AN ASSESSMENT OF CARGO HANDLING IN NIGERIAN SEAPORTS (A CASE STUDY OF APAPA SEAPORT IN LAGOS)

ADEMOLA BENSON IRINYEMI
Department of Transport Management,
Redeemer University,
Ede, Osun State.

ABSTRACT

Cargo handling operations are critical to port efficiency. Optimal utilization of cargo handling capacity is a challenge facing most ports in Nigeria and this has had an adverse effect on port operation (i.e. ship and cargo operation). This paper assessed the extent of utilization of cargo handling facilities and infrastructure performance in Nigerian ports. It applied the UNCTAD's model of indicators of port facility service and utilization to examine usage of facilities & infrastructure as well as significant constraining factors in six ports namely: Apapa, Tincan, Rivers, Onne, Delta and Calabar ports. The secondary data for the study comprised cargo and vessel throughputs handled in the ports, number of facilities & infrastructure and berth performance measures for the period between years 2006 and 2017. These were augmented with primary data on factors affecting port facility utilization obtained through copies questionnaires administered to a random sample of port users. Our Empirical findings using statistical models showed that on the average, vessels that called for service in the ports spent one and half day before being allocated to berths; spent four days (4) at berth and a total of six (6) days at the port before sailing outwards. In terms of berth utilization for all ports, we found that berths were on average, fourty-eight percent (48%) occupied during the study period. When disaggregated by respective ports, berth vacancy rates were higher in Delta ports and Calabar ports in comparison to others; while Apapa, Rivers and Tincan ports had comparatively higher berth occupancy rates. According to the respondents, significant impeding factors to port facility utilization and performance were: obsolete plant & equipment, inadequate number of cargo handling equipment, delays in cargo handling procedures and low investments in cargo handling facilities by the terminal operators. Policy implications of the findings were discussed.

Keywords: Cargo handling, Nigerian seaports, Lagos

Introduction

Nigeria experienced economic prosperity in the70's as a result of the sales of crude oil and this led to the heavy investment on capital assets in other words the government and its people exhibited an intensive consumption of foreign goods. This contributed to the very active and also stretches the facilities of the NPA to the fullest capacity sequel to this it led to congestion at the apapa port in the 70's.the second national development plan made provision for port expansion so as to arrest the problem of congestion. The apapa, warri, and calabar ports were marked for expansion and refurbishing. The massive importation of cement created a major crisis at the apapa port which at a particular time over 75% of all ocean cargoes in Nigeria were handled. There was however some blessings for the authority in that crisis the federal government made a bold step to solve the problem with the establishment of Tin can island port which was commissioned in October, 1977. Today with an ever increasing population of about 140 million people with an increasing quest for foreign goods is our seaport well equipped to handle the expected increase in the volume of cargo to facilitate quick turnaround time of ships. Statistic has shown that the cargo handled through the Nigerian seaport in recent years have continually dropped despite the government policies to attract the ship-owners and importers to patronize our seaport. This project seek to present modest effort towards improving the maintenance of our cargo handling equipments in our various seaports which will of no doubt increase the patronage of our seaports by various importer and by so doing enhance our cargo handling in Nigerian port at large

Though cargo handling primarily involves the interface between the ship and port it covers the handling of raw materials and many goods from point of origin to final destination. It also embrace the packaging, marking, modes of transports, vehicles ,terminal operations and management equipment, engineering information channels and data processing. The level of efficiency attained at any given time maximizes cargo throughout at berth quickness in ship turnaround time in port had reduces cargo handling cost it also reflects on the development of international trade and reduce to a large extent cost of international distribution of goods. Ports management all over the world therefore is becoming more conscious of the need to provide modern berth Equipment with efficient cargo handling facilities and techniques involving low labour content as a means of increasing competitiveness and encouraging international transport services. Failure to provide such facilities and services have often led to ship owners and shippers alike to patronize other ports where such facilities are available and affordable. The form of cargo handling equipment used is basically determined by the nature of the actual cargo and the type of package used .the subject matter of using handling facilities raises the important question of mechanization. Bulk cargoes such as sugar, grain, coal, iron ore lend themselves to handling by echanical equipment and provided the equipment is well utilized its affordability and speedy delivery is were guaranteed.In relation to general merchandise the long term tendency in much cargo trade is towards containerization.

This transformation from loose to containerization of cargoes has taken many years to gain prominence in all trades however the system of Dockers (dockworkers))handling cargo will continue if expert opinion is anything to go by, particularly In the developing countries, Nigeria for example where dock labour cost are still moderate The above factors notwithstanding, is evident that efforts will have to be on the increase to expand the present extensive use of mechanical cargo handling equipment. However it must be noted that containerization in the 1990's and beyond will be firmly established in the distribution of international trade under line cargo arrangement though not all cargo trade will be containerized completely or partially. for instance when cargo consists of heterogeneous collection packages of different sizes, shapes and weight its loading and unloading as compared with handling of bulk shipments present different problems particularly with regards to the use of mechanized handling equipment. Hence cargo handling activities including processing and techniques in Nigeria's ports which form the basis of this research is appropriate timely and urgent.

Objectives of the study

The main objectives of this research study is to evaluate the various cargo handling equipment, the way they are being put into use, techniques in the Nigerian ports their positive impact on the port operations and management vis-à-vis the turnaround of the ships and ports in relations to cargo through port. Attempt will be made to see whether the present cargo handling equipment at the disposal of the Nigerian ports authority are properly put into economic use and their maintenance ensured Specific objectives It is in the intention of this research to reveal the importance of cargo handling equipment in relation to the port operations Examine the factors determining the types of cargo handling equipment to be used. Assess the type of cargo handling system. Examine the problems of container handling equipment. Evaluate the effect of cargo handling equipment on ships and port efficiency and operation.

