

**Evaluating Procurement and Handling Practices of Ship
Husbandry Supplies: The Case of Ethiopian
Shipping & Logistics Services Enterprise**

**By
Tsehay Gebrehana**

**A Thesis Proposal submitted to Addis Ababa University School of
Commerce in partial fulfillment of the award of Master of Arts
degree in Logistics & Supply Chain Management**

**Advisor
Assistant Professor Busha Temesgen**

June 8, 2020

Addis Ababa, Ethiopia

Statement of Declaration

I declare that this work is original & is the result of my own effort, and has not been recognized for a degree & is not concomitantly submitted in application of any other degree in this or any other universities, and the bases of materials used for this thesis have been fully accredited.

Tsehay Gebrehana

Name

Signature

Addis Ababa, Ethiopia

Place

June 2020

Date

This thesis has been submitted for examination with my approval as the university advisor.

Ass. Professor Busha Temesgen

Advisor's Name

Signature

**ADDIS ABABA UNIVERSITY SCHOOL OF COMMERCE
LOGISTICS AND SUPPLY CHAIN MANAGEMENT
DEPARTMENT**

**Evaluating Procurement and Handling Practices of Ship
Husbandry Supplies: The Case of Ethiopian
Shipping & Logistics Services Enterprise**

BY

TSEHAY GEBREHANA

APPROVAL BY BOARD OF EXAMINERS

Chairman Dept. of Graduate Committee

Signature

Advisor

Signature

Internal Examiner

Signature

External Examiner

Signature

Abbreviations & Acronyms

AFS	Antifouling system
AIS:	Automatic Identification System
ARPA:	Automatic Radar Plotting Aid
ATA:	Automatic Tracking Aid
CDC:	Centers for Disease Control
DHHS:	Department of Health & Human Services
ECDIS:	Electronic Chart Display & Information System
ENC:	Electronic Navigational Charts
ESL:	Ethiopian Shipping Lines
ESLSE:	Ethiopian Shipping & Logistics Services Enterprise
ETA:	Estimated Time of Arrival
GDWQ:	Guideline for Drinking Water Quality
GMDSS:	Global Maritime Distress & Safety System
GPS:	Global Positioning System
HCD:	Human Centered Design
IFO:	Intermediate Fuel Oil
ILO:	International Labour Office
IMO:	International Marine Organization
INMARSAT	International Marine/Maritime Satellite
ISO:	International Organization of standardization
IOM:	Institute Of Medicine
LRTIS:	Long Range Tracking & Identification System
MARPOL:	Marine Pollution
MDO:	Marine Diesel Oil
MEPC:	Marine Environment Protection
MFAG:	Medical & First Aid Guide

MLC:	Maritime Labour Convention
NRC:	National Research Council
P & I:	Protection & Indemnity
Qs:	Quarantine Services
RNC:	Raster Navigational Chart
ROTI:	Rate Of Turn Indicator
SKU:	Stock Keeping Unit
SOLAS:	Safety Of Life At Sea
TB:	Tuber Culosis
UNDP:	United Nations Development Program
UT:	Universal Time
VDR:	Voyage Data Recorder
WHO:	World Health Organization

Abstract

This research study is conducted to assess & evaluate the procurement & handling practices of ship husbandry supplies in the case of Ethiopian Shipping & Logistics Enterprise. The purpose of this new area of study is to contribute awareness to readers & to recommend on the gaps investigated in the subject of study. The researcher uses purposive non probability sampling method in choosing respondents. The paper uses descriptive research design to thoroughly analyze & interpret qualitative & quantitative data collected using interview & questionnaire. The findings of this research indicate that not strictly following the international marine regulations & local procurement procedures in the procurement of dry docking services have significant effect to inefficient procurement practices. In addition, absence of software supported ship husbandry inventory handling practices as well as exhaustive ship inventories audit has significant effect to inefficient ship husbandry inventory management practice. The study has geographical limitation to conduct observational survey to ESLSE ships at port of Djibouti. The study also has unexpected limitation by reducing the number of selected respondents that comprise seafarers due to the outbreak of covid-19; that is seafarers that should signoff from their assignment on board at about five months interval are still assigned on board for further months. The study would have practical implications to initiate responsible officers in this area of study to adjust the gaps by underlining the results & the recommendations thereof. The originality & value of the study is undeniable. Many researches are conducted on areas of procurement & inventory handling in different manufacturing & service giving organizations; however little work has done in areas of procurement & handling of ship husbandry supplies. Thus, the study will have value to concerned policy makers in the area. In addition, it will be of great value to interested researchers in this vast industry to stem this study & to elaborate further.

Key words: Procurement, Inventory Handling, Ship's Husband (Agent), Ship Husbandry Supplies.

Table of Contents:

Statement of declaration -----	I
List of Abbreviations -----	II
Abstract -----	III
References	
Appendix 1 Questionnaire	
Appendix 2 Definition of Terms	
Appendix 3 SOLAS Chapters	
CHAPTER ONE -----	1
Introduction -----	1
1.1. Background of the Study -----	1
1.2. Statement of the Problem -----	2
1.3. Research Questions -----	3
1.4. Objective of the Study -----	4
1.4.1. General Objective -----	4
1.4.2. Specific Objective -----	4
1.5. Significance of the Study -----	4
1.6. Scope of the Study -----	5
1.7. Limitations of the Study -----	6
1.8. Organization of the Study -----	6
CHAPTER TWO -----	7
Review of Related Literature -----	7
2.1. Introduction -----	7
2.2. Theoretical Literature Review -----	7
2.2.1. Introduction -----	7
2.2.2. The Procurement Process -----	8
2.2.3. International Maritime Law -----	9
2.2.4. Public Procurement Proclamation -----	9

2.3. Importance of Procurement & Handling Practices of Ship Husbandry Supplies	10
2.4. Agent Appointment -----	10
2.5. Requirement Planning & Need Assessment -----	11
2.6. Sourcing & Supplier Selection -----	13
2.6.1. Selection of Ships Maintenance & Repair Service Providers -----	13
2.6.2. Selection of Banker (fuel) Supplier -----	14
2.6.3. Selection of Ships' Equipment & Spare parts -----	15
2.6.4. Selection of Vessel Inspection & Audit service Providers -----	15
2.7. Contract Award & Contract Administration -----	16
2.8. Procurement of Stores to Ships -----	17
2.8.1. Victuals -----	17
2.8.2. Medical Care Supplies -----	18
2.8.3. Spare parts -----	18
2.8.4. Navigation Aids Procurement -----	19
2.8.5. Maritime Communication (Vessel Communication) -----	20
2.8.6. Ship Inspection & Audit -----	21
2.8.7. Fuel & Bunkering -----	24
2.8.8. Dry-docking Services -----	24
2.8.9. Quarantine Inspection Services -----	25
2.8.10. Nautical Charts & Publications -----	26
2.8.11. Paints & Chemicals -----	27
2.8.12. Ballast Water Discharge & Fresh Water Services -----	28
2.9. Factors Affecting Procurement & Handling of Ship Husbandry Supplies ---	29
2.10. Empirical Literature Review -----	32
2.11. Conceptual Frame Work -----	34
CHAPTER THREE -----	36
Research Design & Methodology-----	36
3.1. Introduction -----	36
3.2. Research Methodology-----	36
3.3. Target population & Sampling Technique -----	36

3.4. Sample size determination -----	37
3.5. Sources of data & data collection tools -----	37
3.6. Methods of data analysis & presentation -----	38
3.7. Description of the study area -----	38
3.8. Ethical considerations -----	38

CHAPTER FOUR -----	39
Data Presentation, Analysis & Discussion -----	39
4.1. Introduction -----	39
4.2. Reliability analysis -----	39
4.3. Demographic Information -----	41
4.4. Results & Discussion -----	44

CHAPTER FIVE -----	57
Summary of Findings Conclusion & Recommendations -----	57
5.1. Introduction -----	57
5.2. Summary of findings, conclusion & recommendations -----	57
Conclusion -----	57
Recommendations -----	58
5.3. Future research directions -----	58

References:

Annex 1: Questionnaire

Annex 2: Definition of Terms

Annex 3: SOLAS Regulations

CHAPTER ONE

INTRODUCTION

1.1-Background of the Study

This paper is directed to evaluate the procurement & handling practices of ship husbandry supplies in the case of Ethiopian Shipping & Logistics Services Enterprise. Before it is named ESLSE Ethiopian Shipping lines was established first in 1964 & reestablished again by the Ethiopian government jointly with American company named Towers Investment from the district of Colombia, U.S. & with the Dutch management team in 1965 with three ships built in Holland (source enterprise's magazine, 2018). Since then it has been doing marine fleet operation to the country's importers & exporters. The structure of the organization regarding procurement is customary however the unique nature of the industry necessitates the application of technical knowledge in the procurement process beyond the normal procurement practices. Thus, the pre procurement activities like procurement planning & need assessment; sourcing & selection of suppliers & agents are performed by technical division staffs under shipping sector with the consent of vessel masters & on board higher officials leaving planned or budgeted supplies activities to special supply division on shore which is organized to arrange supplies to ships. Ethiopian Shipping & Logistics Enterprise has four service sectors namely: shipping, freight forwarding & logistics, port & port terminal and corporate. With regard to ship husbandry supplies procurements & handling Technical department under shipping sector has quality assurance committee comprised of different skilled professionals who have knowledge about ship parts & the corresponding ship husbandry supplies including supportive port services to meet the expected level of marine fleet operation. It is clear that efficient procurement is a vital input to smooth operation of any industry. Ethiopian Shipping & Logistics Services Enterprise is public owned enterprise thus its procurement of ship husbandry supplies roots EFDRE 649/2009 public procurement policies & procedures. On the other hand the enterprise performs international marine fleet operation which is subject to International Marine Rules & Regulations. Therefore the enterprise, when procuring ship husbandry supplies, bases respective local procurement & handling policies & procedures as well as its Safety Management System of SOLAS Chapter IX (Management for the Safe Operation of Ships) ISM code for ship owners. There is another unique feature in the procurement of ship husbandry supplies: that is the involvement of "agent" on

behalf of “ship owner” as facilitator in the provision of ship husbandry items & services at different ports of call where Ethiopian shipping & Logistics services ships call to get required port services in anchorage or at berth.

