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**MEC299**

**A STUDY OF SURFACE  
ROUGHNESS EFFECT  
ON A MOUND TYPE  
BREAKWATER USING  
CWC - An experiment**

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## ABSTRACT

Breakwaters are protective and sheltering structures which aim to provide either protection from waves and currents for people and goods at the coast or sheltering conditions for ships and boats moored at the port, thus ensuring that port operations are performed in safe conditions. The strong water flow that thorough the type of mound surface that should be used to ensure an effective breakwater. It can help the path of ships and bot to go to port by helps in reducing turbulent waves. This research in to analyse the type of surface roughness that help in breakwater mound effectiveness. This paper showed the experiment of breakwater mound surface roughness using the Circulation Water Channel (CWC). Circulating water channels are facilities which can be used for conducting environmental, metrological and engineering studies. The roughness of the breakwater mound is very the important thing in help decrease the waves turbulent. The research will remind us to study more about the effectiveness of the rough surface of the breakwater mound.

# CHAPTER 1

## INTRODUCTION

### 1.1 Background of study

The function of a breakwater is to “break” the “water” and provide a sheltered area where vessels can berth, moor, load, and unload their cargo. In addition, breakwaters protect against sediment transports in the littoral zone. Most breakwater are land-connected. They are usually built in pairs perpendicular to shore and extend to the same depth, narrowing the distance between them to form an entrance.

In many cases the breakwaters are provided with a quay on the inside of sufficient width to allow loading and unloading of certain vessels and the necessary traffic and transport on the quay. This may include space for cranes for loading and unloading for transportation equipment, such as trucks, low-boys, containers and space for pipelines for oil, gas, cranes, conveyor belts, etc.

The difference between a breakwater serving only as protection against waves and possibly also littoral drift and a breakwater with a quay on its inside is that while in the case of the former a certain amount of overtopping during storms may be permitted. In the latter case, the breakwater should provide full protection against overtopping of water, and allow some spray carried over the breakwater by wind action if it does not happen too often. In most developing countries the combined breakwater and quay has been preferred because it is more economical than a breakwater and pier built separately. The drawback with the design has been that because only a certain width of quay is available, it may be inadequate for future requirements.(Losada & Herbich, 1990)

### 1.2 Problem statement

The strong water flow that thorough the type of mound surface that should be used to ensure an effective breakwater. It can help the path of ships and bot to go to port by helps in reducing turbulent waves. If the breakwater didn't exist, it may be hard way to ships and boat industries to working. With different types of surface, different effective will be able

of the breakwater. Other than that, the performance and applicability limits of a water channel will depend on its design and internal components characteristics (flow straighteners, screens (mesh and distribution))(Santos et al., 2016).

However, a study of the breakwater mound will be research in this experiment. The type of surface used with different kind of roughness. The more roughness surface, the more efficient breakwater will be. The breakwater is very useful for decrease flow water to reduce turbulent waves by have their own shape and design to make sure ship and boat industries more safety. All over the world use the breakwater mound in case its very function than other things. So, this experiment showed how breakwater mound use its surface to resist turbulent waves.

### **1.3 Objective**

To determine the flow over a mound type breakwater using Circulation Water Channel (CWC).

To analyse the type of surface roughness that help in breakwater mound effectiveness.

### **1.4 Scope of work**

For this project, the experiment will use Circulation Water Channel (CWC) for experiment with different type mound of surface. The pump of the CWC is the main power of this experiment. The mound model will be design and be put into the CWC tank for the experiment. The surface that be used must place on the mound to show the water flow on it. Different surface showed different water flow on the mound.

For the experiment, the research will use water for testing the surface mound to see the water flow on the mound by using the ink through to the mound. The ink showed the effectiveness of the breakwater mound by flow through the mound. Experiments on the type of breakwater surface were observed and recorded in the data to analyse the effectiveness of the roughness in influencing the flow of water on the mound.