Scope of study

The research scope covers cargo releasing activities in the Nigerian ports authority apapa and tincan island ports which are within the Lagos area.It is therefore presumed that whatever obtains here in the Lagos area with larger concentration of shipping activities may not be too different from what obtains in the other ports in Nigeria

2.0 LITERATURE REVIEW

Ports and ship on global economy

A **p**ort is a harbor with the facilities for ship to anchor, moor, load and discharge cargoes (Maduka, 2010). The important roles of the port in the economy of any country is evident in the amount of trade passing through it by way of import and export. One of the major reasons for international trade of any type is the inadequate distribution of resources and technology among the nations of the world. Therefore for any economy system to be accomplished at the lower possibly lost whether domestic or international

(whitehead, 1982). The port plan important roles in the economy of the nations in Nigeria about 90% of imported goods comes through the sea ports because of the cheapness and the capacity of the sea transport trade. The government and port authority are feting that which is right in improving and relieving the port congestion in Lagos (Ofobrukweta, 1986)

Conceptual definition and clarification

Cargo handling connotes the handling of exports and import of raw materials and manufactured goods from point of origin to final destination. Due to recent advancement in many developing countries in the world economy, upgrading of industrial structure on worldwide scale international segmentation of industry and intensification of economic competition changes in commodities movement have taken place broadly as represented by the containerization of sea cargo. The effort in improving the quality of commodity movement and in reducing the cost involve d is so important as to influence the economy of a country. Much expectation is given in this regard as to improve of the cargo handling equipment which constitutes a major component of the total commodity movement system. for this it is necessary to correctly identify the trend centering around cargo handling equipment particularly on how they are being taken care of now and how they are going the present condition and they problems of improvement and development with them and then to work out adequate measures in this regard. The objective of port management anywhere is to maximize the turnaround time of the vessels through its port as no single cause contributes more to the cost of living of a maritime country than the speed at which ships are turn around and in her port. Hence the availability of modern cargo handling equipment in port operation need not be overemphasized. In order to have a critical assessment of cargo handling system considerations were given to aspects which have led to the present era of rapid technological and organizational changes in international trade distributions and the factors which influences the determination of the most suitable types of cargo handling systems and these are

Nature of the cargo, handling cost, general safety and reliability

It may be bulk ship loads or dry or wet cargo general cargo involving containers or pallets vehicular cargo shipments involving road trailer s requiring a ramp access to and from the ship heaving lift cargo such as transformer needing a high lifting capacity crane livestock needing adequate provision to be made to save their lives from dangerous cargo requiring isolation and special handling requirement to avoid injuries over side loading into barges. The handling cost, general safety and reliability is usually based on per ton cargo unit/container rate. Here again experts believe strongly that a labour intensive system tends to be more expensive**.** They are based on: (i) Available resources: Resources available at the seaport including shared based equipment dock labour and their productivity as well as ship board facilities such as Derricks (ii) Weather condition: Bad weather can seriously interrupt loading or discharging operations and delay the schedule of vessels already worked on at the berth (iii) Evaluation: Evaluating the cost of alternative cargo handling system including maintenance and operational capability. This may involve for example the extent to which lighter age is engaged to speed up cargo unloading and or the use of the ship derricks to quicken cargo discharge to the berth (iii) The type of vessel in use: This is usually a decision factor. It may be a comb-carrier, RoRo vessel, OBO, Fruit carrier, bulk carrier, refrigerated vessels the Very Large Crude Carrier and Ultra Large Crude Carrier (VLCC, ULCC) (iv) Distribution arrangement: Efficient distribution arrangements are a paramount need and will influence the cargo handling equipment requirements. It could be by rail, road, pipeline, or even inland waterways.

Types of cargo handling systems (conventional break bulk handling systems)

According to Alan Branch (1986) the conventional break bulk cargo handling technique is operative in the deep sea and coastal trades within the ship capacity range of 200 – 16000 dead weight. The great majority fall between 800-16000 dead weight. The handling technology employed involves the lifting of cargo in units of between one and three tons with a considerable amount of man handling on shore in the ship hold and in the port transit area in the making up and breaking down of their limit and in stowing of cargo. Alan Branch further contends that the handling rates/speed achieved thus varies about 10tons per hook (crane) for homogeneous goods or cargoes in bags or bales.eg rice, sugar, salt, and bulk cargoes

handled in conveyor belt system. he observed that there are numbers of different pieces of equipment used for lifting general cargo into or out of cargo vessel

a) A popular one is derricks (boom) over the ship side plumbed over the quay and the other over the ship hatchway. A gouging system holding the derricks in place and cargo lifted from the hold of the ship to discharge the cargo. Experts contend that this union purchase system is a very efficient handling system for small unit of approximately one to two tones and where there is a very little spotting requirement is the hold or the dock area to identify cargoes to be lifted

Figure 1:

b) Shipboard cranes: these items of equipment are now commonly used for handling general cargo. This is the view of Alan branch while assessing the impact of cargo handling equipment on port operations. The cranes according to him are installed on either side of or the centre line of the ship. When installed on the centre line it is with the intention of the one crane being able to work both sides of the ship and also one end of the two adjacent hatchways

Even when the crane is positioned it must be larger in order to provide ample reach out over the ship's port users that the shipboard crane is not as fast as handling small general cargo units of two as the traditional unison purchase rig but it has a number of advantages over such system. these includes the fact that the spotting area for crane I considerably better due to the lack of quays, supports and stays etc. the ship's deck remains completely clear of wires hence the safety factor is considerably on the increase. The crane with the minimum of an experienced trained driver that operates it and also it is frequently to the greater safe working load than the rig derricks system. Maintenance is usually less as there are fewer working wires but it is more technical. A wide variety of types of equipment exists for the use of the ship

derrick system or the shore based gantry or quayside cranes they are as follows: Endless rope sling, Multi legged sling, Chain sling, Canvas sling, Double chain sling, Cargo hook
Can hook or barrel hook, Cargo net, and Cargo tray

