INTRODUCTION

The geographical location of Portugal was the main factor that stimulated the people and the rulers of Portugal to understand the importance of powerful navy. The Royal navy in Portugal came into existence with King Afonso Henrique in 1114-1185. Under Sancho II (1225-1248) Portugal had a strong naval fleet comprising of the vessels like Naus, Gales etc. King Diniz can be termed as the true founder of the Portuguese navy. In the Charter of 1377, King Fernando encouraged shipbuilders by granting special privileges which were later renewed in a Charter of 1380. Motivated by commercial, geographical and religious factors, the Portuguese embarked upon an extensive policy of sending expeditions to unknown regions of the world. The initial success of the Portuguese voyages was mainly due to systematic and energetic efforts of Prince Henry the Navigator, who established the first Naval Academy at Sagres. At this Centre, the cartographers, cosmographers and mathematicians were put to work on numerous navigational problems confronting the Portuguese explorers. An unique achievement of the Sagres Naval Academy was the creation of the Portuguese Carabela, a magnificent ship of some 50t to 100t, capable of putting out regularly on the open sea without any problem relating to the oarsmen. By 1470, the Portuguese had successfully examined and mapped a large portion of the African coast. In 1481, King John who succeeded Afonso V on the throne of Portugal took up the projects which had been left untouched since the death of Prince Henry the Navigator. He
improved the methods of shipbuilding and began to build full-decked ships of 100t. In 1482 Diogo Cão passed Cape Catarina, the final point of the discoveries so far made and sailed upto the Cape of Saint Augustin. Bartholomeu Dias rounded the Cape of Good Hope in 1488, and after sailing for some distance upto the Coast of Southern Africa, returned with the news that the sea route to Indies was evidently open. Dias's information was further supplemented by the reports of Pero de Covilhvam who was sent to the East by the King of Portugal. Covilhvam reached the west coast of India proper in 1488 and he submitted his report to the Crown showing the feasibility of reaching India by sea via Cape of Good Hope. Based on the contents of the Covilhvam's report and the information obtained from early voyages, preparations were made for the historic India voyage.

On 8th July, 1497, Vasco da Gama, a nobleman and experienced navigator sailed from Belem with a fleet of 4 ships carrying a crew of 160 and reached Kappucat near Calicut on 17th May 1498. Thus opened the East-West maritime encounter.

The rich dividends of the Da Gama voyage induced the King of Portugal to send every year fleets to India to obtain the spices. The voyages of Pedro Alvares Cabral and Joao de Nova in 1500 and 1501 respectively yielded good profits to the Portuguese Crown.

In the course of time the Portuguese devised a strategy not only for participating in the spice trade of the East but also for obtaining complete control over the maritime trade route. The
Portuguese captains were instructed to block the Muslim maritime trade between India and the Arab states and to divert the same to Portugal. The system of 'controlled navigation' was introduced by the Portuguese in the Indian ocean by means of Cartaz. The Portuguese realised that, the effective control over the spice trade and the route would be possible only if they possessed a well-equipped navy in the Indian waters and the naval installations at strategic points on the western coast of India.

A strong chain of fortresses with anchoring facilities all along the western coast of India was set up, which served as naval and commercial base. In 1503, the Portuguese established their first factory at Cochin. In 1505, the King of Portugal changed his policy of sending annual fleets and decided to appoint a resident Viceroy in India for a term of 3 years to guard and promote the Portuguese interest.

Though Cochin became the main base of naval and commercial operations of the Portuguese on the western coast of India, they soon realised that Goa has much more to offer for the success of their eastern naval enterprise. From the defense point of view, Goa was a fortified port and therefore the Portuguese navy could command the Arabian Sea from the centre. Emphasising the strategic importance of Goa, Alfonso de Albuquerque in his letter informed the King that "it provided safe passage for all ships laden with Your cargoes and the principal outlet for goods going to the kingdoms of Vijayanagar and the Deccan". On February 17, 1510 Albuquerque attacked the Bijapuri forces and took over the
city of Goa. Highlighting the significance of the capture of Goa, Albuquerque wrote to the king that "the capture of Goa alone has done more for Your Highness's credit than fifteen years of sending fleets to India." 