The subject under study roots its origin from united states naval fighting ships; that was in World War I & II the American naval fighting troops were supported by small & medium sized Landing Ships as well as Landing crafts Infantry which serve troops in supply of provisions, armaments, fuel, maintenance services etc. that contribute a lot to the naval defense force in the way to defeat enemies (History of USS Naval Fighting Ships, 1977-1991). Likewise supplies to ships of other types (passenger, commercial & etc.) that fit their purpose are also important & mandatory to make them efficiently operate in their respective purpose.

ESLSE as one of the World Sea & inland transport provider procures ship husbandry supplies to its ships. The procurement activities of ESLSE considers social & environmental constraints in the process of procuring such items which are contented in local as well as international procurement rules & regulations as stated above.

1.2- Statement of the Problem

Ethiopian Shipping & Logistics Services Enterprise is government owned international freight transport provider which should abide by public procurement policies & procedures as well as international maritime laws with regard to the procurement & handling of ship husbandry supplies. Thus, the enterprise follows the public procurement policies & procedures to have sound procurement & handling of ship husbandry supplies that considers value for money (economy, efficiency & effectiveness). The procurement & handling of supplies in any service giving or manufacturing organizations are measured from the dimensions of right quality, right quantity, right time, reasonable cost, good supplier relationship, best customer satisfaction, (responsiveness & reliability), compliance with procurement policies & procedures as well as international laws. However, from the assessment made & from the responses of shipping sector technical & supply division managers as well as audit department senior officers, the following gaps, in the practices of procurement & handling of ship husbandry supplies, are investigated.

- Cost of procurement of ship husbandry items & services are expensive since the enterprise has no economic power to purchase items in cash as in the practices of top private shipping companies as per technical division manager's answer to raised questions in pilot testing.
- Some ship husbandry items & services procurement do not comply with the procurement policies & procedures as well as international maritime laws as per supply division manager's answer to raised questions in pilot testing.
- Procurement of some ship husbandry items & services do not meet the needs of intended customers as per technical division manager of shipping sector.
- The enterprise's supplier relationship building capacity is not strong due to this reason delay in supply of procured items occurs which resulted in interruption of ship operation as per information gained from technical division manager.
- There is poor inventory handling practice in ESLSE ships' deck stores which is not supported by suitable software technology for tracking & tracing inventory status as per the information gained from technical division manager & audit department senior staff.

Given the above mentioned gaps, whether the procurement & handling practice of shipping husbandry supplies at ESLSE is at acceptable level or not have not been empirically examined & there are no studies made in these areas to the knowledge of the researcher.

1.3- Research Questions:

These study efforts to address the following research questions.

- 1- How is procurement & handling of ship husbandry items & services in Ethiopian Shipping & Logistics Services Enterprise?
- 2- How is the handling of ship husbandry items & services practiced in Ethiopian Shipping & Logistics Services Enterprise?
- 3- How are spare parts inventory management practiced with in ESLSE ships stores?
- 4- What are the major factors affecting the procurement & handling practices (performances) of ship husbandry supplies of Ethiopian shipping & logistics services enterprise?

1.4 Objectives of the study:

Every research is conducted to meet some objectives: such as to gain knowledge about existing matter, to add more knowledge than gained before, to find solutions for problems & to suggest requirement of further study. This study has general & specific objectives.

1.4.1 General Objectives:

The general objective of the study was to assess the practices of procurement & handling of ship husbandry supplies of Ethiopian Shipping & Logistics Services Enterprise.

1.4.2 Specific Objectives:

1.4.2.1. To examine ship husbandry procurement & handling performance of Ethiopian Shipping & Logistics Services Enterprise.

1.4.2.2. To assess the procurement practices of ship husbandry supplies of Ethiopian Shipping & Logistics Services Enterprise.

1.4.2.3. To assess the spare parts handling (spare parts management) practices of ship husbandry supplies with in Ethiopian Shipping & Logistics Services Enterprise's ships.

1.4.2.4. To identify factors affecting the procurement & handling of ship husbandry supplies in Ethiopian Shipping & Logistics Services Enterprise.

1.5 Significance of the study:

This research study is useful to understand the technical jargons used in shipping companies & the items & services required to feed ship for smooth marine fleet operation. In addition, readers will be familiar with important attributes of efficient procurement & handling of ship husbandry supplies towards satisfying internal customers & meeting enterprise's objectives. Readers of this study will also have knowledge about the gaps in the practices of acquiring ship husbandry supplies of the enterprise & enables concerned officers of the enterprise to propose policy reforms as remedies to fill the gaps in the existing procurement practices of the enterprise. The other importance that the study holds is: since the research area is new, other researchers may stem this study to further elaborate & generate future related areas of research.

1.6 Scope of the study:

The purpose of this research study was to evaluate the practices in the procurement & handling of Ship husbandry supplies in the case of Ethiopian Shipping & Logistics Services Enterprise. The writer wants to clearly specify what are to be examined under the study topic. The ship industry is a huge industry with a number of items & services to be procured & stored in vessels deck store to serve many purposes. The procurement practices of all items required to make a ship ready for smooth marine fleet operation cannot exhaustively be detailed in this study. Therefore, the writer endeavors to address procurement practices of deck, engine, catering & cabin supplies of victuals, medical care supplies, spare parts, navigation aid equipment, vessel communication service, ship inspection & audit service, fuel (bunkering) service, dry-docking service, quarantine inspection service, nautical charts & publications service, paints & chemicals, ballast water discharge & fresh water service. In addition, it is also hard to examine inventory handling of all ship stores of various electrical & mechanical appliances, machineries, food items & medicines etc. in this work. Thus, the writer limits its handling assessment only to spare parts held in store to on shore preventive maintenance purposes.

In this study the special agency practices in the facilitation of services & items supplies will also be discussed. The facilitation practices of agent discussed here is in line with the writer's convenience of selected procurement practices stated in the scope of the study. Out of seven branch offices in & outside Ethiopia the focus of the study area is confined to head quarter found at the heart of Addis Ababa called legehar. As per judgmental approach of the researcher, the study will employ purposive non probability sampling technique & the author is obliged to limit sample respondents of only 46 employees, that is because of the sudden outbreak of covid-19. These respondents are selected from crew members, & head office staffs from technical, supply division employees which involve in the requirement planning & supply of items & services to ESLSE ships & crew, & internal audit service employees who directly involve in auditing technical & supply divisions ship related procurement & handling performance. Thus, census study is conducted. The duration of the study will take eight months discussing in theories related to ship husbandry materials & services supplies & handling which are required to run smooth marine fleet operation. In this study the importance of ship husbandry supplies procurement, spare parts handling in ESLSE's ships store & the technical jargons that are used in shipping industries

within the scope of the study will be discussed & defined in detail. The study objective is to aware readers about the subject, to help initiate concerned officers to make procedural reforms towards narrowing investigated gaps & to highlight other researchers to elaborate the study by conducting further research on the subject & to conduct new research in the remaining ship husbandry supplies & services procurement.

Limitations of the study

It is known that information is not openly addressed to researchers since confidentiality hinders respondents to keep some useful truths which can be of great contribution to the researcher. In addition, the synthesis of this paper has had the following limitations.

Geographical limitation: the right place to survey data collection regarding inventory handling is Djibouti port where the enterprise's ships berth to required ship husbandry supply services. However, due to work load & cost factor the researcher cannot address information.

Literature Limitation: the other limitation of this study is the absence of literature written exactly on the subject. Thus the study is confined to review journals related to procurement & inventory management & journals related to individual ship husbandry items & services.

Organization of the study

This research paper will be structured in five chapters. Chapter one will be about back ground of the study, statements of the problems, research objectives, significance of the study, scope of the study, limitation of the study, & organization of the study. And chapter two will disclose relevant literature reviews referred from reputable journal articles on procurement & handling of ship husbandry supplies as well as the real practices in the enterprise. Chapter three will highlight the methodology which includes description of the study area, research approach, research design, population & sample, data sources & types, data collection procedures, ethical considerations & data analysis. Chapter four will be about the results, discussions & interpretation. Chapter five will contain summary, conclusions & recommendations. & at end pages after chapter five the paper will have list of references in Harvard style, appendixes, & pictures.