(i) Endless rope sling: This equipment is made from a length of cordage with two ends joined by a short splice. The normal length of an endless rope sling is the distance with the sling spans when stretched and closed it is suitable for low medium values goods or low medium identity (ii) Multi legged sling: This comprises of two or three legged slings with single ring at the upper terminal for attachment to the crane hook four [legged slings (quays) have two intermediate rings joining the legs to the ring for crane hook attachment (iii) Canvas sling: This is cordage enclosing the rectangle of the canvas, having a long loop at one end and a short loop at the other end. This sling is used for lifting bags of commodities such as flour, cement, and similar cargo where an ordinary rope sling would tear or burst the bag (iv) Chain slings: This consist of a chain with a ring on one end and a hook on the other end or a link at each end one or both links being reversible (v) Cargo hook: A variety of design exists and are usually made from galvanized mild steel two popular hooks are the union purchase hook and the swivel hook another item is the u-shaped shackles which link the crane or derricks with the form of cargo handling equipment being used for most lifts according to the maritime practitioners the hook is used the roles of the swivel hook is to ensure that the loads does not spin as soon as the weight is taken by the cane or winch (vi) Double sling: This comprise of two length chain attached to a ring with a hook to each free end can hook or barrel hook. This are used to pick up drums and barrels they consists of a length of chain cordage or wide rope about 3m long at each end of which is attached to a ring the two hook are free to run on the chain (vii) Cargo net: This consist of a cordage net of about 3.6m by 20cm made of 20mm cordage with 26mm boundary ropes which are taken from each corner to form a lifting eyes (viii) Cargo tray: This is a rectangular board reinforced on the underside with a diagonal iron bands that are turned upward at the corner to form eyes some are of steel aluminum construction cargo tray are pallets that are ideal for cargo of moderate dimension which can be conveniently stalled such as carton bags small wooden crates or cases

Container handling equipment

The success of the freight container sterns from standardization of the maximum gross weight the plan dimension and disposition of lifting g points enables handling equipment to be designed largely without reference to the type of cargo and to be marketed throughout the world. A paramount continuous need is to demand for enhanced performance together with an evolving requirement for proper overall control of many items of plants working together as a co-coordinating system. a need for some measure of uniformity in the specification of handling equipment recognize by the manufacturers to help reduce cost and improve reliability by concentrating on a limited range of broadly defined class of machine. The port operators will be looking for simpler and cheaper maintenance procedures and greater interchangeability among mixed plant,, hence over the past decades maritime workers have held various opinions about terminal operation but they tend to agree that the terminal operators have been looking for reliability and flexibility qualities in their containers equipment they require equipment which will work continuously in return for moderate maintenance effort and which can be deployed In a variety of roles to suit changing traffic demands. These includes: forklift truck, barrel handler, boom handler, squeeze clamps. hand pallet truck, hand pallet truck, and side shift mechanism**.**

The effect of cargo handling equipment on ship and port

Cargo handling equipment is very important in the operation of large ports. In recent times it is being given much attention by ports and shipping authorities throughout the world. As international trade expand followed by the greater concentration of shipping in ports and of course that continual increase in the size of vessel the recourse to efficient cargo handling system would not be otherwise than a necessity. Cargo handling equipment as one of the backup system improves the economic size of ships and the port in terms of quick turnaround time as well aggregate throughout. In this regard, this only imperative to acknowledge that the objects of port management worldwide is to maximize the turnaround time of ship throughout the ports. An important area in this realization is to maximize the time a vessel spends in the port, thereby making the best use of the berth and associated equipment and permitting the maximum

throughout at the berth. Cargo handling system is therefore actualizing the maximization throughout and the turnaround time of the vessel in the port or other modes of transport resources that connect the port interface.

Efficient application of hi-tech cargo handling equipment enables the optimum number of ships and berth to be served. This reduces what would have amounted to additional capital investment level to a minimum and facilitates the most favourable profit margin to be made thereof. Consequently efficient cargo handling resources enables cost to be contained at low level thereby permitting the most competitive rate to be device. It also enable lower unit cost to be incurred as greater the tonnage the lower the cost per ton. This in turn encourages trade and improves the overall competitiveness of ship and port. This means that the quality of services provided will be attractive to the range of rail and road transport distribution facilities as well as warehousing operations. As a yard stick the level of cargo handling system becomes a measure of comparison with other known and well developed port

The effect of cargo handling equipment on dock labour

Ports all over the world provide a fairly wide range of services. There are also several market for their production. The demand for bulk cargoes shipment market is different from that of carriage of bulk liquid cargoes. This in turn requires differences from port facilities and not only in terms of berths but also in cargo handling equipment procedures especially those that do not require the conventional man handling or man labour. Professor Cooper once noted that the introduction of high tech modern cargo handling system displaced up to 50,000 dock labour in the massive rationalization of her labour resources with emphasis on acquisition of high technical skills. He further observed that the establishment of a modern Tin can island port in Nigeria has led to the training and retraining of personnel capable of manning sophisticated cargo handling system in view of the repeated increase in maritime traffic volume especially the container and RoRo vessels. Anything short of the above, experts in maritime trade believes that the size of the authority, its organization, cost structure, and the pricing of tariffs are largely uninfluenced by the types of service provided and offered. This may include the provision of stevedoring, services and the complex container terminal cargo handling and control commute warehousing, transit shed forwarding transport and dock labour operations. In all system operations for seaport s are generally governed by the direction of cargo traffic

Historical background of the Nigerian Port Authority = Pre-civil war are

The history of port development in Nigeria dates back to the middle of 19thCentury. This was long after the onset of sea borne trade and transactions which followed the adventures of early explorations on the African coasts. Initial efforts towards provisions of facilities for ocean going vessels were the attempts to open up the entrance to the Lagos Lagoon. Considerable littoral drift occurred along this coast; and the constantly shifting channels in the bar at the entrance made entry very difficult. On February 1, 1914, the first mail-steamer S/S 'AKOKO' drawing 5.64 metres entered the Lagos harbour. Two months later, vessels began to use the facilities provided at the Customs wharf on Lagos Island. Prior to this time, explorative and trade activities involving European missionaries and businessmen in Africa made the existence of a port on the wide coastal stretch from Calabar to Lagos imperative. Specifically, in the 15th century the Europeans opened marine contract and discovered the rich natural resources in the West and Central African region that were needed for their economic and industrial revolution.

