ECONOMIC BENEFIT OF HYDROGRAPHY:

LAND RECLAMATION IN BAYELSA STATE NIGERIA:

A CASE STUDY OF SAIPEM CAMP IN YENAGOA

BY

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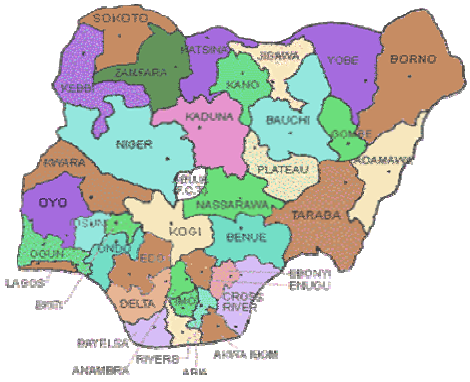
INTRODUCTION

- **Bayelsa State** is a state in southern Nigeria in the heart of the Niger Delta. It is on the coast and between Delta State and Rivers State. Its capital is Yenagoa (See maps of the Niger Delta and Nigeria below).

NIGER DELTA MAP (FIGURE 1)

MAP OF NIGERIA (FIGURE 2)



- The state was formed in 1996 from part of Rivers State and thus, it is one the newest States of the Nigerian Federation.
- It covers an area of 10,773 sq. Km. And has a population of 1,998, 349 (one million, nine hundred and ninety eight thousand, three hundred forty-ninie),(2005 estimate).
- Bayelsa has a riverine setting, a lot of her communities are almost (and in some cases) completely surrounded by water, hence making these communities inaccessible by road. It has one of the largest crude oil deposits in Nigeria. As a result petroleum production is extensive in the state.
- This has posed a large problem to the State since its creation and successive State Governments have not been able to fashion a way out. Apart from the subsistence fishing and canoe making, the state has virtually no stable commercial activity. It heavily depended on royalties (taxes) on crude oil pipeline and Federal Government Allocation.

  For now, the area is grossly untapped and closed to the open world because of the floody and swampy nature of the terrain. To this extent, it is only land reclaimation that can catapault this rather backward community to its prime of place amongst the community of elegant States of Nigeria.
- Saipem Camp is a a case study where this problem can be effectively articulated, the extent to which Reclamation can meet this challenge, it's attendant cost and the impact it will have on the people and the State .

- **SAIPEM; YENEGOA?**
- Saipem is a major contractor to Shell Petroleum Development Company Nigeria Limited (SPDC), and specializes in pipeline projects.
- The company came to Yenagoa, Bayelsa State, due to a pipeline project she had to execute and Yenagoa is closest to the location and as a result, she decided to situate her base camp there. Her regional headquarter is in Port Harcourt Rivers State.
- **WHY RECLAIMATION** ?
- As earlier mentioned, Bayelsa has a riverine setting, and Yenagoa which is the State capital is not left out. For Saipem to build its Camp in Yenagoa, the chosen site of course, required reclaimation, for the site was acutely swampy. The site was dangerously swampy to the extent that one can hardly walk on it without using a swamp buggy. (See Figure 3a and 3b below)

FIGURE 3A: SAIPEM CAMP SITE PRIOR TO RECLAIMATION

FIGURE 3B SWAMP BUGGY CREATING A PATH INTO THE SITE FOR THE DREDGER

FIGURE 3C

RECLAMATION

- **LAND RECLAMATION**
- Land reclamation is either of two distinct practices. One involves a change from an area's natural state, while the other is restoring an area to a more natural state (Wikipedia, the free encyclopedia**)**
- It can also be defined as "the process of improving disturbed land (soil, vegetation, water) to achieve land capability equivalent to the predisturbed condition or for a specified end land use."

- **DREDGING AND RECLAMATION:**

- Reclamation is an important example in this respect, where large amounts of sand are dredged, transported over large distances and used to make new land for industrial, housing, airport and other infrastructural purposes.
- Saipem, in line with the above resolved to dredge its own sand within the premises as this is more cost effective as compared with sand haulage.
- Due to the fact that the area was a vast one, and the job had a timely deadline, three dredging companies to be precise were engaged.

PROJECT PLAN

- The following strategies were adopted for this project in other to effectively execute the task at hand.
- SITE STUDY
  - Determining the actual portion of the landfill area to be reclaimed.
  - Carrying out a study of geological features that is check if the quantity of sand needed could be dredged from the area.
  - Check for stability of the surrounding area.
  - Also check for the proximity of ground water.
- ASSESS PROJECT COSTS
- Project costs may also include the following:

A. Capital Costs
- Site preparation
- Rental or purchase of reclamation equipment
- Rental or purchase of safety equipment
- Construction or expansion of materials handling facilities.
- Rental or purchase of hauling equipment.

B. Operational Costs
- Labour (e.g., equipment operation and materials handling).
- Equipment fuel and maintenance.
- Hauling costs.

Part of the cost analysis involves determining whether the various aspects of the reclamation effort will result in reasonable cost reduction in relation to the anticipated economic benefits. (U.S. EPA. 1997. Report)

THE ROLE OF THE SURVEYOR IN RECLAMATION

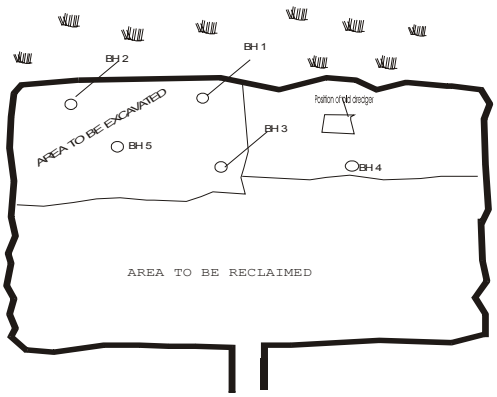
- The Surveyors role in land reclamation is simply inevitable. It is the Surveyor that determines the quantum of sand to be dredged, and to achieve this, he/she needs to carry out a pre and post dredge survey of the area in quo.
- It is also the surveyor's duty to carry a bathymetric survey of the river from where dredging is to be done.
- The surveyor also carries out the geological survey of the area.

