



Nigerian Institution of Civil Engineers (NICE)

Port Harcourt Chapter

(A branch of the Nigerian Society of Engineers)



ENGR. PROF. Y.O.
BEREDUGO

ANNUAL LECTURE

— THEME: —

**EAST-WEST COASTAL ROAD:
CHALLENGES AND PROSPECTS**

— BY: —

ENGR. MAYNE DAVID WEST, SNR.

FNSE, FNIStructE

On

Thursday 27th October, 2011

At

Hotel Presidential, Port Harcourt

By

5.30 pm

All Protocols observed!

It is my great pleasure to be here and to thank the Nigerian Institution of Civil Engineers and members of the organizing committee of the 6th Engr. Prof. Y. O. Beredugo Annual Lecture for giving me the honour to deliver this year's lecture. I believe I was chosen to give the lecture on the East-West Coastal Road because of my involvement in the firm that carried out the studies and design of this vital and topical project. I therefore accepted the honour with utmost humility on behalf of all the people who participated in one way or the other on this assignment - the drivers, the office attendants, secretaries, technicians, surveyors, engineers, specialist consultants etc. It is indeed an honour to be given this privilege to deliver the annual lecture in honour of a very distinguished Professor, a Foundation Fellow of the Academy of Engineering, an accomplished practitioner of Engineering, a teacher and a role model - Engr. Prof. Y. O. Beredugo.

It is my prayer to the Almighty God to see me through this task.

1.0 INTRODUCTION

Nigeria, the most populous country in Africa has boundaries totaling 4,047km, out of which the coastline stretches for about 853km comprising inshore waters, coastal lagoons, estuaries and mangrove especially in the Niger Delta. The coastal environment consists of rich and diverse ecosystems, natural resources, and large human populations. The Nigerian coastal environment is a strip of narrow land bordered by the gulf of Guinea of the Central Eastern Atlantic in the South. The zone lies within the Atlantic Ocean with its continental shelf, Exclusive Economic Zone and the coastal fresh water and brackish wetlands ramified by an atomizing network of rivers and creeks. These water bodies are characterized by periodic tidal variations and ranges along water channels and the differences depend on the hydrological properties and slopes of the various channels. (CEDA 1977)

The Nigerian Coastal zone sprawls over a total of nine coastal states (out of the thirty-six States of the Federation) namely Akwa Ibom, Bayelsa, Cross River, Delta, Edo, Lagos, Ogun, Ondo and Rivers. The coastal states are estimated to account for 25% of the national population. The coastal areas stretch inland for a distance of 15km in Lagos in the West to about 150km in the Niger Delta and about 25km East of the Niger Delta.

The Nigerian Coastal environment is divided into four main physiographic zones, viz:

- i. The Barrier Lagoon Coast which lies between Badagry and Ajumo east of Lekki town.
- ii. The mahin mud coast lying between Ajumo and Benin river estuary in the North Western flank of the Niger Delta.
- iii. The Niger Delta lying between Benin River in the west and Imo River in the east and
- iv. The strand coastline lying between Imo River and the Nigerian/Cameroon border in the east with the Cross River inclusive (Awosika 2001).

The resources in the Nigerian coastal and marine environment have high implications for the nation's economy. Oil and Gas (mainly from the Niger Delta) form the main backbone of the Nigerian economy as it provides 95% of foreign exchange earnings and about 65% of budgetary revenues.

2.0 BACKGROUND FACTS

Coastal Roads constitute a major segment of national road network in countries with vast shorelines like Nigeria. This is so not only because they provide access to fishery, residential and tourism resources but also because of the difficult coastal terrain which is a major challenge to all other productive sectors and social activities on a daily basis.

However, in Nigeria it is a different '*kettle of fish*'. The many years of marginalization, neglect and betrayal by the successive governments at the centre have led to the total absence of infrastructures such as road networks, railroads and general paucity of communication networks in the Nigerian coastal communities (especially in the Niger Delta Region) which provides over 95% of the economic life support for the Nigerian nation.

The East-West Road presently undergoing reconstruction and upgrading is currently the most southern road running through the Niger Delta Region. This road is about 40km from the coastline on the average, leaving a vast section of the coastal communities inaccessible by road transport. Towns and communities such as Ilaje, Awoye, Escravos, Oporosa and Okerenkoko in Gbaramatu Kingdom, Forcados, Burutu, Agge, Tebidaba, Igbomatoru, Peremabiri, Apoi, Brass, Kula, Soku, Bonny, Opobo just to mention a few cannot be reached by road even through their respective state capitals. Effective transportation and communication is limited to water and air, both of which are comparatively more expensive than land transport and therefore outside the range of majority of the inhabitants. This has naturally slowed down development and business expansion. Besides communication, roads provide the platform for evacuating electricity, telephony and other services that stimulate development.