As a result, the Bight of Benin was opened up by John d'Aveiro, of Portuguese in **1485** and in **1553**, Captain Wyndham of Britain landed on the nation's coast The first major breakthrough in opening up the Lagos Lagoon was in 1906 when orders were placed for dredgers to work at the bar. During the same year, approval was given for the construction of the first length of the East Mole. The construction of railway from Lagos to Otta and then to Abeokuta provided easy transportation of stone needed for the construction of the mole. Depths over the bar improved steadily as the entrance moles were pushed further sea words .Decision to develop Apapa Port was taken in 1913 and construction the first four deep-water berths of 548.64 metres long at Apapa began in 1921. Twenty seven years later (1948), an additional 762 metres of berth age were constructed as continuation –downstream of the first four berths and about 41 hectares of reclamation behind the wharves were formed to accommodate transit shed, warehouses and marshalling yards. The discovery of coal of Enugu motivated the building of ports in the eastern flank

of the country; Work commenced on the building of Port Harcourt wharf during the first quarter of this century.

Also, In 1913, Port Harcourt Port was opened to shipping by Lord Lugard, the Governor General. The railway line to Enugu was completed three years later in 1916. Berth for colliers was dredged out and constructed as a place where loading could be affected. Four berths of 1,920 feet long were developed at the Port Harcourt Port in 1927, and following a report by the Port Harcourt Port Advisory Board, the sum of four million pounds was provided for the first major extension work of the Port Harcourt Port in **1954**. During this era **(Pre 1954)** the concept of port as an integral part of social and economic development of a country had hitherto not been properly addressed. Nigerian Railway Department –Cargo Handling at the quay in Lagos & Port Harcourt Ports operation &management therefore remained under the control of different Govt. Departments Marine Department- Maintenance of the harbour channel and berthing of vessels Public Works Departmental –Maintenance of Quays. Between 1955 and 1966, Within the first eleven years of its existence as a corporate body, NPA focused on fundamental issues vital to the success of the ports industry and equally relevant to the overall national economy.

In recognition of the importance of having trained hands on its payroll and in response to the policy of Nigerianization in the years proceeding independence in **1960**, the Nigerian Ports Authority embarked on an elaborate manpower development through Cadetship Training Awards. Emphasis was on Marine – Engineering, Accountancy, General Management, Civil, Mechanical and Electrical Engineering. By the early sixties, beneficiaries of these trainings awards had begun to graduate and to form the core of Nigerian professionals to shape the future of the ports industry. The Authority also within this period continued to sustain the efforts already made towards expansion of ports facilities in Lagos and Port Harcourt. In Lagos, six berths of 943 metres were added to the existing ones, while four berths with a total quay length of 506 metres were added to the facilities and steps were taken to mechanize the traffic operations in these ports. In this era, port development approach became tailored along declared national objectives. The Authority's development strategy became programmed to fall in line with the first National Development Plan between 1962 and 1968. The second Apapa Wharf Extension was executed and so also were further improvements of port facilities in Port Harcourt. The sum N45M was spent during this period on the two ports.

Civil war era (1967 –1970)

This period had tremendous impact on the ports industry in Nigeria. The security aspect of ports came into sharp focus. Port Harcourt (Rivers Ports) was closed to foreign traffic. Lagos thus became the only available port serving the country's maritime transportation needs. The Federal Military Government enacted a special decree which empowered the Nigerian Ports Authority to acquire the ports of Warri, Burutu and Calabar, previously operated by private entrepreneurs. Holts Transport were former owners of Warri Port, UAC owned Burutu Port. Calabar Port was originally owned by five operators. NPA spent N3.35 million at the time to acquire these ports. Lagos Port with its comparatively limited capacity was made to bear the weight and burden of the tremendous flow of war time cargoes and other goods coming. into the country. After the war ended, heavy imports of reconstruction machinery including heavy structures for some basic industries, construction materials and consumer goods flooded the Lagos Port which had earlier been inundated by an overflowing war time cargo that had scarcely been cleared. This marked an important turning point in his history of the nation's ports industry, operation and management

Post-civil war are (1970 –1974)

The Federal Military Government drew up its Second National Development Plan –**1970 –1974**, which was the first major policy thrust in reconstructing and rehabilitating the civil-war damaged economy. The sum of N4.1M was initially made available for the rehabilitation of port structures and necessary mechanical handling equipment. Within the project completed within the first two years of the plan **(1970 –1972).** The rehabilitated and reconstructed ports include Port Harcourt, Bonny, Calabar, Koko and Lagos. These initial post-war port development efforts were however not adequate to prevent congestion phenomenon that was building up in the ports since the civil war period which later led to unprecedented ports congestion.

