Prevention of Reinforced Concrete Structural Failure Due To Coastal Erosion Using Geo Textile Tube Technology in Sangudurai Beach At Kanyakumari District

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Abstract- *As we all know that ocean plays a major role in human life especially to the people who are living at the coastal region. It acts as a major source of food and give income to support their family and life. Around 71% of the earth is covered with ocean and it contains 98% of all water on earth. But due to Some climatic changes coastal erosion occurs.In erosion tides plays a vital role. These tides rise and fall through out the day and through out the year. The pull of a force called gravity between earth and moon. Due to the erosion the concrete structures that are constructed near the sea shore are affected. So as a civil professionals we should help the people who are staying at the coastal regions from erosion. So In this paper we have done a case study on preventing coastal erosion using geotextile tube technology. For that we have analysed a place called sangudurai beach which is located in Kanyakumari district of Tamilnadu. It is severely affected by the coastal erosion and the structures that are constructed on the seashore are affected.*

Keywords- coastal erosion, ocean tides, geotextile tube, gravity

I. INTRODUCTION

A. *General*

Now a days people are preferring to live a luxurious life and along with that population also increases rapidly. For that to satisfy the human needs we are simply exploiting the natural resources in an uncontrollable manner. The human activities like constructing building in the seashore, harbour construction and other offshore structures also causes the coastal erosion.[3]. It is a major problem in advance and well developed beaches and sea shore. To control these type of problems, coastal protection structures are constructed at the shore for preventing the erosion.[2]. Some of the coastal protection structures are breakwater, groins, revetment and sea walls. These structures are constructed using wood, rock and concrete.[4] But in our Kanyakumari coastal regions tripods are widely used for the prevention of erosion. Secondly huge rocks are placed alone the seashore for the erosion prevention in the seashore. So as per my study, by using geotextile tube technologies the soil erosion can be controlled much better than the other methods. It is highly cost effective and there won't be any need of RCC structurs in this method. It gives best results in preventing seashore from erosion. This geotextile tube technologies is already in practice in Western countries like Australia and Japan. So if we use this technology in our sangudurai beach which is dangerously affected by this erosion. This technique is highly durable and It improves the appearance of the place and regains its old profile. So in this study we have analysed the possibilities of using this geotextile tube technology.

Fig-1 Structural Erosion in Sangudurai Beach

B. Geo Textile Tube Technology

"TENCATE" is a geosynthetic materials manufacturing company which produces and uses this Geo textile tube technology in coastal eroded regions. It is a tube like structure that are made out of Geo polymer and it is used with the sand or water filled into the tube. It provides solution to regain the seashore land that is affected by erosion and creating a Newland with good infrastructure and durable ecosystem. The geotube are available in various required length. It reduces the wave impact which arrest the activity of new erosion to take place. During hurricanes and stromes, these geotubes holds the sand and soil in its place. It prevents soil erosion and property damage during the coastal erosion. And even old beach profiles also can be regained or restored. It is very easy to install and it is highly durable. It reduces high water flow towards land so that the fishermen can easily cross the tides when they go for fishing.

II. LITRERATURE REVIEW

Vijela Nehra et.,al (2016) has done a research in coastal erosion and its effects. He states that the tide that comes from the ocans stands for the reason of pressure on surrounding rocks at the seashore and day by day slowly it removes the piece of rock and decreases the strength of the particular rock and cracks are formed soon due to tidal impact.[5] He states some of the things that causes erosion that are transport gradiant, loss of sand at seashore. He says thr geology of the seashore can also be one of yr reason for coastal erosion.

Allan Williams has made study on the management of coastal erosion and describes that now a days erosion is produced by factors that can be showed. E.g sediment by passing at dams and river or other water sources quarrying suppression slope reduction or stabilisation.[6]

The extraction of oil and gas in alluvial plains and near the coastal region decrease the collapse of many deltas has been the major cause of sea levels rise. They have investigated about combined technology of geotextile tube and artificial beach rock for erosion protection. They states that erosion rate in the china is very much higher compared with other coastal regions. The erosion rate per year is 85meter/year. They says that preventing measures such as dykes are constructed in that coaste already.[6]

They states that from their case study the usage of geotextile tube are satisfactory in sandy and muddy beaches but there are some little difficulties in installing. Mangrove rehabilitation can be best solution for the prevention of erosion control in coastal region.[4]

III. RESEARCH WORK

After the text edit has been completed, Sangudurai beach is one of the famous tourist attraction spot in Kanyakumari district of tamilnadu. But recently it is severely affected by the coastal erosion and due to the erosion the concrete structures like seatings and other structures are collapsed and especially there is a tall tower in that beach it is also in dangerous condition that may collapse at anytime due to this erosion. Here we use the geotube can be a wonderful solution for the problem. In Vietnam, according to a research they have said that the rate of erosion in Vietnam southern beach zone is 50 meters /year since last 20th century.

Fig-2 Costal Protection in Vietnam Southern Beach

In Indonesia, the same coastal soil erosion problem began on the northern seashore of jawa Island in the year of 1969 and 1970, then most of the mangrove forest has converted into shrimp ponds the erosion continued in many area like North East sumathra, kalimantan, west sumathra.[7]

Prevention of Erosion using Geo tubes

It is used as a wonderful erosion prevention measures in Coastal regions such as breakwater, groyne, revetment, seawall and land reclamation. The eroded coastal region is excavated to a particular depth and ghf tube is places under the excavated land. Now it is filled with water or soil. After filling tie the filling port. Now cover the tube with sand. Again place another tube over the layer and it is like a peramid structure of three tube. Two tubes at the base of the peramid and touching each other and the one will over this two tubes. After reaching required height it is completely covered with sand and it won't be visible out. When the tide impacts the land the tube that are place at the seashore absorb the force of the tide which arrest the activity of new erosion to occure. It never allows water to pass through it so the soil is prevented deo the erosion. These geotubes are highly durable and helps in regaining the old beach profile. It is very easy to install and requires very less

time. Very less number of skilled workers only needed and most especially it is eco friendly.

Fig-3 Formation for Geo Textile Tube Technology

IV. CONCLUSION

The main objective of this geotextile tube technology is to prevent the coastal erosion and it can be used in Sangudurai beach also to regain its original old look and it helps the fishermen community who are living around the area. It is a cost effective and highly economical method. it gives good appearance to the beach and prevents the erosion completly. This geotextile tube technologies can contribute to the sustainable and safer living environment. World successfully facing the challenge of nature for the protection of people and their happy and peaceful live.

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