The area conquered by Albuquerque in 1510 was about 48 square miles till 1543, Gradually other parts of Goa came under the Portuguese sway: Bardez and Salcete in 1545, Ponda Zambaulim, Canacona and Cabo de Rama in 1783, Bicholim and Satari in 1781 and the Parts of Pernem in 1783. In 1530, Goa became the capital of the Portuguese eastern empire, during the reign of the Viceroy Tristão de Cunha, reducing the position of Cochin to that only of lading the Carracks. With Goa under the Portuguese control, along with Malacca and Ormuz, the Portuguese commercial and political dominations in the east became very effective. Though Goa was not providing all necessary material for shipbuilding, yet the excellent anchoring facilities at Mandovi and Zuari and its geographical location at the centre of the Arabian Sea, enhanced strategic importance. On March 1, 1518 King Manuel proclaimed Goa, to be a royal city never to be severed from the Portuguese crown.

Many works have been published by Portuguese and Indian scholars on the Indo - Portuguese maritime history. The works authored by the Portuguese scholars deal with the Portuguese naval technology in general.
Braz Olivera’s Os Navios de Vasco da Gama (1892) narrates the ships of Vasco da Gama employed in the historic 1498 India voyage. Querino Fonsecas A Caravela Portuguesa deal exclusively with the Portuguese Caravela highlighting different aspects of it such as tonnage, dimension, crew, sail-cutting system and so on. H.L. de Mendonca’s Estudos Sobre Navios Portugueses no Século XV e XVI (1972) traces the use of different types of Portuguese vessels in the early voyages of exploration. The documents appended to this work provide information about the dimensions of the various components of the ship. J.G.P. Barata’s Estudos Arqueologia Naval, 2 Vols. (1989) focusses upon the technical modalities of different types of Portuguese ocean-going ships.

Most of the works authored by the Indian scholars explore the maritime trade. Dr. K.S. Mathew’s Portuguese Trade with India in the Sixteenth Century (1985) is a scholarly work on Portuguese trade with India during the first three decades of the sixteenth century. Michael N. Pearson’s work Coastal Western India focusses upon the system of Portuguese trade operation along the western coast of India and the indigenous input in it during the sixteenth and seventeenth centuries. Afzal Ahmed’s Indo-Portuguese Trade during the Seventeenth Century 1600 – 1663 (1991) elucidates the Portuguese trade relations with the Indian States along with the Portuguese exports and imports with Goa as a commercial base. Thus the above survey reveals that no major study has been undertaken to examine the Portuguese shipping and Shipbuilding in Goa, the main Portuguese naval and commercial
The History of Portuguese Navigation in India 1498 - 1600 (1988) by Dr. K.M. Mathew is the only work in English which explores different aspects of the Portuguese navigation such as nautical science, cartography, the organisation of the navy and the naval policy of the Portuguese in the East. The Present study amplifies the Portuguese Shipping and Shipbuilding in Goa, one of the issues highlighted by Dr. K.M. Mathew in his work.

The study covers the period up to 1780. By 1780 the Portuguese had established their sway over a large portion of Goa and streamlined its naval defense in view of the Dutch and the Maratha attacks. The year 1779, saw the end of the Pombalian era. Marques de Pombal, who was a virtual ruler in Portugal from 1777 to 1779 introduced major reforms restructuring the naval system in Goa. His decree of 1773 reorganised the technical and administrative set up of the Royal dockyard. The decree also made a provision for stationing a permanent and well-equipped naval fleet for manning not only the defense of Goa but to provide assistance to other Portuguese colonies in the East. For the sake of brevity, the study confines the Portuguese shipping from Goa to the shores of India only.

The work is mainly based on the Archival material, collected from the Goa Historical Archives. A brief comment has been made on the sources utilized for the study.

Alfandegas (1779 - 1780), 1 Vol.

These documents are the custom records providing valuable
data on the arrival and departure of the ships to Goa with cargo. Timber rates can be ascertained from this source. However, most of the documents belong to the 19th century.