Port congestion

The sea port congestion was experienced in two dimensions between 1970 and 1975:. They are cargo congestion and ships Congestion, The cargo congestion of 1970 and 1971 creates a bottle-neck in the evacuation processes of cargo, especially from the Lagos Port which had been overwhelmed by the volume of war-time and post-war cargo that far over weighed its capacity. This helped to increase the dimension of the cargo congestion of the early 70s. The change in the conventional methods of packaging cargo in crates, casks, bottles, boxes, etc. into container unit loads which are bigger in size and volume threw a challenge on the country's narrow bridges which were unsuitable for the new cargo. The poor road network made it necessary to unstuffy container good at the port thereby defeating the optimal benefit of containerization. Existing roads were inadequate to cope with expeditious evacuation of cargo in and out of the port. Rail haulage services expected to handle about 50% of port traffic. Responded poorly by handling below 25%. Other factors that contributed to the cargo congestion included: i. Delays by some shipping companies in submitting to NPA essential documents like ship's manifest, the stowage plan, cargo list and the pallet list ii. Abuse in the use of the Authority's transit sheds as permanent warehouses by some. Indigenous enterprises especially the small ones who hardly had the financial strength to run their businesses and thereby failed very often to comply with regulations compelling port users not to keep their cargo in transit sheds beyond certain time limits. iii. Long and tedious customs procedures in the port. This situation becomes serious each day, causing great concern to NPA. The Federal Military Government and the Nigerian Ports Authority took a number of drastic measures to arrest this aspect of port congestion. Incentives such as providing a 24-hour delivery service without additional charges; rent waiver to induce importers to take delivery of their goods already released by Customs but not yet collected were introduced to consignees Direct delivery from vessels to all modes of conveyance was strictly enforced in respect of such cargoes like salt, milk and flour. When these measures failed to yield appreciable results, a state of emergency was declared at the Lagos Port and a Military Port Commandant appointed with full powers to decongest the port.

The ship congestion of 1971-1975 was due to the rapid growth of Nigeria's population, the vast agricultural resources of the country and the sudden increase in the posted price of petroleum from her rich mineral resources had generated an impetus for revolutionary changes in the political, educational, socio-economic and industrial projects like the gigantic National Art Theatre, residential and factory building including facilities for the enlarged military force and all these resulted in a high effective demand for building materials. The Udoji/Williams and Williams' salary award of January **1975** increased the purchasing power of the people in the country coupled with the relaxation of foreign exchange control and the lifting of embargo on imports, led to massive importation by businessmen. The desire to satisfy the increase in the derived demand for cement forced the then military administration to negotiate for the purchase and supply of 20 million tonnes of the commodity, 16 million tonnes of which were for the Ministry of Defence alone. Delivery was to be effected within a period of twelve months at a time when the capacity of all existing Nigerian Ports put together was 6.5 million tonnes of general cargo per annum. Consequently, the Apapa Port was flooded with vessels, which arrived simultaneously within the nation's territorial waters. By the close of **1974/75** fiscal year, 105 ships, most of which were cement vessels were already queuing for berthing facilities. By the middle of **1975**, vessels waiting for berthing spaces in our ports had reached a record figure of 455, which included 300 vessels carrying bags of cement.

NPA was ignorant of the public sector cement agreement. Normal remedial measures were thus adopted. This included an increase of manpower, which rose resulted into excessive overtime and expedited discharge of cargo. None of those measures yielded optimal result. Meanwhile, the effect of the congestion had begun to register on the nation's economy and if the port congestion phenomenon did demonstrate. Any disruption in the port system registers immediately on the national economy. Port congestion resulted in the imposition of surcharges. Ships had to wait for an average of 180 days before they could berth. This attracted a freight surcharge of 30 to 100%. Secondly, when low unit value of commodities is imported, the impact on prices is substantial. According to the first report of the Anti-inflation Task Force, Ministry of Information, it was estimated that between **1970** and **1974**, the average impact prices increased by 67.4%.The increase in freight surcharge affected Nigerian shippers of agricultural exports who were placed at a disadvantage as they found it difficult to maintain competitive

position in the scramble for world markets, and so their profit margins were drastically reduced. One of the adverse effects of the port congestion was on the nation's external reserves. A demurrage estimated at US$4,100 per day for each cement vessel for delay in excess of ten days was paid by the Federal Government. The period **1970 –1974** can rightly be described as a major turning point in the history of ports development in Nigeria. The issue of ports development ceased to be just an NPA affair. It became a national issue.

The **1975-1980** marked the era of third development plan in which port development occupied a very important position. Series of measures both short and long term were planned and successfully executed during this period. By October 14, 1977, the ultra-modern Tin Can Island Port was commissioned. Two years later (**16th June, 1979**) the new Warri Port was commissioned together with the new Calabar Port (**19th June, 1979**). Ironically, no sooner was the massive port structures put in place that the economic fortunes of the country began to dwindle in response to global economic trends that saw the foreign exchange of most developing nations of the world in very precarious position. Beginning from **1982**, Nigeria's domestic economy had been under serious pressure. Between **1982** and **1984** for example, domestic inflation had risen from 7.7% to 39.9%. The downward slope in the prices of crude oil –a predominant factor of the nation's external trade and other micro and macroeconomic factors had brought a depletion of the nation's foreign reserve from N2.4B in 1981 to N798.5M in 1983. Series of economic measures were adopted to check the continuing drain on the foreign reserve and to bring about a complete readjustment of the nations priorities and needs with a view to erecting sound economic base upon which the nation's economic future would thrive. Activities within the nation's maritime industry have had to respond to the realities of the situation. A previously booming import business which had since the beginning of the 70 kept the Nigerian Ports busy and congested had since the beginning of the 80s gradually scaled down. A sizeable proportion of the existing port facilities this remained underutilized.

