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Survey And Design Of Harbour Near Coastal Region

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Abstract : A fishing harbour contains multifunction facility that provide sufficient requirements for the capture of fish and its consumption. Large fishing vessels and huge number of fish creates a demand for maintenance and repair facilities not only for the vessels but also for the equipment as well. In the kosamba 463 boats are available they are facing problem of parking space for the boats. Because of that they are regularly facing problems during monsoon when almost all fishermen are come back home and park their boats at river bank nearby residential area. During low tide their boats are stuck in mud due to lack of water on the river bank nearby their residence which result in their unemployment condition. In this project, attempt has been made for designing a parking facilities and maintenance of fisheries boats at proposed location. As a result of that fishermen can go for the fishing as per their convenience which encourage their employment at highest level. Designing harbour developments requires an estimation of littoral drift and the direction of net drift. To examine shoreline changes in the coastal region, various techniques are applied. One of these, mathematical modelling, is regarded as a successful method. The mathematical models used in the current work, such as the spectral wave model to calculate nearshore waves, are used to address this issue.Climate, a one-line model for predicting changes in the shoreline along the project's nearby shoreline, and a Boussinesq wave model for changing the harbour layout to offer sufficient wave tranquilly in the harbour basin. In the current work, mathematical models were used to build a layout for a fishing harbour in Kerala State, on the west coast of India. [1]

Key words - Harbour, Parking facility, Littoral Drift, coastal region.

I. INTRODUCTION

Gujarat is having large coastal length and fishing is one of the predominant activities of fisherman beside along the coastal length. Kosamba village predominant to fishermen. It is located in Valsad district of Gujarat state of India. In the kosamba, there are around 500 boats. In addition to that, adjoining line of Sea, Auranga river and wanki river formed T junction in kosamba. Due to lacking of basic facilities such as harbour and other watersheds facilities, fishermen are parking their large vessels nearby port or tied in wanki river. This makes huge trouble for transportation via waterways. Moreover, increase in numbers of boats also causes problems. Therefore, it needs to be solved earliest.

A fishing harbour with two breakwaters—a 145-meter-long north breakwater and a 476-meter-long south breakwater—was developed in Thottappally. The area is completely exposed to heavy waves from the Arabian Sea that can reach a height of 2.5 m.as well as to littoral drift's impacts. Currently, significant harbour silting and subsequent progress of the Shoreline erosion has been seen on the northern side of the north breakwater and the southern side of the south breakwater.since the two breakwaters were built. According to Central Water and Power Research Station (CWPRS),changes to the current harbour architecture to reduce the issue of siltation in the harbour and give sufficient wave calmness In order to improve the harbour. [1]

II. STUDY AREA

Valsad town has a flat topography, which slopes towards west. The average elevation of town is 13 m above the sea level. The Arabian Sea lies to its west. As shown in figure 1 There are junction of Rivers andsea in which Wanki river is small which divide kosamba in two parts and Auranga is river. Both the rivers and sea intersect ocean that point is tagged as T junction. As per home interview survey, 463 large and small boats are there in kosamba.