CHAPTER TWO

REVIEW OF RELATED LITERATURE

2.1-Introduction

In this chapter the writer will refer theoretical literatures about ship husbandry supplies procurement & handling, procurement policies & procedures (local procurement policies & International Marine Laws) elements of procurement process, the parametric dimensions of efficient procurement &, its importance with regard to the objective of this research study. The chapter will also include theoretical reviews on the concept of inventory management, inventory management techniques & its importance as well as software technologies that facilitate part of efficient procurement & handling performance. In addition empirical literature reviews will be reviewed to support the study & to show the gaps why this research was conducted. The history of ship husbandry supplies in general & the legal meaning of the term “ship husbandry” basing its legal definition in maritime law were also covered. The chapter also contains the conceptual framework of the study which guides readers about the intention what the author wants to publicize.

2.2-Theoretical Literature Review

2.2.1. Introduction

The subject “ship husbandry supplies procurement & handling practice” is not yet familiarized by scholarly writers even though individual subjects like procurement of food provision to crew on board by (Lau y., & Yipt T., 2017), quarantine when ships enter ports by (Phillipines Bureau of Quarantine Department of Health, 2004), dry-docking service by (Molland F., 2011), spare parts by (Mania, Nenni, et al 2013) etc. are highlighted. The area of research is new so the writer finds it important to clarify the term “ship husbandry” first. The term “ship husbandry” is known as derivative of the noun “ship’s husband”. In the context of shipping industry & as per the legal meaning of ship’s husband: ship’s husband is a person or an agent appointed by the owner of a ship, & assigned with authority to make the requisite repairs, & attend to the management, equipment, & other concerns of the ship where the owners of merchant vessels are bound by the acts of their agents & must pay for all services, supplies, & repairs that they order (ESLSE

Agency Agreement Document, 2016). Thus, ship husbandry supplies are the act of providing supplies and services to ships by other small supply ships. Once the confusing terms are cleared, the next is about the history of ship husbandry supplies. The history of supply ships (ship husbandry supplies) dated back to World War I & II when the united states naval fighting ships being supplied provisions, fuel, clothing, infantries etc. by small & medium sized landing ships & crafts (LSM-137, LCI-151 etc.). Various supply ships were assigned different purposes one to supply hull maintenance service, the others to supply food, provisions stores, etc. to navy fighting ships (James, 1976). According to Victor & as it is chronicled in the book called “The History of the Supply Ship” the history of ship husbandry service supplies by supply ships dated back to 1950, when such ships support oil rigs & platforms to other ships in all required need (2007). In another history, one of the largest Navy dive operations, which are one of the major ship husbandry supplies in history, is seen in England. In this ship husbandry service supply, 160 frogmen comprised of surface-supply divers – the ones who drop down to the accident from the barge & ship husbandry units that is service and repair ships below the waterline, are involved keeping them afloat and sparing them constant trips to shipyard dry-docks Paul (2011). The other services & supplies experience with regard to the subject is noted in New South Wales which put on board the Sirius and Supply ships; the former to supply chemical cleaning service & the latter to supply provisions, stores (implements of husbandry & clothing) New South Wales (1892). Likewise, supply provisions of all kind to make cargo operating ships, passenger ships, fuel carrying tanker ships seaworthy has remained an international practice in all ship owning countries.

2.2.2. The procurement process

In any business organization whether public or private whether ship husbandry items or other supplies procurement process is similar. Efficient procurement process is the interest of every organization since it contributes for better performance in product quality, cost, cycle time, and responsiveness (Sanderson & Cox, 2008). The process which composed of different stages as pre-acquisition phase, tender process and contract award, contract and supplier management; requires specific and careful design guaranteeing the best possible results (Baldi et al., 2016). In the existing dynamic environment the strategic importance of procurement becomes a key business which necessitates a change from earlier practice to better one (carter & Yan, 2007; Porter &

Kramer, 2011; Ryals & Ragers; 2006). In ship husbandry supplies procurement the procurement process starts from requirement planning by chief officer, chief engineer & chief steward leaving the remaining processes to supply department on shore (Dictionary of Naval Shipping, 1941; Lane 1986.; Naval Science for Merchant Marine Officer, 1981).

2.2.3-International Maritime Law

International maritime law is a package of laws & regulations with regard to passengers, crew, ship, sea & environmental safety that is ILO Conventions on crew safety, SOLAS Chapters on safety of life at sea, & MARPOL 73/78 on safe sea & ocean water free from pollution designed to govern all vessel owners around the world. As in the reports of different scholars, the risk commercial & passenger vessels cause to seafarers or passengers necessitates the enforcement of ma Operators of commercial vessels have rescued tens of thousands of migrant seafarers in the Mediter- ranean Sea since 2014. For commercial actors, swift disembarkation of survivors is critical to ensure safety and prevent further disruption to the rescuing vessel's primary voyage. From 2014 through 2017, European coastal states such as Italy, Malta, and Greece permitted ...

2.2.4-Public Procurement proclamation 649/2009

In publicly held enterprises like ESLSE, which spends a huge amount of money in procuring supplies & services to make its ships seaworthy, procurement law is important to guide & control the huge expenditure. Before discussing public procurement law it is better to know what public procurement is. Public procurement is the overall process of acquiring goods, civil works & services which includes all functions from need identification, supplier selection, contract award & administration (UNDP; 2010 p.5). Public procurement law is the elected legal authority to advise, plan, obtain, deliver, and evaluate a government's expenditures on goods and services that are used to fulfill stated objectives, obligations, and activities in pursuant of desired policy outcomes (Eric P. and Clifford P., 2009). Thus, to achieve such purposes Ethiopian Federal Democratic Republic of Ethiopia procurement law 649/2009 is proclaimed to be strictly exercised by government organizations. This law places the necessary requirements in the procurement of government expenditures. It places the principles, approved methods of procurement, bidding procedures, etc. to control agents from corrupted practices so as to make true the principle value for money.

2.3-Importance of Procurement & Handling Practices of Ship Husbandry Supplies

It is a mandatory importance for all ships to equip the necessary stores for deck, engine, cabin, & other parts of ship to make ship seaworthy & get certification to enable marine fleet operation. The required supplies to make ship operational in number & count of food items, medicine, equipment, are guessed sum subject to change with the consent of on board chief engineer, chief officer & steward in their respective responsibility (Dictionary of Naval shipping, 1941). In the facilitation of import & export trade activity, every shipping company plays a pivotal role by enhancing GDP which in turn promotes country's economy. This vast industry spends enormous amount of money to equip its ships with the required materials, manning & various services supplies. By its nature, the industry has a number of items & services to be procured to ships' deck, engine, bridge, etc. to be stored for short or long term consumption and to determine the ships seaworthiness. The procurement of such supplies is required to frame local & international rules & regulations for safe operation of the industry. Purchasing department on shore has the same status as the heads of the deck, engine, and departments on board. Thus the purchasing agent; Along with chief officer, chief engineer & chief steward, participates actively in the establishment of standards of quality and quantity of the stores to be positioned onboard ship (Lane 1986). Chief engineer of a ship is responsible for the maintenance and repair and so all requisitions regarding spare parts or material used in repairs of any kind are directed through him to the offices of the procuring departments on shore (Lane, 1986). In naval shipping the supply of standard food, medicine & other deck, engine, bridge items, receipt, delivery & shipment is accomplished by on shore supply department & the inspection, preparation of food to serve crew goes to steward & mess man in the procurement of provision stores (Naval science for merchant marine officer, 1981).

2.4-Agent appointment

Agency appointment by ship owners is a long history. The concept of appointing agency arises in line with the increase in volume of sea trade. Agents are appointed to serve ship owners interest at ports where the principal's ships operate (Latarche, 1998). In Great Britain there had been an experience of appointing agents to serve finding market for export cargos (freight), port clearance activities & other freight related activities in return for commissions to be paid to agent (Journal

of the house of commons, 1803). In the (Journal of The House of Lords, 1787), it again reads the Govenor General Warren Haffings appointed James Peter Aerial Esquire to be an agent for providing supplies for the relief of the prefidency of Madras to cover the scarce provisions. The other story of agency is widely seen in Saudi Arabia Shipping Agents handling bulk tanker carriers, general cargo containers, naval ships, dry-docking repair arrangements, bunkering, supplies, crew changes, husbandry management, & etc. (Who's Who In The Arab World, 2007). Ship owners pay large amount of money for agency contract & commissions for freight that agent finds from market & for other port related clearance services that the agent accomplished. To illustrate, the fees expenses & gratuities paid by ship owner amounted to one hundred & ninety pounds in the year 1780 to procure agency contract & to pay freight commission to the appointed agents (Latarche, 1998).