We cannot talk about the East-West Road without acknowledging the progenitors of the road, the people who conceived the vision and stayed focused on it and put their dream into action. The story of the East-West Road is not complete without mentioning HRH King Alfred P. Diete-Spiff, the Amayanabo of Twon-Brass and Ambassador Professor L. B. Ekpebu for their tireless contribution in making the East-West Road a reality. The East-West Road was started in Rivers State in 1972 by these illustrious compatriots of the Niger Delta when the King was the governor of the then River State and the Ambassador his commissioner.

The Niger Delta Regional Development Master Plan, a blueprint for the sustainable development of the Niger Delta Region, laid the conceptual foundation for the East-West Coastal Road in 2004. By the way the Niger Delta Regional Development Master Plan is the first integrated development plan in Nigeria that is solely based on stakeholders' participatory inputs and experts' analytical guidance in 25 sectors, including health, education, transportation and agriculture.

Before the Master Plan, the Niger Delta Environmental Survey (NDES/OPTS), in formulating development priorities in the Niger Delta Region, proposed the construction of an East-West Coastal Road in 1998.

Again, the International Conference on the development of the Niger Delta Region held in Port Harcourt from the 10th to 12th December, 2001 under the aegis of NDDC and UNDP emphasized the urgent need for an East-West Coastal Road. The conference was of the view that there can be no meaningful development of the region without the proposed Niger Delta Coastal Road.

In tandem with the Niger Delta Regional Master Plan, the objective of this regional road (East-West Coastal Road), is to serve as a strong east-west spine from Calabar towards Lagos, with several north-south 'ribs' connecting growth poles, central and northern Nigeria. The purposes of the regional road are:

- To link centres of economic activity with their business connections, raw materials and markets.

- To provide fast links between sub-regional roads and growth poles

- To concentrate regional traffic on a few routes that would justify a viable rail transport.

3.0 ALIGNMENT AND SCOPE OF THE EAST-WEST COASTAL ROAD

The alignment commences from Calabar, the old nexus of national administration and the former Colonial Capital of Nigeria on the Calabar Ogoja Road. From this starting point, the alignment takes a southerly direction, finding its way to the coastal area through the hilly terrain of Cross River. At Ibeno in Akwa Ibom State, the alignment moves westwards connecting the Coastal areas of Rivers, Bayelsa, Delta and Ondo States. From Ondo State, the East-West Coastal Highway stretches through Ogun State before terminating at Ibeju on the Lagos Epe Expressway. The highway connects over 1,000 communities. From the detour on Route 90, the East-West Coastal Highway is linked to the Trans West African (Coastal) Highway (Lagos Benin Enugu Abakiliki Ikom Cameroon Mombassa on the East African Coast.

The Coastal Road travels over 704km on the main alignment and with about 106km of spurs, straddling over barrier Island forests, fresh water swamps, mangrove swamps and waterways. Spurs are provided to connect the East-West Coastal Highway to centres of economic activities in the northern and central regions of the country, and also to create access to the coastline for maritime industries, tourism and recreational activities.

4.0 PROSPECTS

This road is crucial not only because of the vital communication links that it would provide, but the wider benefits of acting as a catalyst in the development of the region and unlocking the vast tourism potentials and opportunities in the region.

It should have been Nigeria's prime paradise, but beleaguered by environmental challenges, the coastal area (Niger Delta Region) of Nigeria has its multi-faceted socio-economic challenges, complicated by low levels of industrialization, poor human capital development, high rate of poverty (70% of the people in the region live below the poverty line) and rising unemployment. The recently released National Bureau of Statistics (NBS) report which placed Bayelsa, Akwa Ibom and Rivers as the States with the highest level of unemployment (38%, 36% & 32% respectively) in the country rightly underscores the urgent need for a possible means of employment

Creation and generation in the region. Following years of national neglect and environmental degradation, the economic life of the people has suffered dwindling fortunes. Ironically a different scenario should hold for a region that is just about 25% of the entire population providing 80% of the country's annual income.

The planned 704km East-West Coastal Road of the Federal Government will help immeasurably in opening up of the Niger Delta region's economic potentials, assist in dousing the severity which encumber the movement of goods and enable the people to improve their living standards.

The East-West Coastal Road holds much prospects for the Coastal Region as well as for the Nigerian economy at large. According to recent studies, it is revealed that the road project will create employment for over 11,000 people in the region during the construction period.

The nation has already started appropriating some of the prospects of the East-West Coastal Road. For instance, for the first time in the country's history, local experts are given a chance to contribute to national development and this has created jobs, built local capacities and enhanced technology transfer.

180No. bridges which includes 3No. iconic bridge structures are expected to be constructed along with the road to ease the movement of goods in and out of the region. These are lasting legacies and assets that are expected to give the people of the region a deep sense of belonging. Moreover, apart from the emotional or romantic deepening for the people, the road when finally completed will connect over 1,000 communities; improve fishing and trading activities in the region by at least 27.5% and 24.4% respectively. These communities whose economic contributions, hitherto disconnected from the mainstream centres of economic activities, the road will certainly assist in absorbing their contribution to national growth and facilitate the movement of raw materials from the rural end of the market to the high end urban centres where their produce are transformed into final outputs.