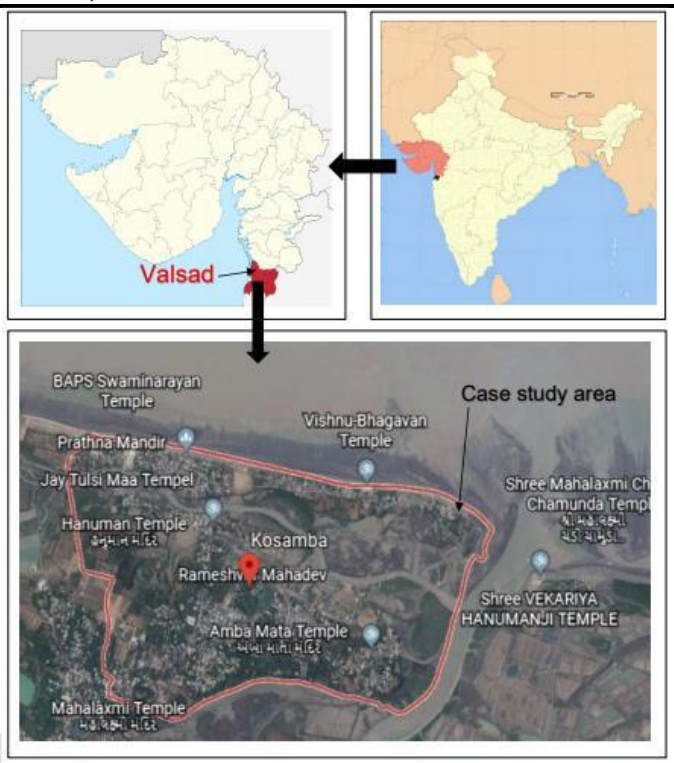


Figure 1 : Case Study Area

Moreover, after analysing it can be observed that the most appropriate location for harbour is at T junction. In addition to that, it is the only location which is very near from lighthouse and the by that location ocean is very near.

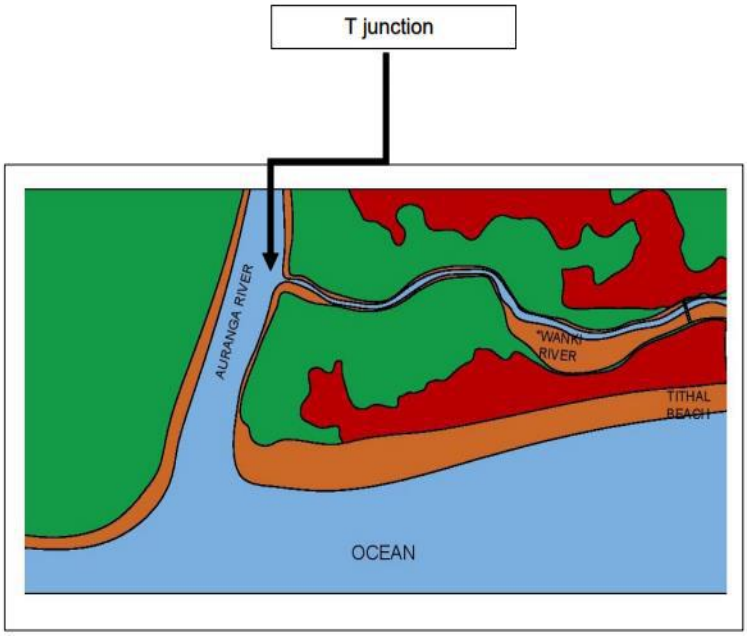


Figure 2 : T-Junction

III. Site Condition

- **Tides**

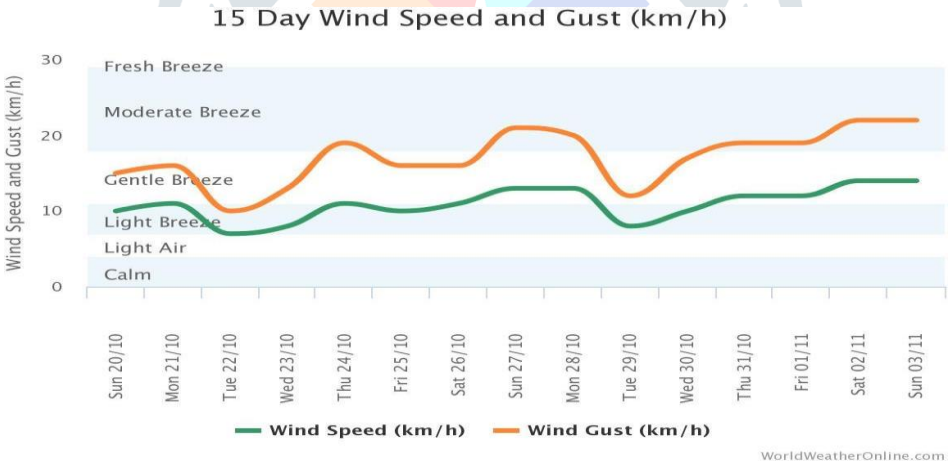
Tides are the periodic rise and fall of ocean waters. They are produced by the attraction of the moon and sun. The force causing tides are gravitational. The height of the tide when plotted against time gives sinusoidal shape of the curve. There are two rises of flood tides and two fall of low tides every lunar day, i.e., 24 hrs. 50 min. Thus, the average interval between successive high tides is 12 hrs. 25 min. A lunar day is a time between successive passages of the moon across a given meridian. Tide table from 20 to 25 oct. is shown as below. From the table the tide is rising in Valsad at the moment. It can be observe that the highest tide (4.28m) was at 5.19 am and the lowest tide of 1.23m is going to be 11.10 pm.