2.5-Requirement planning & need assessment General

In any shipping industry it is worthwhile to equip ships in all required supplies including crew. As it is depicted in the (U.S. Federal Register prerequisites for ship operation, 2013) there are shipments carried as baggage to be stored for on board consumption other than shipped by bill of lading. These store items includes supplies & equipment in reasonable kind & quantities of spare parts, bunker fuel, provisions of medicine, food items, slop chest & salon items for steward department (U.S. Federal Register prerequisites for ship operation, 2013). The requirement planning of ship baggage consider voyage, length of trade route, already employed crew & anticipated employment, maintenance records, life of ship etc. as these are neatly detailed in each & every respective legal enforcements (MLC Regulation 2006, SOLAS Chapters 1974, IMO, MARPOL 73/78). As it is indicated in SOLAS Chapter IV in relation to Radio communications requirements: Global Maritime Distress Safety System (GMDSS) & Search and Rescue Transponder (**SART**) are vital equipment on the ship as they perform their respective job of a signal-man during distress & locating the position of the vessel when the ship goes in the wrong track respectively. Another legal base for requirement planning is, Maritime Labour Convention 2006), International Labour Organization 2015a), which enforce the employer to ensure and finance medical care of seafarers whether on board or not crew. And ILO Convention 1970 No. 1, requires ship owner to plan accommodation which comply with the accommodation of crews additional provisions. In addition, SOLAS Chapter V – Safety of navigation commands ship

owner to plan & equip the ship with gyrocompasses &, magnetic compasses to aid direction detection. Thus, every ship owner plans the requirement based on these enforcing laws. The other enforcing maritime law which necessitates the ship owner to plan inspection service requirement is SOLAS Chapter I which is procured to assure compliance in keeping safe medical care appliances, spare parts, and gantry, engine room, fuel tanker, safe food, etc as per the relevant IMO conventions & to enable ships to have certificate of compliance in safe marine operation. MARPOL 73/78 is another regulation which forces ship owner to plan for safe procurement of ballast water discharge, hull cleaning, fuel & other services & items etc.

According to (Robinson, 1967) the process of procurement commences from assessing internal need identification which encompasses verification of technical specification, recording expenses of acquiring intended items & services and auditing, planning monitoring activities and collecting supplier information. Procurement planning is the first and foremost activity in any procuring industry or organization & its importance can be viewed from the benefits of deciding what to buy, when and from what sources; it helps concerned officers to determine whether planned expectations are accurate to meet responses from offer & other notices. Procurement planning is the purchasing function through which organizations obtain products and services from external suppliers (Burt et al, 2004). A procurement plan defines and documents the details of purchases from suppliers needed for a particular department. According to Basheka, procurement planning is the major function that sets the stage for successive procurement activities (2008). The trend of procurement planning dated back to 1962 when naval officers are made to report the need requirement for three months stock to the shore Military Sea Transport Service. The requirement of the three months stock need is initiated & determined by first officer, chief engineer & chief steward (U.S. Bureau of Naval Personnel, 1962). According to U.S. Bureau of Naval Personnel, 1962 the screening process keeps the types & quantities of materials in allowances & equips the ship with technical aid leaving coordination, follow up & delivery activities of all requisitions to shore supply office. Procurement planning with regard to the procurement & handling of ship husbandry materials & services supplies are done to each item & services before the remaining procurement processes are in action (U.S. Bureau of Naval Personnel, 1962). Inventories & services to be procured to make ship operational are more of technical, thus, such type of planning is performed by concerned technical division staff of shore with the consent of each vessel command & higher administrators on board such as chief officer, chief engineer & chief

steward in their respective acquisition responsibility as per ILO regulations, SOLAS chapters, MARPOL 73/78 regulations, the requirements of port authority control, flag administration, Insurance corporation, classification societies & other concerned bodies requirements. Thus, planning requirements stems from assessments of the life of ship, Maintenance records, four seasonal situations which determine the requirement planning related to ship supply needs. The Quiet Season (January – March): this is the time freight volume is down. The weather is not shipping-friendly with low temperatures and snowed highways. The Season from April to July is the time volume of freight shipping is picking up & supply is also. The Peak Shipping Season (August – October) is another busy season but vast produce season is coming to an end. The last season is the holiday shopping season (November – December) when shippers are quickening to complete their former orders and get everything in or out before holiday closures. Frequency & length of trade routes & other things that can influence supply volume will be taken in to consideration (retrieved from internet).

2.6-Sourcing & Supplier Selection General

Procurement is a broad word with a process. The process next to procurement need assessment & planning is identifying & assessing suppliers which is an input to have short listed material & service providers that support the way towards industry goals. As in the notice report about procurement phases in naval shipping there are three phases of procurement & the one out of these is sourcing & supplier selection & is accomplished through tendering & contract award (Military Organ MOND 2003). The National Oceanic Atmospheric Administration (NOAA) which possesses 30 vessels has professionals of commissioned & civilian officers & crews trained & experienced in the scientific & engineering skills responsible for developing detailed repair & maintenance specifications used for selecting suppliers (U.S. Congress House Committee on Merchant Marine, 1988). In the today's dynamic world, it becomes necessary to cut the production and variable costs to sustain and survive the high competition. Supplier selection process is of paramount importance in any successful or efficient supply of materials & services if the right quantity and desired quality of the final product is delivered at the right place in the right time (Mandal and Deshmukh, 1994). It is impossible to produce low cost, high quality products in today's competitive situation without proper suppliers (Weber et al., 1991).

2.6.1-Selection of Ships' Maintenance and Repair Service Providers & Repair Yards

The concept of selection to all types of procurement is same. The initial days supplier selection criteria price, quality and time, were upgraded by other important factor in the selection Dickson (1966) summarized 23 criteria which are vital in the process of supplier selection. Other researchers criteria in the process of supplier selection is well-defined criteria which depend on the level of supplier-buyer relationship and integration, the organization's position in the market or the competitive situation, the organization's corporate strategies and strategic management decisions (Weber et al., 1991). According to NOAA the repair & maintenance specifications are designed by ship engineers as a prerequisite & source for selection of suppliers (U.S. Congress House Committee on Merchant Marine, 1988). As in the book of U.S. Industrial Outlook, (1994) there were 36 privately owned competitive ship maintenance & service providers who had ship yards to provide repair services to both commercial & naval ships & the selection of such yards is based on their location, timeliness of repairs, competitive prices. The 1993 reports of U.S. shipyards showed an increase in the repair & conversion work that is to accomplish repair work within two days using their vast resources. Thus, the selection of ship yards include the qualified repair professionals, machineries, equipment & other necessary materials required to accomplish the ship repair work (Ronald H., 1994).

2.6.2-Selection of Banker (fuel) Suppliers

The fuel supplier selection is a long history dated back to World War I & II when fuel consumption increases & petroleum production declines (Report of Conference Held in Washington D.C. on May 22, 23, 1999). The Americans Naval Ships selection on fuel (oil bunkers) suppliers was on the bases of the qualities & price benefits they have to the Navy ships at different world ports (Report of Conference Held in Washington D.C., 1999). Fuel or bunkering is one of the very important services to be supplied to ships, and fuel suppliers as well as ship owners are required to provide sulfur free or less sulfur contented fuel types to comply with MARPOL 73/78. For selection of supplier and purchase of bunker for at ports things to be considered are commitment of charter party agreement, voyage charter requirement or liner service arrangement (retrieved from internet).

2.6.3-Selection of Ship's Equipment and Spare Parts Supplier

The delivery of ship equipment & spare parts is a long history in the American navy ships. The ship control equipment like gyrocompasses with both main & auxiliary power generating units, supply panels, control panels, navigation panels etc. are very important to run the navy operation & to provide these items on board suppliers were selected (U.S. Navy Department Bureau of ships Manual, 1941). It is impossible to stock all spare parts in deck store at commencement so the spare parts to fix naval ship's control equipment are to be supplied by selected on board suppliers to fill this gap (U.S. Navy Department Bureau of ships Manual, 1941). Ship spare parts take great portion in shipping industry & its importance to on board preventive maintenance is a great concern of all ship owners since it plays a pivotal role in smooth marine fleet operation (Maria & Massimiliano, 2013).

2.6.4-Selection of Vessel Survey and inspection Service Providers

It is a mandatory practice to all ship owners to procure inspection & audit service to their ships as per Safety of Life At Sea regulations to reduce accidents & create safe ship operation. The conservative maritime transportation industry in terms of regulating its activities towards vessels owners necessitates inspection of ships. Vessel owners who conduct most of their operations at sea are not practicing regulations exhaustively (Chauvin et al. 2013). During the 1980s and 1990s there were numerous accidents, followed by surveys into the causes of polluting sea water (Batalden and Sydnes 2013). As a reply to such bypass of regulations, the resulting accidents & environmental consequences, the IMO adopted the International Code for the Safe Operation of Ships and for Pollution Prevention (ISM Code) (IMO 2010). The ISM Code has been designed to provide an outline for companies to establish integrated Safety Management Systems (SMS) (Rodriguez 1998/1999). Thus, audits of internal & external certification constitution to ships & procedures for inspection are enforced, as an integral part of the safety management rule (Hale et al. 1997). To reduce the humans risk, environmental pollution, & loss of property due to accidents by substandard ship's the maritime bodies (Flag states, Port State Control authorities and Classification Societies) have increased their willing efforts towards the promotion of safety. The intention of inspection & audit is to progress the effectiveness of SMS by enabling the organization to improve the safe operation of shipping industries (Bhattacharya 2009). ISM Codes provide a way of ensuring that shipping industries are acting in line with established standards

and public good (Power 2000; Hale 2003). Qualifying the suppliers 'suitable' depends on the suppliers being able to provide the retailer with the right quantity of the right product/service at the right time in the right place (Mandal and Deshmukh, 1994; Sarkis and Talluri, 2002). Thus, the practices of ensuring, that Safety Management System implemented on board ships as per the relevant IMO conventions, requires inspection by qualified inspectors. The automated inspection of vessels are researched & applied to ease time consuming inspection work (Newsome and Rodocker, 2009).