Other benefits of the East-West Coastal Road, when completed, are as follows:

to give direct access to waterways that are currently not utilized and encourage the establishment and growth of maritime industries such as ocean terminals for deep anchorage, ship repair/maintenance and engineering facilities to handle large ocean going vessels, boat building facilities, passenger cruise terminals, fishing terminals etc.

to encourage establishment of export processing zones in the individual coastal states.

to enhance the exploitation of the natural resources of the Niger Delta oil and gas, salt, sand for glass-making, timber etc.

the proposed road will enhance the security of the region and nation at large.

the East-West Coastal Road will serve as the shortest route linking Lagos to the coastal areas of Ondo, Edo, Delta, Bayelsa, Rivers, Akwa Ibom and Cross River States and also connects the North-South vertical routes:

- Route 10 - Lagos - Sokoto
- Route 50 - Warri - Kaduna - Zaria - Kano - Daura
- Route 70 - Port Harcourt - Makurdi - Bauchi - Kano/Maiduguri Road
- Route 90 - Calabar - Ikom - Ogoja - Jalingo - Numan - Maiduguri

which will be linked to the Trans-West African Highway (Lagos - Benin - Enugu - Abakiliki - Ikom - Cameroun - Mombassa on the East African Coast).

the construction of the coastal road from Calabar - Lagos will engender a genuine feeling of national integration in the people of the Niger Delta Region who have always felt marginalized in national developmental programmes.

It will encourage the creation of ecosanctuaries where people will experience natural encounter with wild life in a regenerating ecosystem. This will bring about tremendous development in the area and engender employment opportunities in tourism.

it will display the first set of Nigeria's monumental bridge structures. This will automatically give a permanent seat to Nigeria in the elite club of nations with iconic structures which will give massive added flavor to tourism.

Presently, the odds and pressure of usage on existing roads along the corridor of the proposed East-West Coastal Road present hassles for the users and no doubt, the stakes are high in terms of time wastage, the hazards posed to lives and properties and the delays heavily experienced. These hardships that beset the commuters and business across the affected states along the proposed road corridor will be assuaged upon its completion. The road is expected to serve as a fast link between sub-regional and growth poles in the country, to ease traffic congestions and delays by shifting the concentration of regional traffic to few routes and reduce traffic delays to save commuters plying the route an average of three travelling hours to the capital cities of the various States where it crosses. According to a recent survey, this translates into about N267billion saved per annum in monetary terms, based on the assumptions that only one-third of the estimated current vehicular traffic to the capital city exists and that each vehicle plying the road on an average has only two occupants. *“An estimate of the monetary worth of the total benefits of the road when construction work would have reached about 70% is about 595 trillion naira in one year! The stream of benefits here include transport cost savings, benefits to government, traffic benefits and other developmental benefits such as additional income to aquatic economic life, and other forms of commercial agriculture, mineral resources exploitation, expansions in market activities due to expanded access to link centres of economic activity with their business connections, raw materials and markets, to provide fast links between sub-regional roads and growth poles, to concentrate regional traffic on a few routes that would justify a viable rail transport”* (Source: NBF News).

Mr. Chairman, ladies and gentlemen, after evaluating all the benefits enumerated above, I stand here this evening, to tell you and the nation that I am convinced that the East-West Coastal Road is **A NECESSITY OF LIFE** to the people living in the Coastal Region of Nigeria and thus the present effort by the Federal Government to construct it is a welcome development.

5.0 CHALLENGES

The East-West Coastal Road holds a lot of promise for the people of the coastal communities and Nigeria at large but this promise will come with some sacrifice and challenges. As the saying goes - *'there is no Gain without Pain'*.

The proper design and construction of the East-West Coastal Road requires intimate knowledge in many specialized fields of civil engineering and a good knowledge of coastal environment. The scoping of the challenges below is only to highlight the diverse multi-disciplinary demands that the design and construction of this road would make for it to truly serve its design life. Such a challenge calls for a highly competent and versatile consulting engineering firm; a firm that can enlist the services of a technically sound and delta-wise multi-disciplinary team. Such a team should understand both the sensitivity and dynamics of change in a delta confronted by a spectrum of forces. On the whole, because of the peculiarity of the job, twenty-seven (27) Specialist Consultants were engaged in areas of Hydrology, Geotechnical Investigation, Geophysical Studies, Topographic Surveys, Bathymetric Surveys, Traffic Studies, Wind tunnel and aerodynamic Studies, Economic Studies, Environmental and Social Impact Studies, etc.

The challenges are encountered in 3 phases namely - Field Studies & Investigation Phase, Design Phase and Construction Phase.

5.1 Field Studies and Investigation Phase

The field works for the East-West Coastal Road commenced during the chaos in the creeks. A period aggrieved youths, local territorial guards and ethnic fighters had taken up arms against the State as a consequence of the years of marginalization, neglect and betrayal. They had strategically positioned their numerous camps across the length and breadth of the Coastal Niger Delta. The Joint Military Task Force (JTF) had also mounted their positions to enable them respond adequately to the then escalating tension in the region. The frequent clashes between rival armed youth groups and even inter-community conflicts made the area a near impossible place to undertake such a daunting assignment that involved cutting through, staking-out, taking levels over 600km of mangrove and fresh water swamps.