Assentos de Conselho de Fazenda (1618 - 1740) 10 Vols.

These are the records of the proceedings of the Revenue Council of the State. Authentic and useful data on rigging and repairs of the ships can be obtained from this source. It also contains technical certificates issued to the Fragatas, Manchuas, Pallas, etc.

Alvaras & Provisões de Sua Magestade (1610 - 1781) 7 Vols.

These provide considerable information on the type of the cargo that sailed from the port of Goa to Lisbon. However, it does not throw much light on the system of loading operations.

Cartas, Patentes & Alvaras (1557 - 1664) 20 Vols.

These Documents unfold information on the fortification of the Portuguese naval installations in the East, specially at Ormuz, Malacca and Macau. There are also orders exempting the timber which was brought for Royal dockyard from the custom duties.

Cartas, Patentes & Provisoes (1605 - 1775) 6 Vols.

The documents are the records pertaining to the naval artillery of different caliber installed on the Portuguese ships. A list of artillery carried on board the Nau Nossa Senhora da Piedade, Nau Nossa Senhora de Madre Deus, Nau Nossa Senhora de
Estrella and the Nau Nossa Senhora de Aparecidade can be traced in this series. This also contains technical details of the Palla São Luís which sailed to India in 1723. There is also a decree issued to the Surgeon of the Nau Madre Deus and Nau São Francisco Xavier in 1724.

**Cartas, Patentes & Provisões (1726 - 1752) 1 Vol.**

The documents include the list of the ship's cargo which sailed to Goa from Lisbon. Details of the voyage of the Nau Nossa Senhora de Livramento in 1726, Nau Santa Thereza in 1729 and the Nau Nossa Senhora da Aparecidade in 1730 are provided in this volume. Other details like the execution of the surety by the captain of the ships, instructions to the Chief-Master of the dockyard about anchoring of the ships etc. have been given in this volume.

**Instruções Para O Intendente Geral da Marinha (1774), 1 Vol.**

It is a very important source for the study of the organisation of the Portuguese navy in Goa during the 18th century. It contains instructions given to the Chief of the navy regarding the maintenance of the ship at the dockyard, quality control system, economic regulations, etc. This also includes administrative instructions given to the officers of the dockyard.

**Livro de Cartazas : (1704 - 1782) 5 Vols.**

These are the records of the sailing permits issued by the
Portuguese to the Muslims and other native merchants. They also furnish information on the tonnage of the local crafts and the amount of naval artillery that was allowed by the Portuguese.

**Livro de Correspondence da Kanara : (1647 - 1769) 2 Vols.**

The documents contained in this are the letters written by the Viceroy of Goa to the Portuguese officials at their Mangalore factory. Some of them throw light on the supply of timber, rice etc. to the Portuguese establishments in Goa.

**Obrigações de Feitoria de Goa : (1772 - 1774) 2 Vols.**

The documents are a list of medical provisions supplied to the ships during the voyage. It also provides information on the supply of other material to the Portuguese ships sailing from Goa.

**Peticoes Despachados da Conselho da Fazenda (1682 - 1761), 32 Vols**

A very informative source shedding considerable light on the Portuguese naval operations in the East. It furnishes a good deal of information on home-bound Indiamen specially regarding the passage and accommodation.

**Provisões, Alvaras e Regimento (1515-1596) 2 Vols.**

It unfolds very authentic data on various aspects of the Portuguese navigation during the early days of their rule in India. Among the various other documents it includes the orders given to the Governor Diogo Lopes de Sequeira over the safety of the ships carrying the horses and on anchorages in the river
Mandovi. It also furnishes information on the sailing permits issued to the ships sailing to Ormuz.

**Provisões dos Visoreis : (1602 - 1631) 3 Vols.**

They contain technical fitness certificates issued to Lisbon-bound ships, regulations for loading the home-ward bound East Indiamen and so on.

