

Application of Clam (lokan) Shell as Beach Retaining Wall

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Abstract— This project is about investigating the possibility of using the local clam (lokan) embedded in the concrete as beach retaining wall. Since the shell is considered as undesirable product and normally disposed in open area, the researchers taking this opportunity to determine the possibility of lokan shell powder as the alternative fine aggregate to increase the compressive strength of the concrete. From the compression test, by embedding lokan powder into the concrete, it can increase the compressive strength up to 16% (at 30 wt% of lokan powder) compared to concrete without lokan powder. Thus, it can be concluded that lokan powder which is waste material has high potential as the alternative fine aggregate to improve strength of the concrete and can be applied as a retaining wall.

Keywords: clamshell, aggregates, porosity.

I. INTRODUCTION

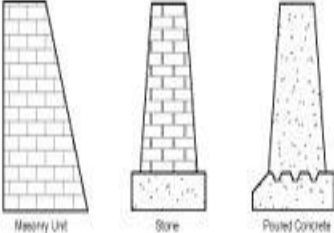
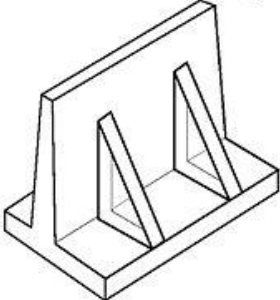
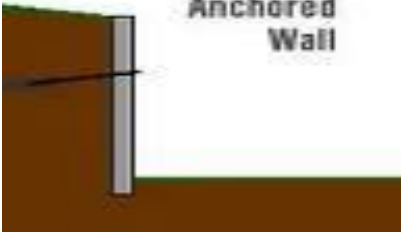
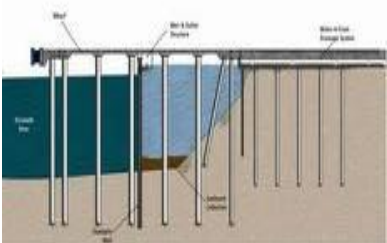
Retaining wall is a structure that is designed to oppose the lateral pressure of soil when there are some changes in ground elevation that exceeds the slope of repose the soil. For beach retaining wall, its main function is to separate the retained soil from being struck by strong wave from the sea and thus, avoid the erosion along the coastline. According to the Annual Report, department of Irrigation and Drainage (DID Malaysia, 2007), about 1415 km out of 4809 km of Malaysia's coastline is subjected to erosion of different degree of harshness. Besides, the water level increased during the monsoon period and the wave produced will breaks directly against the fragment that causing the loss of materials. This has forced society to take urgent action to commence coastal erosion protection by using bulky construction such as concrete.

Retaining walls serve to retain the lateral pressure of soil. In this case, for beach retaining wall, the wall is not only subjected to the pressure from the soil but also the sea water and the sea wave. For this purpose the selection of the type of the retaining wall and the materials (including the concrete) is very important. However, for this study, the only point to be concentrated is to improve the compressive strength of the concrete that can be applied to build up the retaining wall. The researchers assume that the best selected

concrete is if the compressive strength is higher than the standard concrete. Other important properties such as durability, impact, etc are not discussed.

Generally, there are many types of retaining wall. Table 1 shows some types of the retaining wall available.

Table 1: 4 types of retaining wall

<p style="text-align: center;">Gravity Retaining Walls</p>  <p style="text-align: center;">Masonry Unit Stone Poured Concrete</p>	<p>1) <i>Gravity wall</i> Depend on the weight of their mass to resist pressures from behind and will often have a slight 'batter' setback to improve stability by leaning back into the retained soil.</p>
<p style="text-align: center;">Counterfort or Buttress Retaining Wall</p> 	<p>2) <i>Cantilevered wall</i> These walls cantilever loads to a large, structural footing, concerting horizontal pressures from behind the wall to vertical pressures on the ground below</p>
<p style="text-align: center;">Anchored Wall</p> 	<p>3) <i>Anchored wall</i> It can be constructed in any of the aforementioned styles but also includes additional strength using cable or other stays anchored in the rock or soil behind it.</p>
	<p>4) <i>Sheet piling</i> For taller sheet pile, anchors are placed behind the potential failure plane in the soil</p>

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