2.7-Contract award & Contract administration General

The last phase of procurement is awarding contract to winner supplier, signing binding contract, & administering contract. In procurement process it is a customary practice to notify auctions to award contracts for a variety of products & service requirements in both public & private sectors. The purpose of auctions is to finally award all to the solely selected supplier, in which the supplier promises to provide the required items or services as per signed contract (Wilson R. 1979; Bernheim B.D. and Whinston M.D., 1986). In any business organization there is a demand of services or items that makes an organization to participate in the management of contractors (suppliers) to obtain service or product and to meet its envisioned requirements (Kumar and Markeset, 2007). Authors report about procurement phases in naval shipping & the one out of these is Contract administration which encompasses compliance, verification, and settlement of payment for supplied items & services (Military Organs MOND 2003). Contract administration is implementation of agreements of contracting parties that are stipulated in the contract clause (Sherman, 2011). Preparing effective specifications, contracts, and contract administration plans is designed to avoid the potential problems or diminish the potential negative penalties (Davison & Wright, 2004). The absence of key knowledge of contract administration & closeout should not be deficit to process capability and maturity. As in the recent reports by the Government Accountability Office (GAO), deficiency of process capability & maturity are identified areas of problems throughout department of defense (DoD) and the federal government. As it is identified by scholarly writers problems related to ensuring proper management, oversight, and investigation of awarded contracts (GAO, 2005; GAO, 2006a; GAO, 2007c), & management of

contractor performance information (GAO, 2007d) causes difficulty in Contract administration. According to DoD Inspector General (IG) “organizations are lacking in contract administration, including investigation of contract performance, assignment of contracting officer, preparation of quality assurance following plans, and collection and recording of contractor past performance” (DOD IG, 2007). Organizations performance can be evaluated from the result of their performance on the project effectiveness. The one which contributes to such result is having well established and matured contract management processes which enable to generate additional savings and have a different competitive gain over their opponents (cited in Nguyen, 2013). Poor administration of contracts on the other side, will lead to inefficient functioning control, little customer satisfaction with risks and undesirable costs (cited in Nguyen, 2013). As in the findings of current international studies conducted by senior supply chain managers on the difficulties and risks of project contracts, a significant loss of money is seen due to unproductive management of project contracts. Prosidian Consulting (2011), for instance, research firm Aberdeen Group, advocated that enterprises lose US\$153 billion each year due to ineffective project contract management. According to Dendane (2018) & as per Green Point Global (2013) out of 80% of business transactions governed by agreements or contracts than 10% of contracts are lost. Even if regulatory framework exists in the public sector, millions of dollars have been mislaid in unsatisfied contracts. Prevailing indication assured that the government is still mislaying huge amount of money in inferior works and services (IGG Report, 2012) To combat such risks & unnecessary costs a model that fits efficient contract administration that combines risk, performance & relationship management is essential Hotterbeekx (2013).

2.8-Procurement of stores & services to ships

2.8.1-Victuals

The procurement of standard quality food & drink on board a ship is mandatory to keep health of seafarers or passengers. Seafarers on board vessels are confined to environments at sea for long periods that cause them unique stresses on their mind & body. The Ocean atmosphere & the voyages together influence the crew immune system, which may result in various illnesses (Lu et al., 2010; Myznikov et al., 2000; Protasov et al., 1996). The severe temperature changes & poor diet structure can lead to slight changes in physiological and psychological functions (Lu et

al., 2010). In contending such negative consequences the International Labor Organization's (ILO's) addresses Food and Catering regulation to Ships' Crew by Convention 1946 (No. 68) and accompanying the importance of Certified Cooks in all ships by Convention 1946 (No. 69); as amended in 2006 in Geneva. Shipping companies in the world provide international passenger as well as cargo transporting service thus they are required to equip ship with standard quantity, nutritional value, quality and multiplicity of food and drinking water supplies, to seafarers on board, seeing their religious requirements and cultural practices for the duration and nature of the voyage (ILO Convention 2006 regulation 3.2a;).

2.8.2-Medical care supplies:

In shipping industry, crew health & safety is crucial, & thus proper standard of medical supply (MLC convention 1987 (No. 164) the provision of medical care & protective devices) is to be provided to protect crew health & injury. According to the Maritime Labour Convention (MLC) & (ILO (International Labour Office, Labour Convention – 2006 2015a), the employer is under regulation to ensure and finance medical care of seafarers whether on board or not and also, hospital care for the entire period of employment of a crew member. There is a standard to have a ship's doctor on the ship. The required working and living conditions on board, medical and health status of the crew, as well as the provisions for medical care by doctors and nurses are visibly defined in the Maritime Labour Convention – 2006 2015b). It is also known that any illness or injury of a crew member can result in the loss of medical fitness for marine work. However there is no medical specialist on board ships. This means all treatments to be treated at ports. The published studies in the on board consultation of crew (Dahl 2005a, 2005b, 2006, 2010; Dahl, Ulven, and Horneland 2008; Sobotta, John, and Nitschke 2008) show daily medical consultations provided to crew which is high in number. Thus, to provide bridging treatment for seafarers' symptoms & pains on board by having medicines with treatment guide is mandatory.

2.8.3-Spare Parts:

In spare part procurement there is a regulation on procurement of goods proposed by (Regulations on procurement of military goods, Ministry of National defense available on line accessed on 7

June 29, 2020) Ministry of National Defense (MOND) in 1995. According to Regulations on procurement of military goods of Ministry of National defense the planning & acquisition of spare parts basis the specification & planned spare parts procurement. As per regulations on procurement of military goods spare parts & regular maintenance & shipyard repair plans are to be formulated on the bases of dry dock ship yard repair sessions of each ship.

The vessel is to be seaworthy at the commencement of the voyage (Wardley, 2008). Seaworthiness of a ship is assured, if that ship is able to follow the regulation for the safety of a ship, including the hull of the ship, safety equipment, passenger, radio safety certificates, radio telegraph certificates and the cargo safety equipment, tools which mainly include spare parts.

As the main objective of the shipping company operated their owned vessel is to get financial benefits as much as possible, ship worthiness is to be sustained. However, there is possibility of hull leakage that will make disturbance to ship stability which causes the ship to sink. Incomplete safety equipment, fire extinguisher which is not working properly and some of sea survival equipment that do not work properly is also considered un-seaworthiness (Goltz, 2010). In addition, the damage of main engine and auxiliary engines, the unavailable spare parts on time that make the damage not to be repaired as fast as possible, will make the ship fail to operate properly (Carlsson et al., 2006). Un-seaworthiness of the hull of the ship causes danger to the ship and the loaded cargoes. In the maintenance of heavy duty equipment, availability of adequate spare parts is very important to support the operation of marine fleet ships in any shipping company. In some big shipping industries, spare parts of expensive cost are to be stocked to maintain smooth fleet operation (Kotabe & Murray, 2004).

2.8.4-Navigation aids equipment

As the recent marine traffic report perceived, the significant increases in traffic and trends toward larger and faster ships, resulting in a greater risk of marine accidents. According to Ministry of Oceans and Fisheries out of 80 % Korean Maritime Safety Tribunal ship accident reports, collision accidents were the highest, and these was caused by operational error including navigation, which in turn continue to increase along with the resulting damages (2015). & Aids to Navigation System Equipment and Resources Used Onboard Modern Ships such as gyro compass a device which automatically finds a geographical direction based on the rotation of the earth;

magnetic compass a navigation device used to find the northern direction with the help of the earth's magnetic field. Automatic Radar Plotting Aid (ARPA) used for creating tracks with the use of radar contacts; Speed & Distance Log Device used for measuring speed & distance; Eco Sounder a device used for echo sounding; etc.(Maritime Manual, 2019 retrieved from internet) are provided to mitigate such accidents as per SOLAS **Chapter V – Safety of navigation** which deals with all the seagoing vessels of all sizes, from boats to VLCCs, and includes passage planning, navigation, distress signal etc.(retrieved from internet). Thus, ESLSE procures navigation aid tools as per SOLAS chapter v.