Table 1 : Tide Table

Day	1st Tide	2nd Tide	3rd Tide	4th Tide	Sun
20 Sun	05:19 h ▲ 4.28 m	11:10 h ▼ 2.1 m	16:58 h ▲ 3.68 m	23:10 h ▼ 1.23 m	▲ 06:36 h ▼ 18:11 h
21 Mon	06:16 h ▲ 4.1 m	12:27 h ▼ 2.26 m	18:00 h ▲ 3.45 m		▲ 06:36 h ▼ 18:10 h
22 Tue	00:22 h ▼ 1.48 m	07:31 h ▲ 3.97 m	14:12 h ▼ 2.23 m	19:31 h ▲ 3.32 m	▲ 06:37 h ▼ 18:10 h
23 Wed	02:01 h ▼ 1.62 m	08:58 h ▲ 4.01 m	15:40 h ▼ 1.96 m	21:21 h ▲ 3.46 m	▲ 06:37 h ▼ 18:09 h
24 Thu	03:35 h ▼ 1.57 m	10:13 h ▲ 4.19 m	16:42 h ▼ 1.56 m	22:44 h ▲ 3.84 m	▲ 06:38 h ▼ 18:08 h
25 Fri	04:47 h ▼ 1.4 m	11:10 h ▲ 4.42 m	17:31 h ▼ 1.13 m	23:45 h ▲ 4.29 m	▲ 06:38 h ▼ 18:08 h
26 Sat	05:45 h ▼ 1.22 m	11:58 h ▲ 4.63 m	18:15 h ▼ 0.74 m		▲ 06:39 h ▼ 18:07 h

- **Wind**

Air I motion is wind. This is a vector quantity having speed and direction. The direction is taken to be that from which the wind blows. The below figure shows Valsad wind speed of 15 days. From this figure it can be determined that 12 km/h is average wind speed in the Valsad. In maritime works, it is sometimes necessary to know the force that particular wind velocity exerts on given area. As for example, when a ship is moored and presents the surface area S to the wind component v, it is necessary to find the force exerted by the wind to estimate the pull on the moorings.



- **Breakwater**

There are sites on the coast or inland places, which are naturally protected from the fury of the sea. But, if a harbour is to be built on an open coast, as at Chennai (Madras), it needs to be protected artificially by breakwaters. A breakwater is, as the name suggests, a structure meant to reflect and dissipate the force of wind generated waves and thereby to prevent their incidence on a water area it is intended to protect. Changes in the observed sea-level influence the diverse action and administrations in harbours and ports, including navigationtimes, dispatch support administrations, safety and assurance of harbour's buildings and coastal engineering plans. [2] Recognizing natural phenomena affecting those bodies of water, such as seiches or freesurface oscillations, requires a thorough understanding of resonant periods. This phenomena appears as a spike and fall in price of the water's surface and frequently causes a gradual increase in wave amplitude. [2] Breakwaters are of two types: vertical wall type and rubble mound type. Where the depth of water is very great, or the bearing capacity of the sea bed needs to be improved, a composite type with a vertical wall on a rubble mount base, is used. There are many examples of composite types and the considerations will predominant depending upon whether the rubble mound or the vertical wall part dominants.The analytical approximations discussed above have not been applied to a basin with a breakwater. Our main objective is to determine when resonance occurs if a submerged breakwater is installed. [2] Proper planning and design of harbour requires a complete study of certain natural and meterological phenomena and their consequences at and near the shore. These natural phenomena also effect the design of protecto works in the form of breakwaters, offshore mooring, marines and structures within the harbour for mooring the ships.

