The Study of Seawalls Combined with Moats

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Tsunami of The Great East Japan Earthquake caused a lot of damages to Tohoku area. Nowadays, people make very high seawalls which can prevent our town from tsunami. Those seawalls are very important for protecting our lives. However, by doing so, those seawalls destroy the scenery and damage to tourism. To solve this problem, my research suggests new seawalls that combined with moats.
I make seawall model by using Styrofoam and aquarium. And I generate wave and hit to the seawall. This experiment control depth of the moat.

EXPERIMENT 1
At first, I examined how much depth was effective. I changed depth (0,5,10,15cm) and corrected each 5 data. As a result, I couldn't get certain data that showed how much depth was the moat. However, it was found that the reaching distance of the wave can be reduced more if there is a moat than there is no moat.

EXPERIMENT 2
Second, I experimented on only5cm depth 48 times to increase the number of data. Using this result, I created a scatter plot(X : Height of wave Y : reaching distance of wave) and an approximate straight line (y=1.9592x-33.27 Correlation coefficient is 0.73).

I changed the effect of the moat to a lite size by using this formula. As a result, I could prove seawalls combined with moats were stronger than before.
However, this experiment have some problems. For example, this experiment have many variables. So it is difficult to expect the result when experimental condition is changed.
In the future, I'm going to use PC to simulate a lot of case.

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