2.8.5-Maritime communications (Vessel Communication Service)

The recent technology developed in shipping tends to be unified & dispersed through world shipping companies. The earlier days point to point wiring electronic communication onboard ships changed to rapid ship board electronic devices. This is done by ship builders when they replaced old style wiring (Shipboard Data Multiplex System (SDMS) with modern local area networks. The growing networking technologies introduced supervisor controller systems such as Command, Control, Communication & Intelligence (C3I) systems into ship systems (Thomsett, 1993). SOLAS Chapter IV – Radio communications which includes requirements of GMDSS, SART Search and Rescue Transponder (SART) which is extremely vital equipment on the ship as it performs the job of a signal-man important machine during distress It is a vital machine during distress for it helps in locating the position of the vessel in case it goes off-track., Emergency Position Indicating Radio Beacon or EPIRB is another communication aid used to alert search and rescue services in the event of an emergency. It does this by transmitting a coded message through the free to use, multinational Cospas Sarsat network for cargo and passenger vessel. Global Maritime Distress & Safety System (GMDSS) facility is an internationally agreed-up on set of safety procedures, types of equipment, & communication protocols used to increase safety & make it easier to rescue distressed ships, boats & aircraft. It consists of several systems to perform alerting (position determination of the unit in distress), search & rescue coordination, locating (homing), maritime safety information broadcasts, general communications, & bridge to bridge communications (accessed from internet).

The maritime user applications necessitating access to communication systems: Safety & Security; Vessel operations; Regulations/Policy; Tracking & Monitoring; Crew Welfare; Shared Situational Awareness. Global Maritime Distress and Safety System (GMDSS) is the radio system whose systems and frequencies are defined by the ITU (international telecom unit) and for which mandatory equipment carriage supplies has been adopted by the IMO for commercial vessels. These items are important as a requirement to be applied not only to vessels but also goods/oil/persons on-board the vessel & from vessel to ground too (Accessed from internet).

2.8.6-Ship Inspection & Audit

Ship inspections are to be performed to find out whether all parties are complying with required technical requirements and to decrease the deficiencies. These activities are implemented by classification societies. This is a scheduled practice to ship owners to assess annual survey needs to arrange annual surveys by International Association of classification society which are organized to categorize flag ships Duncan(1992). IACS now provides technical support, compliance verification & Safer and Cleaner Shipping states Boisson (1992) & Brooks(1996). Thus to enable continuity of vessels trading periodical surveys and certifications by classification society are compulsory. The confirmation certification provided as assurance witnessed that vessels are operating in compliance with international regulations to be endorsed to continue marine fleet operation (SOLAS regulations). There are detailed areas of inspection such as quarter deck, gantry, pantry & service area etc. (WHO, 2011). **Quarter deck:** deck area located near to master of vessel & which is to be inspected to have clean atmosphere for crew. According to the IHR (2005) and other relevant international agreements to be interpreted as stipulated in (Article 7), quarters for crew members should comply with existing crew accommodation conventions on food and catering as per ILO conventions. The reviewed accommodation of Crews Convention 1949 No. 92 should be complied for ships constructed before July 2006; & all crew accommodation should comply with the Accommodation of Crews (Supplementary Provisions) Convention 1970 No. 133. For ships constructed after July 2006, accommodation should satisfy the Maritime Labour Convention 2006. That means the style of construction design, management & operations of the quarter that resulted causes of illness to crew members on board should not occur. In the inspection of quarter deck documents: inspector should check the existence of documents that shows construction drawings of sanitary facilities

and ventilation, cleaning procedures and logs, construction sketches demonstrating how cross-contamination is eluded in specified clean and dirty areas & smoke tests (identification test of gases harmful to health) at exhaust and at air intakes close to exhaust (ILO, MLC,2006). In Galley, pantry and service areas there are risk factors associated with poor preservation of perishable food, polluted potable water, infectious agents, poor food serving rooms, etc. which are to be inspected & corrected. Therefore, inspectors services are procured to ships to detect contamination in the sources, preparation and processing of food, as well as in the service of food at restaurants and in mess rooms. Inspectors check whether standards of food items are as per Codex Alimentarius Commission (CAC) 1995; 1997a, b; 1999; 2003) & ILO, Maritime Labour Convention 2006 Regulation 3.2, Food and catering, paragraph 2 which regulates ship owners to store adequate, varied and nutritious meals prepared and served in clean environments with suitably trained catering staffs & the duration and nature of the voyage as per article 5 of ILO Convention 1946 No. 68. **Non-food Stores** Non-food stores subject to inspection at appropriate intervals as per Safety and Health Convention 1981 Article 7 include cleaning equipment, chemicals and other non-food equipment or supplies. Hygienic stores which are appropriately labeled as per ILO No. 155, limit the potential for dirtying clean supplies by not attracting breeding of pests. Thus, inspection is made against such compliance proofs. **Hazard Analysis Critical Control Point system (HACCP)** In the process of providing safe food to the needy the FSP based on the HACCP system is to be implemented by ship owners & whether the system is properly functioning is inspected by qualified inspectors (WHO, 2011). **Medical facilities** ILO & Maritime Labour Convention 2006 Regulation 4.1 & ILO, IMO, WHO, International medical guide for ships, 3rd edition, 2008 (IMGS). The former states that ship owners should equip Medical care items (medicine chest, medical equipment and a medical guide) on board ship and ashore & the latter is noted as a source of information in the non-statutory part of the Maritime Labour Convention 2006 to serve as a medical text for the prevention, diagnosis, treatment and epidemic control of communicable diseases, & as guidance on disinfection and removal of insects. Medical facilities are important for the onboard observation and control of disease & so stocked to give first aid relief services along with treatment guide. If such medicines are not kept properly they may cause harm to seafarers' health. Thus, inspection is to be made to the stocked medicine to check whether they are in safe condition (WHO, 2011). **Swimming pools and spas** Swimming pools serve all crew members, & in the swimming pool a variety of infectious agents

(viruses, bacteria and protozoa) may be associated with the water. These communicable agents affect the skin, ears, eyes, and respiratory tract etc. of crew members. Thus, inspection is to be made whether the swimming pool is free from such contagious agents (WHO, 2011). **Solid and medical waste:** Ships go lengthy trade route so it is inevitable that large amounts of waste are produced on board. The treatment of wastes from ships should be as per MARPOL Annexes I (oily & other damage elements), IV (sewage from black water that is animal, human urine & waste; sewage from grey water, waste from laundry, shower & dish wash) and V (all wastes from ships including sewage & grey water). The international definition of garbage is all kinds of food, domestic and operational waste, excluding fresh fish and parts of fish, generated during normal operation of the ship, as defined in Annex V of the IMO International Convention for the Prevention of Pollution from Ships (MARPOL 73/78). Thus, inspection made here is to effectively discharge these wastes in to the required place as per MARPOL 73/78 convention for waste disposal. **Engine room:** The engine room and nearby compartments can contain hazardous microbial, chemical and physical agents due to unregulated construction of ship engine. Thus construction lay out of engine to ballast water, oil–water separators, cooling water, boiler and steam generator blow down, industrial wastewater, and hazardous waste transmission structure is inspected. The inspection result should come up with IMO, Guidelines for engine room layout, design and arrangement (MSC 68/ 834) IMO, and MARPOL 73/78 annex VI which sets limits on releases of nitrogen oxides (NO_x) from diesel engines. **Potable water:** Clean drinking-water is referred in the WHO Guidelines for drinking-water quality (GDWQ), Vol. 1, 3rd ed. Geneva: WHO. ILO, Accommodation of Crews (Supplementary Provisions) Convention 1970 (No. 133) states permanent access to cold potable water, showers of hot & cold to crew on board. Thus, every ship owner is obliged by regulation to enable check by certified inspectors whether such provisions are as per ILO regulation. **Other systems and areas:** The other systems and areas that present health concerns because of on board vectors such as mosquitoes, rats, mice, cockroaches, flies, lice and rat fleas are to be inspected by qualified inspectors to keep health & safety of crew as well as smooth marine fleet operation (WHO, 2011). The inspection of such is made at port of entries by employing quarantine disinfection services (retrieved from internet, 7 June 2020)

2.8.7-FUEL & Bunkering

The term fuel is used having fuel for ships engine whereas bunkering is when a ship carries fuel to pour to other ships (retrieved from internet). There are different types of marine fuels: such as **Residual oil** (the heaviest fraction of the distillation of crude oil, with high viscosity, high concentration of pollutants & darker combustion smoke than other fuels; **IFO 180** intermediate fuel oil which is a mix of 98% residual oil & 2% distillate oil; **IFO 380** intermediate fuel oil which is a mix of 88% residual oil & 12% of distillate oil; **MDO** (marine diesel oil) it mainly consists of distilled oil with lower sulphur content as compared to the above three; & **MGO** (marine gas oil) which is purely distillate oil with lowest sulphur content (retrieved from internet).

In shipping industries one of the services with high cost is fuel or bunkering. Many operational strategies in cargo operating shipping service have focused on reducing fuel costs (Christiansen, Fagerholt, Nygreen, & Ronen, 2013). On the other hand, shipping companies are concerned with sailing speed as an important decision variable affecting fuel consumption. As in Yao et al., bunker fuel management strategy is studied for a single shipping liner service which includes bunkering port selection (where to bunker), bunkering amounts and ship speed adjustment (2012). Even though, sailing speed is an important decision variable, the greenhouse gas emission as a result is subject to regulations (SOLAS Chapter X – Safety measures for high-speed craft: safety code for the high-speed craft (retrieved from internet). According to European Environmental Agency the impacts of transport on human health, the environment and climate change are closely linked to the choice of fuel & thus, using clean alternative fuels, including electricity, are already available to constitute viable options to petrol and diesel (2018).