In addition, port developments embarked upon in **1980** has remained stalled because of the depression in the economy. The Federal Ocean Terminal –the first planned deep seaport in the country – was conceived both as port of long term measures against possible repeat of the congestion experience of the mid 70s and also as a response to the then projected needs of the nation's maritime sector. The port was also planned as a support to the Port Harcourt Port (which was already over-stretched in the handling of conventional cargo traffic) and to facilities the handling of the raw materials input required by the Ajaokuta Steel Mill, the new refinery in Port Harcourt, the petro-chemical and the fertilizer plants located in Rivers State. At the time the Ocean Terminal was conceived, there was a consensus within the sub-region on the idea of a large deep seaport that could serve the transshipment needs of the sub-region. The Federal Ocean Terminal, Port Harcourt could be seen as part of the grand Concept of regional ports. It was originally designed to accommodate ships of 35,000 tons dead-weight and after an envisaged expansion to take in vessels of up to 60,000 tons dead-weight. Construction work began in July, **1980** after the contract agreement was signed in March the same year between the Nigerian Government and the firm of Advian Volker Civil Engineering Company. By March **1982,** 500,000 square metres of the total area of 5.6 million square metres had been dredged, while 28 out of planned 40 units of senior staff quarters were ready for occupation. The construction work at the site was suspended in **1983** for further negotiations between government officials and the contracting firm on the possibility of resuming construction of the terminal. The Nigerian Ports Authority has made remarkable progress since inception in April 1955. From a modest beginning, it today controls eight major ports excluding oil terminals, jetties with cargo handling capacity of 35 million metric tonnes per annum. In based on of the need for deep sea ocean vessels that would be involved in lifting liquidified natural gas, crude oil, related products and project cargoes for National Fertilizer Company, (NAFCON), the Nigerian Ports Authority strategically located the Federal Ocean Terminal at Onne.

The construction of the first phase of this project was completed and commissioned in **1996**. This multipurpose and ultra-modern seaport is the largest and first of its kind in Africa. It is expected to handle adequately, exports from Nigeria's petro-chemical Industry. Based on the fact that ports statistics indicated operational increase between **1970 and 1995**, government in that line made efforts to improve the services and revenue yielding potential of the Nigerian Ports Authority. This led to the commercialization of the

organization in **1992** under the name "Nigerian Ports Plc."How, considering the fact that the organization was still hundred percent owned by Federal Government of Nigeria, it was reverted to its former name Nigerian Ports Authority in October **1996.** Consequently, the Apapa Port was flooded with vessels, which arrived simultaneously within the nation's territorial waters. By the close of **1974/75** fiscal year, 105 ships, most of which were cement vessels were already queuing for berthing facilities. By the middle of **1975**, vessels waiting for berthing spaces in our ports had reached a record figure of 455, which included 300 vessels carrying bags of cement. NPA was ignorant of the public sector cement agreement. Normal remedial measures were thus adopted. This included an increase of manpower, which rose resulted into excessive overtime and expedited discharge of cargo.

The Nigerian marine and its legacy

Lord Fredrick Lugard the first governor of colonial Nigerian created the marine it had the responsibility to manage all ports and waterways in Nigeria. In addition it was charged with the responsibility of providing navigational aids such as light house and buoys. Another of its function was the enactment and reinforcement of safety regulations such as issuance of vessel licenses and examination of personnel. It was also saddled with the taste of maintaining public dockyards, wharfs, inland waterways and the general administration of the existing public ports. An omplimentary function was the operation of freight services for mails, cargo, and passengers. The marine operated a fleet of about 100 vessels which included dredgers, tugs, coal carriers, launchers and a number of barges, lighters, dingers and canoes to enhance the performance of these functions other department operated a number of dockyards across the country a floating dockyard in Lagos with the lifting capacity of 3,600 tones. Soon after the establishment placement was made in 1906 for the other dredgers to combat the menace of sand bar and other encumbrances that made the passage into the entrance of the Lagos lagoon difficult. The development of Lagos ports received another boost in 1913 when government officially approved its expansion the Port Harcourt port was also opened to shipping that same ear having been commissioned by the government of Fredrick laggard.

Statutory duties of the Nigerian port's authority

The duties and the major functions of the Nigerian ports authorities include: Providing and operation of cargo handling and quay facilities, Pilotage and towage services, supply of water and fuel to vessels at anchorage a or mooring buoys, Repairs and maintenance of vessels, Dredging and contract dredging of water ways Navigational lighting of the ports, Other ancillary services, Develop, own and operates ports and harbor Provide safe and navigable waters, Maintain port facilities and equipment, Develop and own property, Ownership and administration of land and water within port limits, Planning and development of the port operational infrastructures, Leasing and concession o ports infrastructure and setting bench mark for tariff structure, Responsible for nautical /harbor operations and hydrographic survey. Marine incidence and pollution, Maintenance of safety and security at the common user areas, Enacting port regulations and byelaws as well as monitor and enforce them, Day to day monitoring of operations and enforcement of relevant sections of respective agreements. The management of the Nigerian ports authority is responsible to the board appointed by the federal government.

The board is responsible for formulating the policy of the Nigerian ports authority although the federal ministry of transportation may issue to its directives of a general nature relating to matters affecting public interest and specific directives for the purpose of remedying particular defects, The day-to-day administration of the organization however is under the supervision and control of the managing director who is also the chief executive. In order to achieve better performances of the Nigerian ports authority, the management is further organized into division. These divisions are headed executive directors who are assisted by general manager and assistant general managers while each port is headed by a port manager with delegated power over all sections of the port

3.0 METHODOLOGY

Research design

The project is focused on issues related to hindrance to effective cargo operation. In this regard the causes of accident and congestion are to be considered. Therefore the variables that are of importance to this work include safety which includes the vessel, plants, persons onboard and the operation sides.

