tsunami's flooding could also interfere with maritime shipping as well as marine life migratory routes and feeding grounds. For wealthier countries, they could be installed in more remote areas with little marine life. In more populated areas, hollow cylindrical pylons could be the most viable alternative.

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