2.8.8-Dry docking services

To ships & boats safety it is a usual practice to have dry docking procedure for ship inspection, repair & maintenance & the inspection & maintenance activity is done by exposing vessels to dry land (<https://www.shmgroup.com/blog/dry-docking-procedure-scope-and-advantages>). Before dry docking services are procured dry dock surveys are to be conducted by qualified inspectors. Extensive inspections of such annual surveys on functional, operational aspects and maintenance

routines of shipboard equipment are verified (SOLAS Regulation). After such verifications are made dry –docking services are to be made to ships as per Safety of life at sea (SOLAS) code of regulation. The regulation to commercial ships enforces dry docking maintenance service to be done as mandatory surveys every 2.5 years (Eruguz et al. 2017) leaving intermediate maintenance surveys with the owner.

Dry docking service supply in shipping is very exhausting operation which requires a huge amount of expense & loss of considerable amount of revenue. Ships should have power to move in the required speed during marine fleet operation. The considerable power that lets ships move smoothly is to overwhelm the frictional resistance between the hull & water. A dry docking service supplied to ships enables to maintain their frictional resistance from 70% up to 90% for low speed ships; & up to 40% for high speed ships (Molland F., 2011). Dry docking service supply to ships also has benefits to the industry by reducing fuel consumption, operating costs, green house emission, & eradicating undesirable species from the hull (Townsin et al. 1981; Swain et al. 2007, 2010; Schultz et al. 2011).

2.8.9-Quarantine Inspection Service

Quarantine, stipulated in the Quarantine Act 1946 & revised 1989 under Maritime Regulation, have been made to be in force from 10 May 1946 by the Quarantine Authority at ships port of entry. The practice of quarantine began during the 14th century in an effort to protect coastal cities from plague epidemics. Ships arriving in Venice from infected ports were required to sit at anchor for 40 days before landing. This practice, called quarantine, was derived from the Italian words *quaranta giorni* which mean 40 days (historyquarantine.html/CDC quarantine & Isolation, Accessed 15 December 2019). The inspection made to control infectious diseases if any before entering new boarders at different ports dated back to fourteenth century. The institution organized to respond to plague epidemic started during 1347-1352 (Mafart B.Perrret JL., 1998). The cause for the spread of the plague was sailors, rats & due to cargo arriving in Sicily from the eastern Mediteranean (Mafart B.Perrret JL., 1998; Cohen D., 1974). The spread of the plague disseminated to Italian states like Flourence, Venice, & Genoa (McNeill W., 1998). The disease then moved from Italian ports to ports of France & Spain (Bowsky WM., 1964) crossing the Alps affected Austria & central Europe. The plague then halted towards the end of the fourteenth

century but not disappeared thus, the next 350 years was known for the outbreaks of pneumonic diseases in various cities (McNeill W., 1998). In such situations medicine injected against the plague cannot cure (McNeill W., 1998). Thus, the only measure taken to escape infectious plague was to avoid contact with infected persons & contaminated objects. Therefore, merchant strangers were prohibited from entering cities by city states (Ziegler P. and Platt C. 2nd ed 1998). Hygienic measures were taken by firm actions of authorities including prompt mobilization of repressive police forces & separation between healthy & infected through the use of makeshift campus was initially accomplished (Ziegler P. and Platt C. 2nd ed 1998). The first time when quarantine was introduced dated back to 1377 in Dubrovnik on Croatia's Dalmatian Coast (Grmek MD. And Buchet C., 1997) with the first permanent plague hospital lazaretto which was opened by the Republic of Venice in 1423. The time to wait for inspection counts forty days as it was believed to dissipating the pestilential miasma from bodies & goods through system of isolation. From that moment onwards, the system of Isolation was improved Grmek MD., 1980; Porter R., 1999; Cipolla CM., 1981). During the first half of the 20th century the U.S. Public Health Service (PHS) maintained more than 110 quarantine stations (QSs) at international ports of entry throughout the United States in major land border ports. The mission of these stations was to prevent the introduction of seven "quarantinable" infectious diseases (cholera, diphtheria, infectious tuberculosis [TB], plague, smallpox, yellow fever, and viral hemorrhagic fever) into the U.S. (authorized by Title 42 U.S. Code Section 264 (Section 361 of the PHS Act). The Department of Health and Human Services (DHHS) Secretary is responsible for preventing the introduction, transmission, and spread of communicable diseases from foreign countries into the U.S. (state regulations found at 42 CFR Parts 70 and 71 delegate authority to the Centers for Disease Control and Prevention (CDC) to detain, medically examine, isolate, quarantine Institute of Medicines (2005). It was in connection with the Levantine trade & with the intent to reduce the spread of disease bills of health details of the sanitary status of ship from port of origin is a must (Porter R., 1999).

2.8.10-Nautical Charts & publications

The concept of Charts & publications is old. Literatures tell the history that Shipping routes along the coast of the Russian Arctic were recognized progressively during the migration of the local population living in this region. That is the 1648 Semyon Dezhnev discovery to move from

Europe to the Far East. It is a mandatory component for cargo carrying ships to have official nautical charts & publications in order to secure safe navigation. The importance of having official nautical charts & publications is stated in the SOLAS Convention as a requirement for cargo carrying ships for the intended voyage. This carriage requirement may be satisfied fully or partly by two electronic means such as Electronic Navigational Charts (ENC) & Raster Navigational Charts (RNC). The IMO requirements for the carriage of nautical charts are neatly detailed in SOLAS chapter V. Regulation 2, of SOLAS defines the nautical chart, SOLAS Regulation 191, specifies the equipment to be carried in different types of ships, SOLAS Regulation 27 stipulates the requirement to keep charts and publications up-to-date. The official nautical charts serve ships as specifically designed maps to meet the requirements marine navigation showing depths, nature of bottom, elevations, configurations & characteristics of coast, dangers & aids to navigation (Facts about charts & publication requirements, 2004).

2.8.11-Paints & Chemicals

In shipping companies paints & chemicals are used to serve many purposes. Out of the purposes hull painting to protect from corrosion is the one. It is known that unwanted organisms attached to the ship's hull are introduced to the new environment due to hull cleaning (IMO, 2018). The introduced species then survive, reproduce and become invasive species exposing the ocean and biological conservation to menace. As the volume of cargo carrying ships & sea born trade increases, it is enviable that the same increase in volume of invasive species moved by ship's hulls is expected. These invasive species which have been recognized for several decades are identified to cause a significant risk to ecological system, which also endangers human health. Moreover, it causes destructive consequences to the tourism industry & causing degradation to marine environment which in turn has risk to the survival of fisheries.

The prospective of introducing invasive species to a new environment by bio fouling from the ship's hull is recognized by other international organizations, such as Convention on Biological Diversity (CBD), Protection of the Mediterranean Sea against Pollution, the Asia Pacific Economic Cooperation forum (APEC) and the Secretariat of the Pacific Region Environment Programme (SPREP). This situation initiates IMO to adopt an international convention on anti-fouling systems called AFS 2001, convention that addresses anti-fouling systems on ships. The system was designed to pose a mandatory international command to control the use of harmful

substances (chemicals & paintings of such) anti-fouling coat components, to stop the effects of hazards impacts on the marine ecosystem. Thus, both invasion of species & harmful chemicals used are under regulations to keep safe water & eco system. The, IMO in 2007 authorized the MEPC to control the transfer of invasive species from biofouling. And After the IMO AFS Convention came into force in 2008 chemical painting industries change their production to non hazardous chemical paintings. Moreover, IMO 2017 came as a project “GloFouling Partnerships”, which targets developing countries to implement bio fouling guidelines and safeguard the marine ecosystem.

2.8.12-Ballast water discharge & Fresh water Services

Ballast water discharge service: The risks in connection with invasive aquatic organisms have been proposed to be reduced by U.S. and international rules. This requires ballast water from ships must be treated to kill or remove living organisms to meet standards before being discharged. Enforcing these rules requires verifying when a discharge violates these standards (retrieved from internet).

It is clearly stipulated in the "International Convention for the Control and Management of Ships' Ballast Water and Sediments" by The International Maritime Organization (IMO) international legislation, to regulate discharges of ballast water and reduce the risk of introducing nonnative species from ships' ballast water. In addition, as per the regulation D-2 of the convention it is required to manage ballast water discharge by not introducing nonnative species to sea water using technologies that can manage this situation. Thus the Maritime Regulations guides every shipping company to note and act as per IMO legislation with regard to the issue of ballast water discharge.

Fresh water: The procurement of fresh water stems Maritime law. The law in Fresh water procurement & supply is included in Maritime Labor Convention, 2006: along with Food and Catering: Provision of Food and Fresh Water Notice to all ship owners, masters, all seafarers and other shipboard personnel. The notice should be read in combination with Part 8 of the Merchant Shipping (Maritime Labor Convention)(Minimum Requirements for Seafarers etc.) Regulations 2014 ("the MLC Minimum Requirements Regulations") and with Merchant Shipping Notification

MSN 1846 (M) Maritime Labor Convention, 2006: Food and Catering: Ship's Cooks; Merchant Shipping Notice MSN 1844 (M) Maritime Labor Convention, 2006: Crew Accommodation: Marine Guidance Note MGN 481(M) Maritime Labor Convention, 2006: Crew Accommodation.