5.1.1 Topographical Survey

The survey work of the East West Coastal Road (Calabar - Lagos) was broken into 6 segments:

- a. Calabar to Andoni River
- b. Andoni River to Brass River
- c. Brass River to Ramos River
- d. Ramos River to Benin River
- e. Benin River to Lekki in Lagos State.
- f. Spurs

Several teams were mobilized for the execution of the survey, taking all the segments simultaneously.

The challenges in the survey of the Route varied from segment to segment in terrain, accessibility, human occupancy, presence of wildlife, activities of militants, and attitudes of host communities. The expansive nature of the route running from the east (Calabar) to the west (Lagos) cut across the three geographic belts of the Nigerian Transverse Mercator (West, Mid and East Belts) and even the two zones of the Universal Transverse Mercator (Zones 31N and 32N) with their different transformation parameters. The sheer size of the survey teams engaged in the project was itself a serious challenge.

5.1.1.1 Terrain/Accessibility

The terrain of the Coastal Region is not as much of a blessing as what lies underneath it. The entire route of the proposed road traverses through difficult places such as freshwater and mangrove swamps, tidal marshes, mud flats, and virgin forest area.

Working through the thick freshwater forest of the Ibeno axis, Imo River - Andoni River, Apoi Creek - Ramos - Forcados River was difficult due to near total lack of access by either vehicle or boat. The crews spent long hours trekking to and from work daily.

In the mangrove areas of the entire route whose waters were tidal, the crew experienced limited hours of work due to the tidal effects. When the tides are low, it was difficult for boats to reach the river/creek edges for the personnel to disembark onto land for work. At very high tides, the overflow into land

made movement along the route and even setting up of equipment difficult if not impossible. Thus the crews in these sections which comprised about 60% of the entire route had limited hours of work daily due to tidal effects. The areas around the Calabar river system, Andoni River to Brass, Forcados River to Escravos River to Benin River even to the fringes of the popular Tsekelewu Mudflats in Delta State fall into this section.

The area that posed the greatest challenge in the course of the survey was the section from Tsekelewu through the entire Ondo State axis to the fringes of the Lekki Lagoon. This section has a terrain that is soft to about 1.5m below a massive body of water covered by floating grass. Even the areas with vegetation are still soft. It was therefore difficult to find grounds to stand and/or setup survey equipment.

5.1.1.2 Accommodation/Medical/Messing

The proposed East-West Coastal Road traversed areas in the coastal area devoid of comfortable habitable accommodation. Throughout the execution of the project, the field crews faced various challenges in terms of accommodation. The few houses available for occupation were often without windows and ceiling in many of the communities along the route of the project.

Access to medical facilities was one major problem throughout the duration of the project especially deep inside the delta. Thus medical needs were sourced at the major towns far away from route host communities like Warri, Bonny, Sapele, Igbokoda etc, with huge cost of transportation and loss of man-hours which affected the progress of the project.

There were scanty places for messing and the only portable drinking water was sachet (“pure”) water at exorbitant prices.

5.1.1.3 Community Issues

These included personnel and equipment seizures, assault on personnel, stolen boats, imposed idle workers and community demands. A total of eighty (80) cases of personnel and equipment seizures were reported.

Inter-communal boundary issues were triggered in several communities, where mutual distrust had existed for decades. It took the intervention of senior government officials from the affected communities and assurances from top management staff of NDDC to pacify the conflicting parties.

Community stoppages were encountered all through the project in almost every segment of the work, a total of 43No. community stoppages were reported and settled. The stoppages in most cases were caused by the insistence of communities that their demands were met before commencement of work. Demands often included settlements for the forest to be cut, farmlands, security fees and employment for indigenes.

Concluded negotiations for community labour and pay, boats, homages, accommodation and even fuel prices were often broken. These often lead to further forceful negotiations which many times resulted in work stoppages.

The high level of unemployment in the coastal region of Nigeria poses a threat to sustainable infrastructural development. The high population of idle youth in rural communities who jostle for the limited job opportunities that projects such as the East-West Coastal Road bring to their communities, creates a delicate situation which if not well managed will cause fatal clashes within communities.

Much as the communities welcome the project, the confidence level is low which is an expression of discontent over government inability to execute projects that will improve their standard of living over the years. A summary of incidence statistics is given below:

Security Incidence Report

Personnel Seizure	-	31Nos
Equipment Seizure	-	49Nos
Physical Attack	-	21Nos
Community Stoppages	-	43Nos
Boat Accidents	-	3Nos
Stolen Boats	-	2Nos

Police Issues	-	3Nos
JTF Issues	-	1No
Loss of Lives	-	2Nos

As always, project challenges shoot up the cost of project execution. The security issues anticipated triggered cost intensive security plans that included engaging the services of military personnel and gun boats for several months, negotiations and settlement of communities and youth groups, community liaison officers, payment of idle workers and alternative logistics arrangement. All these challenges compounded with the accessibility to locations caused severe delays and lengthened projection duration in almost every segment of the project; such delays always come with huge cost implications.