IV. SURVEY AT VILLAGE

The data collected from this survey is from the survey the total number of boats is 114 Kosamba. There may be a greater number of boats but near the coastal area people used to live in the huts and very small house. And it's been difficult for us to get in touch with every fisherman. In Valsad there are so many villages that contains more boats but the kosamba is very near from the ocean so they park their boats nearby kosamba. The data collected in terms of number of boats per house in the village kosamba. From the survey we have come to know that which boats are exist in the kosamba village.

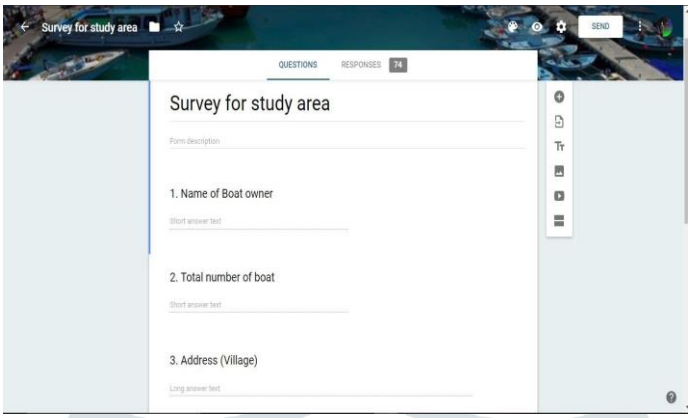


Figure 3 : Google Form For Data Collection

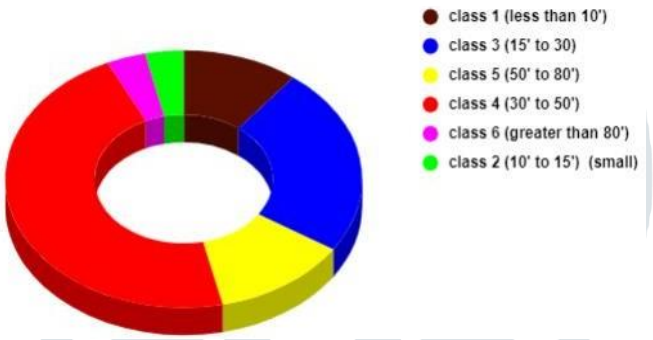


Figure 4 : Classification Of Boats

Table 2 : Data Collection Of Active Fishermen

DISTRICT NAME	VILLAGE NAME	TOTAL POPULATION	TOTAL NUMBER OF FAMILY	ACTIVE FISHERMAN
VALSAD	Magod Dungri	3899	925	2146
	Meh Machhiwad	736	179	291
	Survada	1344	253	540
	Kosamba	7372	1129	2303
	Bhadeli	6515	1182	1722
	Bhagal	1521	255	794
	Dandi	1941	325	463
	Kakwadi	2296	446	906
	Methiya	563	114	235
	Nani Dati	2339	395	506
	Moti Dati	1073	169	254
	Athiyawad	410	91	0
	Dungri	389	67	93
	TOTAL	**30376**	**5530**	**10307**

V. ANALYSIS

From different kind of survey, we can get information and acknowledge about how to achieve this project and what are the work that we should do so according to them. We have studied the most of the aspect related to harbour i.e. how this work can be achieved successfully, what data needed for the design harbour, how survey is carried out etc. are used for the purpose of this project of this study is that to know or analysis. We have conduct survey to acknowledge the exact number of boats at nearby kosamba area. And from the survey we concluded that in kosamba there are around 463 large and small boats. These boats are mostly class 2 boats. The maximum size of boat is 80’ X 40’. After all the scenarios at the project site this harbour can handle 150 boats at a time. This capacity may not be able to handle the boats at the time of congestion of boats. The expansion of harbour will be necessary in future due to usage of harbour by nearby costal region.

VI. CONCLUSION

After analyzing data of survey , it can be conclude that proposed location of harbour is at T-junction with capacity of minimum 150 boats. The moisture content of soil is so high that pile foundation is need to be provided at proposal location.

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