Effective communication and adequate dissemination of information between the shipping line, ports authority and cargo owners

Population and sampling size

The population of this project is drawn from stevedoring operation at the apapa port and other relevant agencies like the Nigerian ports authority, the Nigerian custom since the research is intended to show the study of ship handling operation the population is drawn from those who are still active in the service and those who are former dock worker

Instruments/ data collection

The main device for collecting data were through secondary data collecting information from various sources available journals, textbooks and magazines these information were used to carry out the analysis required and test the hypothesis Since this information are secondary information in which it has been worked upon and are readily available different materials were used and the researcher visited some libraries and some projects were used to collect some information

Data analysis method

For the purpose of this study all data were collected were tabulated accordingly

4.0 PRESENTATION OF DATA

Table 1 number of Nigerian port authority cargo handling plants equipment as at 31st December 1993

Type of plant	Apapa port	Container terminal port	Tin can port	Roro port	Warri port	Port-harcout	Federal lighter terminal	Calabar port	Total
Portal crane	8	2	10	--	8	2	4	9	**43**
Gantry crane	--	1	--	--	--	--	--	--	**1**
Mobile crane	5	3	5	1	3	6	1	6	**30**
Forklift truck	38	10	12	24	55	26	4	21	**300**
tractors	8	8	2	15	2	10	--	5	**50**
Handler	1	24	7	20	2	4	--	2	**60**
ngine	7	--	--	--	--	2	--	--	**9**
Other	--	8	--	4	--	--	--	1	**13**
Total	**86**	**97**	**103**	**71**	**92**	**86**	**18**	**73**	**686**

Source: Nigerian Ports Plc Annual Statistical Abstract 1993

Table 2: number of Nigerian ports authority cargo handling plants and equipment as at December,1994

Type of plant	Apapa port	Container terminal port	Tin can port	Roro port	Warri port	Port-harcout	Federal lighter terminal	Calabar port	Total
Mobile crane	7	1	9	1	5	7	1	8	39
Portal crane	6		9	--	8	--	--	9	32
crane	--	3	--	--	--	--	--	--	3
Forklift truck	36	5	110	21	62	24	5	27	290
Freight lifter	6	2	14	6	7	2	--	8	45
Straddle carr.	--	6	--	--	--	--	--	-	6
tractors	4	11	2	10	1	5	--	6	39
Trucks	2	4	10	7	2	36	1	--	62
Handler	--	26	7	15	--	7	--	--	55
Engine	6	--	--	-	--	2	--	--	8
Other	--	--	--	--	--	--	--	1	1
Total	**67**	**86**	**163**	**60**	**109**	**93**	**7**	**84**	**669**

Source: Nigerian Ports Plc annual statistical abstract 1994

Table 3: Number of Nigerian ports authority cargo handling and equipment as at 31st December 1995.

Type of plant	Apapa port	Container terminal port	Tin can port	Roro port	Warri port	Port-harcout	Federal lighter terminal	Calabar port	Total
Portal crane	--	2	--	--	8	--	--	9	19
Mobile crane	6	--	5	1	2	7	1	8	30
Forklift truck	41	3	68	15	62	--	5	31	225
Freight lifter	10	--	6	5	7	3	--	8	39
Straddle carrier	--	10	--	--	--	--	--	--	10
tractors	5	5	5	10	--	5	--	6	36
Trucks	--	4	5	--	2	34	--	--	45
Trailers	--	37	--	--	24	10	--	25	96
Handler	--	14	--	13	--	2	--	-	29
Engine	6	--	--	--	--	2	--	--	8
Other	--	22	--	3	4	36	--	--	67
Total	68	97	89	47	109	99	6	89	604

Source: Nigerian ports plc annual statistical abstract 1995.

Table 1. 2. And 3 shows a breakdown of available cargo handling plants and equipment in the various seaports in the country between the years 1993-1995. A comparative analysis show the uneven spread in the equipment and this is attributed to the size of each port and the nature of cargoes handled and each port. Another reason could be the transportation network as with the case of provision of locomotive engine in only two out of the nation's eight ports i.e. apapa and Port Harcourt which are the only ports linked by rail tracks Also observed in the tables is the increase in some plants such as forklift trucks in the port of warri from 55 in 1993 to 62 in 1994, mobile crane in apapa, Tin can island and warri and port Harcourt from 5,5,3 and 6 in 1993 to 7,9,5,and 7 respectively in the 1994. This is seen as effort by the Nigerian ports management to update their plants and equipment from time to time by procuring modern plants

Cargo throughout in all Nigerian ports for a period of 1995

Table 4 show the cargo throughout in all Nigerian ports for a period of 1995 and indications are that there has been a steady decline in the volume of cargo handling either by exports or by import. The reason is attributed to the government fiscal and financial policies in relation to tariffs and restriction put on the nature of goods

Table 4: **Cargo throughout in all Nigerian ports for a period of 1995**

Cargo Type General	Inward	Outward	Total	Inward	Outward	Total	Inward	Outward	Total
Containeris ed cargo	1521131	326815	1847946	1139491	408624	1548115	1355828	371222	1727050
Fish	455597	40	277242	277242	-	277242	258634	-	258634
RoRo Vehicle	250877	1031	251908	145740	1177	146917	93120	3845	96965
Others	2290662	364361	2655023	2188944	282384	2471328	1731125	384498	2115623
Sub Total	4518267	692247	3210514	3751417	692185	4443602	3438707	759565	4198272
Grail/Offal	1027107	29900	1057097	587172	22600	609772	660245	20951	681196
Other	1694903	80	1695983	856395	-	856395	849301	-	849301
Sub Total	751750	300154	1051904	477729	236205	713934	524012	237572	761584
Liquid Bulk Refined	3474850	330134	3804984	1921296	258805	2180101	2033558	258523	2292081
Other	4721986	4679904	9401890	3838334	327443	7112777	3726440	2951158	6677598
Sub Total	56762	-	56762	11803	5119	16922	4038	5700	10738
	126090	36762	162852	57119	51327	108446	86228	8136	94364
	4904383	4716666	9621504	3907256	3330889	7238145	3817706	2964994	6782700
Grand TOTAL	12897955	5739047	1863700 2	9579969	4281879	1386184 48	9289971	3983082	1327305 3

Table 4.4: Cargo throughout at Nigerian Ports (Excl. Crude Oil Terminals)

Cargo 1993, 1994 and 1995 (tones)