5.1.1.4 Technical

Unavailability of Primary Survey Controls in the remote areas where the road passes made it imperative for extensive control establishments to control the route survey. Even where these primary stations existed, the records of their locations and where to obtain such records was a challenge. It was only around the area of Calabar (Cross River State), Bonny (Rivers State) that some few existing controls were found through interactions with locals; the values proved more difficult to obtain. This impacted on the project cost and speed of execution. These controls can be of immense benefits for future use in these areas.

The project span through two projection zones (UTM Zone 31 and UTM Zone 32) with some overlap. The entire area between Calabar upto a point on Sangana River (beyond Brass River) in Bayelsa State fall within the UTM Zone 32, while from Sangana River through the rest of route in Bayelsa, Delta, Ondo, Ogun and Lagos States are within the UTM Zone 31.

The segment, Brass River to Ramos River, which falls in two zones proved difficult to present as single continuous route on a drawing due to the differences in the coordinate origins of the two zones. However the route on ground is one continuous line.

5.1.1.5 Wildlife

The fear of wildlife attack was a serious problem especially at the Imo River Andoni River Bonny River, Brass River to Ramos River axes of the project as there were evidences of wild animals like elephants, crocodiles and pythons in abundance in the area. This caused the reluctance of many workers to be engaged in these areas, some others that were engaged who become aware of the presence of the wildlife abandon the project halfway into the project execution.

Hunters were engaged to work with survey crew.

5.1.1.6 Personnel Management

In the execution of the survey of the entire route of about 704km, a total of about 43 survey teams (each comprising of ten (10) men excluding host community workers) were mobilized. The management of this number of persons was not an easy task especially in funding and organization. Personnel turnover was high due to several reasons (hostility of the project host communities, threats to life by militants, expansive rivers crossed daily for work locations and daily fear of dangerous animals, the difficult terrain especially the deep swamp forests, unstable sinking grounds).

5.1.2 Geotechnical Investigation Challenges

The challenges are in the areas of field work, the spatial and vertical variability of the properties of the sediments encountered and the application of the recommendations of the various geotechnical specialists to achieve a durable and economical design.

5.1.2.1 Field Work

The route of the proposed road is of necessity in close proximity to the coastline, traversing virgin, salt or fresh water swamps of medium to dense vegetation. For about 60% of the road alignment surface soil deposits encountered are very soft to soft organic peaty clays that can hardly support

human weight not to talk of investigation machinery. Except for few kilometers at the beginning, in Cross River state and a fairly re-aligned long stretch at the end in Lagos State, access to the alignment is by water transportation and movement of personnel and equipment between test points is by a combination of small river craft and on foot. Seasonal flooding and daily tidal inundation of the swamps make work difficult.

On a road alignment, the general practice is to do hand auger borings and trial pits to 1.5 to 2m depth. But for this project, the nature of the materials expected and indeed encountered, required that borings had to be made by light rigs to 15m depths generally. Probing had to go as deep as 30m in some cases to ascertain the location of granular materials. The borings were alternated with Dutch Cone Penetration tests. For the bridge site investigations, generally probing went to a minimum of 40m depth. Midstream investigation at major rivers had to be carried out on jack-up barges hired with foreign currency. The community courtesy calls and the fragments of militancy were more pronounced for the field geotechnical investigations. A global security arrangement had to be made with the JTF for the entire period and the investigation at the major rivers on jackup barges had to be accompanied by military gun boats. In spite of these, there were instances of stolen hired boats and seizure of equipments incurring monetary payments as mentioned earlier.

5.1.3 Hydrological Investigation Challenges

The proposed East-West Coastal Road will traverse all major river systems in the Coastal Region and will inadvertently be affected or influenced by them. It is therefore imperative to explore the characteristics of these rivers. Since the NEDECO Report some 50 years ago, no new detailed region-wide river investigation has been carried out. As a result, available data is sketchy, site specific and on project basis.

The Niger Delta is potentially associated with several navigational problems such as indiscriminate felling of trees, active wellheads facilities, overgrown mangrove swamps, abandoned ship wrecks, sand bars etc which pose great challenges to the hydrological investigation. Easy access to project site was almost impossible in some instances. All these hazards resulted in loss of time and increased financial cost.

The water speed in some places is extremely high coupled with high water discharge. This made vessel navigation strenuous in maintaining transverse survey.

5.1.4 Environmental Challenges

There is a growing awareness that road development has major environmental impacts which include damage to sensitive ecosystems, loss of productive agricultural lands, resettlement of large numbers of people, permanent disruption of local economic activities, demographic change, accelerated urbanization and introduction of disease.

The proposed East-West Coastal Road traverses distinct ecological zones including the mangrove and the barrier islands. The barrier forest Island in the Niger Delta is considered one of the intact tropical rain forests in the region. The Barrier Island forest is also ecologically sensitive since it is very rich in biodiversity made up of various species of mammals, birds, reptiles and plants which are used for food, medicine, construction, and artisanal purposes. Some of the species in the area are of high conservation significance such as endangered, threatened and endemic species of mammals and amphibians.