GEOLOGICAL SURVEY OF SAIPEM CAMP

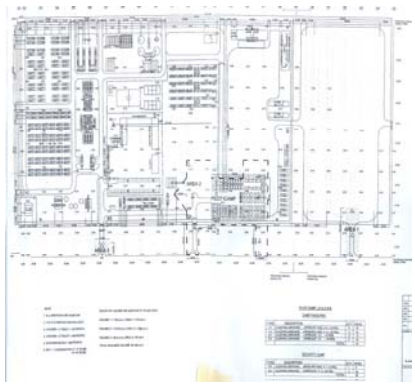
- A recce was conducted round the area to be dredged. After the recce, boring was done at random.
- The average width of 25.0 m x 25m away from the area where the previous dredger was situated was covered. Samples were taken at five different points to a depth of 15m**.** See figure below.
- From the samples taken, the following results were obtained.
- Note: On this project, the geological survey was done prior to the dredge mobilizing to site. (See results of geological survey below.)
- **FIELD OPERATION**
- **RESULTS**
- **Bore-Hole 1:** 0.0m – 3.0m contains Clay, from 3.0m – 6.0 m has Reddish sharp sand, from 6.0m – 8.0 contains white sharp sand while from
- **8.0m – 15.0m has very smooth white sand.**

- **Bore-Hole 2**: 0.0m – 2.5m contains clay, from 2.5m – 6.0m has reddish sharp sand, 6.0m – 8.0m is made up of white sharp sand, while from 8.0m – 15.0m contains smooth white sand.
- **Bore-Hole 3**: 0.0m – 3.0m contains clay, from 3.0m – 6.0m has silt mixed with clay, from 6.0m – 8.0m contains clay and from 8.0m – 15.0m has clay.
- **Bore-Hole 4**: 0.0m – 3.0m contains clay, from 3.0m – 4.0m, has reddish sharp sand, from 4.0m – 8.0m contains sharp sand mixed with clay and from
- 8.0m – 15.0m has clay
- **Bore-Hole 5**: 0.0m – 3.0m contains clay, from 3.0 – 6.0m has reddish sharp sand, from 6.0m – 8.0m contains white sharp sand, while 8.0m – 15.0m is made up of smooth white sand.

SUB-SOIL INVESTIGATION SITE SKETCH



- As stated earlier, as soon as the result of the geological information were on hand, the dredge mobilized to site, and the dredge was positioned by the surveyor on the specific spot from where commercial quantity of materials (sand) could be produced. After the dredge has been positioned, sand mining had begun.
- However it should be borne in mind that after much materials had been deposited, a post dredge survey was carried to determine the actual quantum of materials that was actually produced on site.
- Prior to the sub-soil investigation, a pre-dredged survey of the site had earlier been carried out (See figure 6 below.)



- **BENEFITS OF RECLAMATION**
- - Providing needed land for use.
- - Extending land capacity at the site..
  - Lowering operational cost.
- Costs for reclaiming the site was relatively low for the following reasons:
- The distance for transporting the produced materials was only a few metres away. The management authority avoided commercial hauling prices by using its own trucks and employees to transport the reclaimed for eventually this was resulkted to when the pace of work by the dredgers were dismally slow for the materials were not so easy to come by from the designated chosen spots..

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- **PROBLEMS ENCOUNTERED**
- COLLAPSE OF BOND WALLS
- There were series of this at the site due to the thickness of the mud. The mud was 3m thick, and as such while dredging was going on, the areas around where materials were being produced from, were always collapsing. The excavator had to be used to remove the mud before dredging could continue. If this is not done, the mud stucks to the dredge's cutter and affects the production of the dredge.And this caused some down time while dredging.
- Due to the above, surrounding farm owners were always at site complaining of such incessant pollution to their farm and as a result, the dredge had to relocate. This again means down time.

- INCREASING WEAR AND TEAR OF EQUIPMENT
- Reclamation activities shortens the life span of the equipment. For excavators and bulldozers are continuosly on the use due to the high density of produce being handled. Infact there were series of breakdown of such equipment. It was always the case of overheating and as such the equipment had to stop work for some hours. Hence down time. The toll on the machine cannot be overemphasised .

- **CONCLUSION**
- However , as had been mentioned earlier on in the course of this project, the company due to the slow pace of work by the contracted dredgers, that were small; (for only small dredgersthat could enter the almost land - lock canal for they were virtually carried - in by excavators) and as such their capacity cannot produce the pace required. And again, due to the materials that could not be found in commercial quantity and the attendant muddy hicups that were experienced, which resulted onto expensive downtime loss, the company had no choice but to resort to haulage of materials from nearby sand beach. Infact, so many tippers were engaged instantly, that within a few days, about five thousand cubic metres were hauled and spread on site.(see figure 7 below)
- This project has afforded the people currently with gainful employment, improved quality of life as cash is readily available, reduced incidence of crime, increase in government revenue due from tax on company facilities, and from income tax, afforede time and space for relaxation. Thus the joy and human satisfaction this has occasioned had in no small way made for the relative peace the State and thus Nigeria by extension now enjoys currently.

- FIGURE 7: RECLAIMED LAND OF THE CAMP

THANK YOU VERY MUCH FOR LISTENING