**Regimento E Instruções : (1564 - 1779) 24 Vols.**

This is the prime source of the present study. Except one volume, all other volumes contain instructions to the captains of the Northern and Southern fleet. The system of voyages from Goa to Malacca, Macau, Persain Gulf and Timor can be ascertained from this series. It also contains information on the instructions given by the Pombalian administration regarding the fortification of Goa in view of the Dutch and the Maratha pressures.

**Registo de Alvaras e Cartas Regias : (1610 - 1645) 7 Vols.**

This contains rolls of seamen, remuneration of Viceroys and captains and privileges of Captain-Major of India. It also throws a good deal of light on the construction rules and regulations of the India carrack.

**Registo Gerais : (1769 - 1775) 2 Vols.**

This appraises about the rates of matti, zambo, jackfruit wood etc., measurement wise. It also furnishes information of the supply of wood and other material from Daman Bassein and Surat to
the Goa dockyard.

The Thesis is covered under two sections. Part I is on Portuguese Shipping and Part II on Shipbuilding.

The First Part on Shipping comprises of the 3 Chapters as under:

Chapter 1 entitled Portuguese Shipping - Its Mechanism: discusses the operation of the Portuguese voyages from Goa to northern and southern part of the west coast of India. From Goa fleets were sent to these parts under the charge of Captain-Majors to acquire cargo of spices for the Lisbon-bound ships anchored at Goa. It is also proposed here to probe into the rules regulating the entry of the ships into the bar of Goa, the garrisoning of the vital naval installations, and the naval strength of the Portuguese in Goa during the 18th century.

Chapter 2 entitled Types of Ships And Their Artillery & Equipment: narrates different types of Portuguese Ocean-going ships such as Caravela, Carrack, Fragata, Galleon, Nau etc. The country crafts like Charrua, Catur, Tone, Taforea, Paraos etc. were also used by the Portuguese in India. The ships had to be properly rigged and equipped with all naval accessories and artillery pieces to meet the requirements of the eastern voyage and warfare. The artillery of the Portuguese vessels depended upon the make and the tonnage.

Chapter 3 entitled Life onboard the Portuguese Ships
attempts to highlight the general conditions of the people onboard Portuguese ships. The desire on the part of every Portuguese man to sail to India to make fortunes and the Captain's greed for wealth by selling the space onboard to private individuals often led to numerous problems and hardships. The food, the living, diseases, medical treatment, the slaves onboard and religious ceremonies are the issues that are examined here.

The Second Part on Shipbuilding comprises of another 3 Chapters:

Chapter 4 entitled Shipbuilding In Goa 1510 - 1780 explores various issues relating to Portuguese shipbuilding in Goa. The Royal authorities emphasised the need to build at least one ship every year in India for Carreira da India. Supply of timber and other shipbuilding material, selection and cutting system of wood, type of wood used for different parts of the ship, system of joining the wood, causes for the decay of the wood and the wood preservation techniques are the issues highlighted in this Chapter. The ships returning with cargo from Goa had to be properly cleaned. The caulking and the careening system also form important aspect of shipbuilding.

Chapter 5 entitled Dimensions of the Portuguese Ships, examines the tonnage of different types of the Portuguese ships. The Portuguese ships underwent structural changes in the course of time with the addition of the decks. The rigging of the ships depend upon the general tonnage of the vessel. The dimensions of
the vital components of the ships such as yards, mast, keel, stem, stern etc. have been discussed in this chapter.

Chapter 6 entitled *Naval Dockyard of Goa* probes into the administrative and technical aspects of this establishment. When Albuquerque conquered Goa he was astonished to see a well established Naval dockyard at Old Goa. Series of measures were introduced revamping its working, both technical and administrative. The dockyard became a vital unit of the Portuguese Eastern Navy. The system of ships anchoring, labour, and their operations have been dealt under the above heading.

The concluding remarks sum up the issues discussed in the Chapters earlier. The Portuguese eastern naval enterprise depended upon the indigenous manpower and material. The colossal loss which the Portuguese suffered was on account of the defects in the organisation of the eastern voyages.

The study ends with a Glossary of technical words, 7 Appendices containing selected original documents and their translations and detailed Bibliography.
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