There are no formal ecologically important or protected areas within the barrier forest island ecozone of the Niger Delta region. The Andoni area of Rivers State has been proposed as a game sanctuary although no further efforts have been made to provide the necessary legal framework. The presence of species of conservation value such as the African Elephant, Hippopotamus and Nile crocodile in particular makes the area a biodiversity 'hotspot' that requires immediate conservation attention.

Any disturbance or opening up of the fragile ecosystem will result in upsetting the habitat of the different species. This disturbance is more obvious from Nun River to St. Bartholomew River section and from New Calabar River to Eastern Obolo Zone particularly at Bonny and Andoni sections of the alignment.

The Ilaje axis of the coastal region is a major shrimping ground. Activities associated with the construction of the coastal road will therefore affect the development of shrimps in the area resulting in a major socio-economic impact on the communities in the area.

In Akassa of Bayelsa State, the green turtle listed as endangered by the Nigerian Decree 11 of 1995, is not threatened on the island due to the conservative efforts being undertaken by interest groups working with local Akassa people. The conservation effort has created a breeding haven for the turtles along the sea coast.

5.2 Design Phase Challenges

The choice of the alignment, design and construction of this road have to take into account ecological, hydrological, geological and geomorphological challenges amongst others like oil and gas facilities, pipelines etc.

The first challenge derives from the consideration that the Niger Delta is a sensitive ecological area that requires minimum disruption or interference. This implies that the alignment of the East-West Coastal Road will be such that avoids highly sensitive breeding/spawning and nesting area. The hydrological challenge is in designing a road that runs perpendicular to the drainage direction without impeding surface flow. When surface flow is impeded, flow dynamics will be altered often with severe consequences on vegetation, water resources, fisheries etc.

The geological and geomorphological challenges deal with the nature and properties of sediments to be encountered in terms of spatial and vertical variability of geological properties and geomorphological processes, particularly erosion and flooding.

The Coastal Road entails the design of 180 No. Bridges across river channels as it makes its journey from Calabar to Lagos. The sheer number of bridges itself is enough challenge. Some of the bridges cross large river channels which provide passage for ships, oil tankers, bulk carriers, container vessels and naval vessels. These bridges require certain allowable vertical and horizontal navigational clearances.

In particular, Bonny River, Forcados River and Escravos River having widths between banks at the crossing points of between 1.9km and 2.525km, are on ship route. And the minimum bridge span to be provided at any river crossing is governed by the navigational clearances required which is a function of the vessel size using the river as well as the river and navigational channel alignment and river bed profile.

The Nigerian Ports Authority and the National Inland Waterways Authority provided the navigational requirements, taking into consideration future development. Eventually, suspension bridge was proposed for the Bonny River Crossing and a Cable-Stayed bridge each for the Escravos River Crossing and the Forcados River Crossing. Now this brings new challenges to the design of the East-West Coastal Road as such bridges are alien to this clime and very much specialized in terms of design and construction. We therefore collaborated with a British firm who have the necessary competence and expertise on such major bridge structures. The collaboration placed us on a new learning curve of best international practice and helped us to advance our capacity and capabilities.

The trend in the world climate change necessitates that wind tunnel and aerodynamic studies be carried out on the major bridge structures especially as they are located on the Gulf of Guinea coastal region so as to take measures to safeguard the bridge structures against wind excited vibrations and in the probable event of hurricane. The challenge here is that there is no laboratory locally to carry out these studies.

The East-West Coastal Road traverses various soil types, mostly consisting of very soft to soft organic peaty clays, with considerable thicknesses in some areas. To carry out a proper engineering design of a road on these '*teasing*' soils that will be technically practical and cost effective is a major challenge.

5.2.1 Funding and Co-Ordination of Specialist Consultants

Funding for the Studies and design was a major critical challenge and the initial funds were from borrowed monies. The co-ordination and management of the twenty-seven (27) Specialist Consultants was not an easy task.

5.2.1.1 Nigerian Perception

Closely following the funding challenge is the general false perception-challenge which some people in authority have on Nigerian professionals; the false and retrogressive notion that Nigerian professional is incapable of contributing to the development of his country. So the challenge was to correct this perception, and we considered it as a challenge for the Nigerian professionals which we had to bear on their behalf. I urge the government to give more challenges to Nigerian engineers because *'It is only through projects of this nature that the Nigerian Engineers can acquire deeper engineering knowledge, expertise and higher standards of practice; and then the much needed SELF-RELIANCE can be achieved.'*

5.3 Construction Phase Challenges

Contractors for the construction works will contend with the same challenges of security, community issues, accessibility etc as mentioned earlier.

The topography of the region is characterized by labyrinths of rivers, creeks and rivulets along the coastal swamps that are heavily waterlogged especially during the raining seasons. For a region which experiences an average of three to four months of dry season a year, the heavy body of water that comes with the rainy season may add up to the number of challenges that seek to frustrate the timely delivery of works by the contractors, inspite of the fact that the project is regarded as long overdue.