Table 5: Major storage facilities at enumerated Nigeria Ports

Storage Identity	Available Space (m^2)	Storage Identity	Available Space(m^2)	Storage Identity	Available Space (m^2)	Storage Identity	Available Space(m^2)
Transit Shed		Transit Shed		Transit Shed		Transit Shed	
No 1	6521	1	6800	1	4877.41	Old Port	610.44
No 2 -5	26017	2	6800	2	4866.41	2	333.77
No 6	4525	3	6800	3	2926.23	3, 4	505. 545.23
No 7	4877	4	6800	4	2926.23	5 6	300.50 379.45
No 8- 9	11845	5	6800	5	2926.23	7 8	238.06 372.26
N0 10 -11	25084	Warehouses		6	2962.23	9 10	367.56 378.26
Back Shed				7	2962.23	11 12	368.38 224.94
N0 1	903	A	6800	Arcon Shed		13 14	224.94 766.32
N0 2	620	Government Ikorodu Lighter	6800	1	559.00	15	304.30
N0 4, 8, 19, 20,22.	2514			2	559.00	New Port	
No 3	558	Nos 1.4	27200	3	548.00	1 2	7200 7200
N0 5, 6, 9, 10	2069	Kirikiri Jetiy 4 (N0)	27200	4	548.00	3 4	7200 7200
N0 3, 7, and 11	1029			Ware House		Warehouses	
N0 12	561			1	5574.00	Old Port	
No 13	535			2	5547.00	A	1643.57
N0 14	563			3	781.00	B	475.80
N0 15	583			4	557.00	C	1123.02
N0 16	279					D	789.49
N0 17	499					17	1856.84
N0 18	522					18	1341.36
N0 21	587					19	1117.63
Ware Houses						20	1830.00
A	8827					Opposite	1683.26
B	10663					New Port	1683.26
C	6116					Warehouses	7200.00
D	6189					Government	7200.00
E							
F							
G	5354						
H	6400						

Source: Nigerian Ports Plc Annual Statistical Abstract 1993

Table 5: Given a breakdown of total storage facilities available at the Nigerian Seaports which has remained under-utilized over the years.

Table 6: Round Time of ships completed at enumerated Nigerian Ports: 1995 and 1994.

Port	Total of Ship Completed	Awaiting Berth	At Berth	At Port	Time Spent Waiting	Time Spent At Berth	Turn Round Time Per Ship
Apapa	238	236	2469	2705	1.0	10.4	11.4
Container Term.	207	43	326	369	0.21	1.57	1.73
Tin Can Island	221	115	1755	1870	052	7.94	8.46
RoRo	124	43	319	362	0.35	2.57	2.92
Warri	127	7	471	471	0.05	3.71	3.76
Sapele	18	2	76	78	0.011	4.22	4.33
Oko	14	1	93	94	0.03	3.90	3.93
Port-Harcourt	111	104	755	859	0.90	6.80	7.70
Federal Lighter	115	24	524	548	0.21	5.56	3.77
Calabar	61	11	254	265	0.18	4.16	434
1995	1236	586	7042	7628	0.47	5.70	6.17
Total	**1718**	**1463**	**7204**	**8667**	**0.86**	**4.17**	**5.04**

Table 6 Give at a glance the turn-round time of ships completed at all Nigerian sea port during the year 1993 and 1994 and as could be seen, there was a decline in the number of ships that entered the Nigerian sea port as there was an obvious low record in maritime trade due to government policies and port operational method was largely through the mean-handling techniques of the dock labour. This system which was often dirty, risky and time consuming has seen exhausted its merit as the century witnessed a technology revolution in our ocean liner and cargo handling equipment as well as modern engineering imports' designs. To this end, specialized ship now call for specialized cargo handling equipment and sometimes with greater automation than one would have seen a score and ten years ago. Similarly, specialized ports now call for high tech cargo handling equipment. The application of computer technology of port and cargo handling operations make the business of international trade (sea borne) flexible to environmental adaptation of technology transferred among trading nations. Thus, the modern high tech / speed container terminal cannot work economically if the flow of information about container movement is made slow. In some modern terminals for instances store updated information and made it quickly available for cargo handling procedures, operational planning and control purposes just as the Nigerian sea port have computerized the cargo clearing procedures

5.0 Conclusion and Recommendation

Summary

This research project which is on cargo handling in Nigerian's sea ports (the experience from apapa and tin can island port in Lagos) started chapter one with the general introduction which highlighted the background to the study, state of problem, objectives to the study, specific objectives, scope of study and methodology. In his chapter 2, the researcher dealt with the review of relevant literature and conceptual frame work / clarification. Chapter three dealt with the historical background of the Nigerian port authority to what it is today. Also touched its port development elsewhere in comparison to our ports. Chapter four dealt with the presentation and analysis of data. Finally in chapter five, the researcher dealt with his research finding and summary, recommendation.

Conclusion:

From the forgoing, the importance of cargo handling equipments as facilitate us in the daily routine of ports operations need not to be over flogged. While the primary aim of the port is the transfer of goods and passengers from land to sea, and vice versa, cargo handling equipment increases the economics turnover of the port by effective loading and discharging of cargoes at minimum time thereby increasing the turnaround time of ships. Just at the beginning of this century, cargo handling operations.

Recommendations

The following recommendations are based on the review of literature in relation to this studied project: The standard of maintenance in ports must keep pace with the demands of modern plants and equipments. There are few ports in developing countries which have managed to avoid accumulating a permanent pool of equipment awaiting repair. In some cases, the reactivation of such equipments would give the biggest single gain in performance that management could achieve. The management of Nigerian ports authority should give this fact a serious view and consideration.

- Capital investment in cargo handling equipments should be made only on the equipment that can guarantee low maintenance cost.
- There should be a regular technical expression of the equipment in use to detect early fault and determining the general state of the equipment for repairs and routine maintenance.
- Further training should be given to hydraulics engineers and maintenance technicians to reduce the cost of servicing machines elsewhere.
- More employees should be sponsored for training on cargo handling and documentation courses.

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