Work in some areas are complicated by scarcity of sand sources for possible use as construction aggregates and embankment material.

The contractors must be highly resourceful and must have successfully or substantially completed similar works. Similarity shall be based on the environment, physical size, complexity and methods/technology.

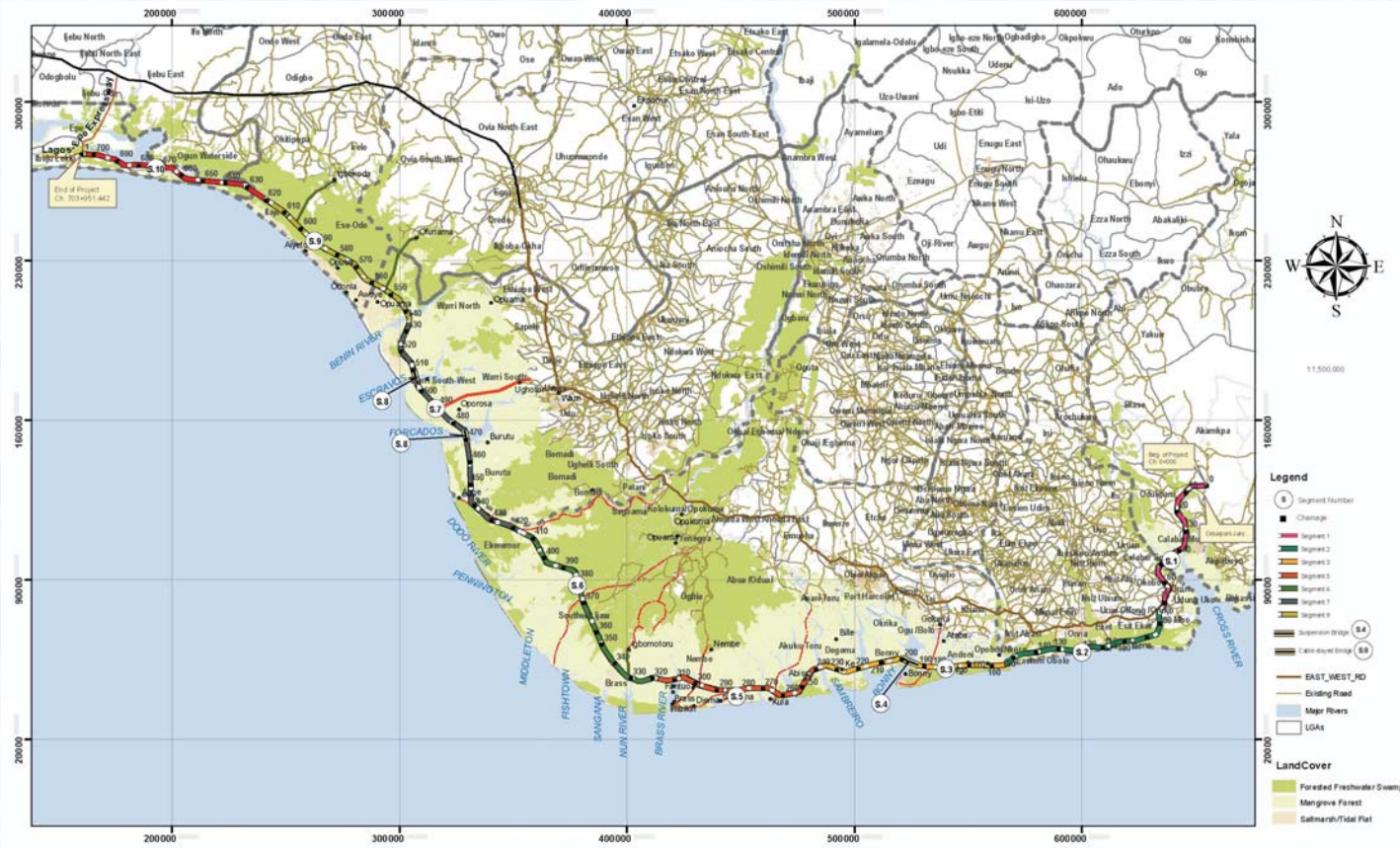
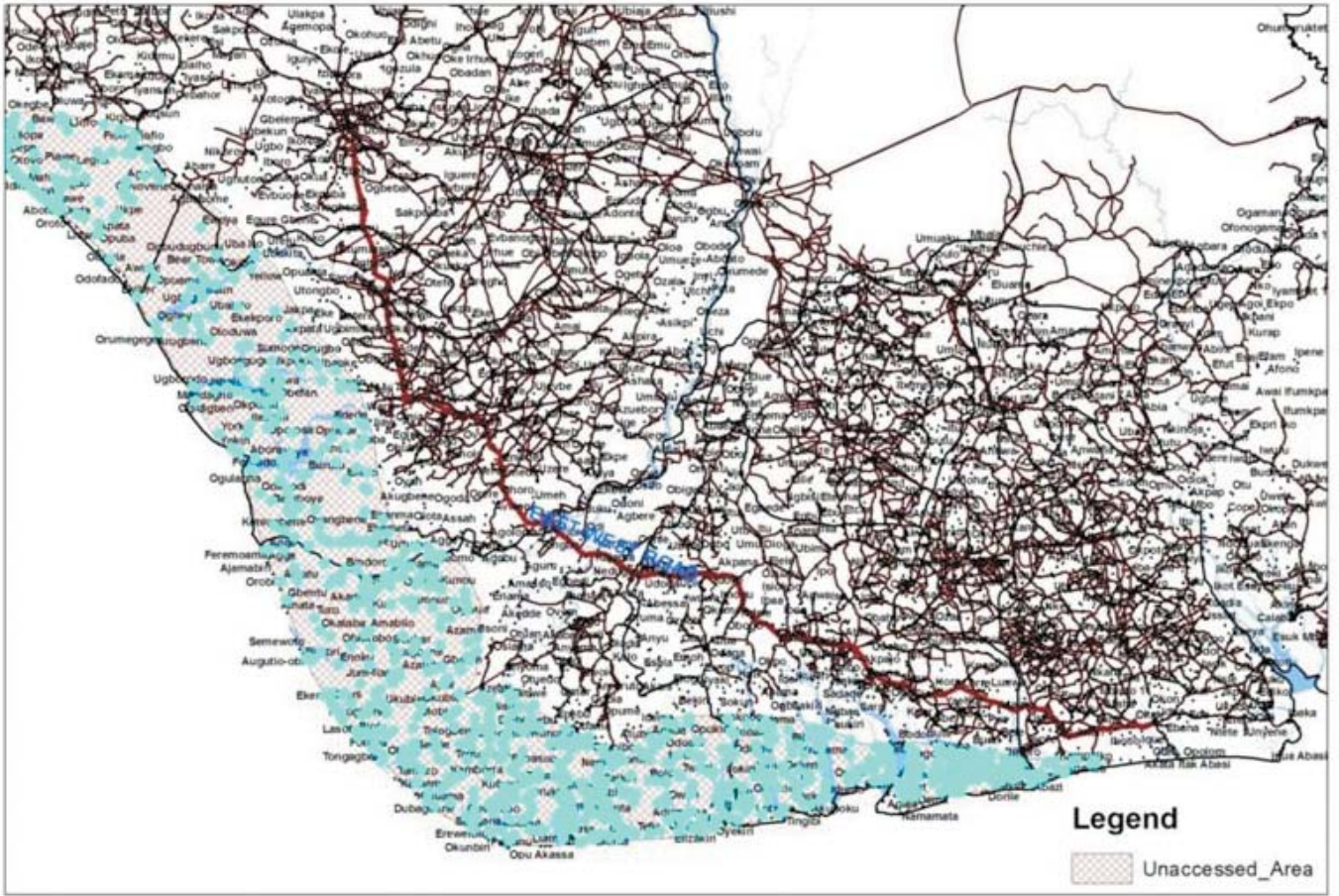
A couple of challenges have already been identified to be confronting the execution of the project. But uppermost among these challenges is the issue of funding. According to projections, the road is expected to gulp a total of N1.8 trillion (\$6.5billion) and weighing this cost some suggestion on other

alternative means of funding the project have been made. This solicits the support of State governors (whose States lie along the corridor of the road), oil companies, international donor agencies and willing investors to come on board. However, the clog in securing the full support of the governors concerned may be the looming responsibility of paying the minimum wage; an added burden on the States' finances. States along the road corridor may as a result find it difficult in meeting allotted financial obligations unless certain ad hoc arrangements are made to ameliorate the weight of the project on State finances.

While it is a welcome development for the Federal Government to seek external sources for raising the required fund, it is important that the government also device some internal mechanisms that could further assist in raising substantial finance to fund the project. This could come in the form of deductions from oil revenues which are predominantly generated from the coastal states. This suggestion borders on the awareness that the East-West Coastal Road is a necessity of life in the Coastal Area, knowing fully well that these States need this infrastructural development to enhance the economic base of the region.

The issues cascaded in this paper are a glimmer of the possible challenges that will confront the construction phase of the East-West Coastal Road as the project moves ahead. Going forward, the challenges just like ours will be enormous on all fronts - political, technical and environmental, but they are nothing compared to the suffering of the people who dwell day and night in those deprived parts of the Coastal Region; cut-off from the rest of the world and sufficiently solicitous of benefits of modern infrastructural development. The challenges we encountered were just a bit of what those people who live in the coastal areas of Nigeria have endured for decades. For us, it was worth it because we know and still believe it is possible.

In conclusion, if we think of the immense opportunities this project holds for the country, it will be in the interest of the Federal Government and the Nigerian State at large to support the East-West Coastal Road Project which holds great prospects for the country in the area of revenue that could be generated from tourism, expanded agricultural activities and job creation.





Personnel Carrier transporting people to the jackup barge



Drilling at west bank of Odeama Creek