Fresh Water on board ships is used for a variety of purposes. From domestic uses such as drinking (potable water or safe water) and washing to ship operation purposes such as machinery cooling and cleaning, fresh water is of utmost importance on board ships. Fresh water in ship serves more purpose than the radiator coolant in vehicles does. As in the definition, Fresh or salt water is defined as any solid or liquid, held in tanks and cargo holds of ships to increase stability and maneuverability during transit (NRC 1996). In olden times ships carried rocks, sand or other heavy materials as solid ballast to be dumped on to ballast grounds serving as vector for plants & invertebrates (Mills et al., 1993) with the limit of ballast discharge as per the International Convention for the control & management of ships' ballast water & sediments (IMO 2004). Contemporary studies revealed that ballast or fresh water exchange is an advantage to effectively replace coastal port waters with 97-99% efficiency for bulk carriers & tankers (Ruiz & Raid, 2007). Ballast water also serves variety of purposes on board a ship like drinking, cleaning & cooling machineries which increases its importance. In addition, it is impossible to have sufficient fresh water using freshwater generators inside the ship. Thus, the procurement of fresh water to shipping industries is important to fit such purposes.

2.9-Factors affecting procurement & handling of ship husbandry supplies

Non-compliance with maritime laws & local procurement procedures

Out of the factors which affect procurement performance with laws & procurement procedure is the one. The international rules such as IMO ILO, ISM etc. are designed as a rule to govern ship operation engaged in international sea trade. Even though these are there to be obeyed by ship owners, there are ships which operate below standard hull, machinery, equipment etc. (IMO Resolution A 787 (19). Ship owners should be held responsible for ensuring that their ships to comply with the international rules that govern substandard ships not to be certified seaworthy (ONeil, 2000). To avoid accidents occurred by substandard ships IMO regulations should be complied (George S., 2000).

Ensuring quality of items & services procured

The importance of ensuring quality of goods & services is reported by different scholars (Quality management research of Deming (1986), Juran (1988), and Crosby (1979). From this research, a greater emphasis was placed on continuous process improvement and increasing the capability of organizational processes. Organizations should strive in enabling them to produce high-quality goods and services in a faster, cheaper, and better way than their competitors by using their competence that leads them towards competitiveness (Ulrich, Nason, & Von Glinow, 1999). Quality can also be assured through ship Inspection & Audit. Ensuring quality of items & services is proved during inspection & audit which is made to check whether quarter deck items such as food, drinks, & nonfood items such as medical facilities, solid & medical waste, ballast water, engine room etc. items are in line with the Maritime Labor Convention 2006, Convention for the Prevention of Pollution from Ships 1973/78(MARPOL 73/78), SOLAS Regulations & IMO International Safety Management System. Ethiopian Shipping & logistics Services Enterprise assures quality of items & services procured through inspection & audit service to the required areas from selected & certified inspectors to enable its ships keep in the required standard. Ensuring quality of procured FUEL & Bunkering helps ship owners to comply with MARPOL 73/78. The trend in fuel service quality assurance is to be in line with MARPOL regulation 73/78 which commands ship owners to procure sulphur free fuels for ships' use. **Ensuring quality of dry docking services** as per Safety of life at sea (SOLAS) code of regulation is mandatory. As per SOLAS regulation it is mandatory to do dry docking maintenance service two times per five years by selected service providers as per maintenance specification. Quality assurance: quality is assured through compliance check of nonstandard ships to have standard hull, cleaned, well stored ships, standard equipment one way or the other proofs standard procurement which is cleaned corrupted practices (George S. 2000). As per IMO Resolution A787 (19) the ship owners are responsible to equip their ship with standard quality items & services.

Adequate transparency & accountability

The procurement process is to be empty of any malpractices and unites equal opportunity to interested parties seeking to take part in provision of materials to the organization as per principle of nondiscrimination (public procurement proclamation 649/2009). An important aspect that

ensures nondiscrimination is adopting transparency and accountability practices as described by various researchers such as Kaspar & Puddenphatt 2012; Leitch & Leitch, 2017; and Biela(2014). Balsevich, Pivovarova & Podkolzina (2011) while studying information transparency through a comparative literature and rating, transparency is the timely and easily understood access to information. Kaspar & Puddenphatt (2012) again put that transparency is the visibility and accessibility of information in public procurement performance that is timely, stating price for a specified procurement characteristics of the goods, works and services that are acquired, and on the results of the procurement processes i.e. bids, prices, tender contracts among others. active access to information; hence can be regarded as the open gain to information in all procurement matters. According to Biela(2014), accountability is defined as the obligatory nature of individual or supply chain organizations to succinctly explain its activities, be liable for its responsibility and divulge the results in an open way. It is the responsibility of business organizations to explain their actions and roles in procurement processes to their shareholders. It can thus be explained that transparency and accountability are more inclined to the open sharing of information as well as the responsibility nature of pra Transparency & Accountability is essential to achieve set goals. According to De Bievre, 1999, quality performance is the result of combined factors which requires collective efforts to ensure consistency & willingness to undertake to do things open. Transparency & accountability is the source of quality information management, shipping performance & interaction from the many parts involved (Card, 1999).

Adequate awareness in procurement market

The global awareness on sustainability (Bryde, 2011) rising pressures and expectations lead to more efficient and value-added deliveries of products and services for their established needs (Grönroos, 2006; Walker & Brammer, 2011; Bryde & Meehan, 2010). All bodies, whether district, region or national, all stakeholders from employees and shareholders to taxpayers, need quality and effective procurement processes and system which can be sustainable (Kalubanga, 2012). Organizations adopting sound programs and policies of sustainable policies will achieve greater steps in achieving sustainable procurement (Alliance for Development, 2014).

Just in time procurement & lean management goes together with total quality management. The concepts of JIT and total quality management (TQM) have evolved into the lean and six sigma management paradigms (Bhasin & Burcher, 2006). The lean paradigm is built on the techniques and methodologies its JIT and TQM indications. This is mainly true for procurement and sourcing functions where JIT procurement or lean procurement is the dominant methodology.

Reliable procurement & risk management

Efficient risk identification is seen in agency theory which extends organizational thinking by pushing the consequences of outcome uncertainty to their implications for creating risk. The implication is that outcome uncertainty coupled with differences in willingness to accept risk should influence contracts between principal and agent (Whittington, 2012 and Jensen & Meckling 1976) In the procurement processes, ex ante risk identification tolerates for risks to be tapered up front and thus managed efficiently by the most able party (Shrestha et al 2013). The theory thus also gives prominence to risk allocation and monitoring. Agency theory provides lenses to explore and understand the five landscapes on which procurement risks occur: external dependencies (supply chain robustness, supplier viability); market conditions and behaviors (competitive or not; supply availability); procurement process; management panels; and the ability and quickness to handle unforeseen event (Russil, 2010); and therein provides a basis on which to develop risk management strategies.

Furthermore, these theoretical literatures provide some guidelines for the preparation of a good specification, for instance, procurement requirements should be unambiguous, solution-independent formulation, clearly linked to internal user and customer needs, measurable in qualitative or quantitative bases).

Reliable procurement starts from clear specification & then followed by uninterrupted delivery to customer. Hugo and Baden horst-Weiss (2017) acknowledge the benefit of having a comprehensive specification at the start of the procurement process.

2.10-Empirical Literature Review

Empirical studies are reported in the area of procurement practices of various government & non-government organizations. Many researchers have reported about procurement & supply

management activities in government & private organizations to respond to specific objectives of the study. Even though a lot of contributions are made by different scholars towards enhancing its status in business & academic environments the contribution can be considered partial and so makes procurement a not fully mature discipline (Murray, 2009; Spina, Caniato, Luzzini, & Ronchi, 2013). The activities in the procurement of supplies (items & services) to ships & the responsible departments is found stated in the book of U.S. Bureau of Naval Personnel (1962) detailing the responsibility of requisitioning, receipt, custody, & issuance of materials among the heads of deck, engine & steward departments leaving the remaining supply function to shore offices of Military Sea Transportation Service. Immediately after, this trend of procurement becomes outdated by reporting the need requirement up to 60 days stock to the shore Military Sea Transport Service. The requirement of the three months stock need is initiated & determined by first officer, chief engineer & chief steward (U.S. Bureau of Naval Personnel, 1962). According to U.S. Bureau of Naval Personnel, 1962 the screening process keeps the types & quantities of materials in allowances & equips the ship with technical aid leaving coordination, follow up & delivery activities of all requisitions to shore supply office.

As it is highlighted in the history of supply ship, supplying items & services is a long history however no scholarly research is conducted so far to aware readers about the procurement & supply of such except in the U.S. Bureau of Naval Personnel (1962). In fact there are individual reports emphasized by scholarly researchers in various subjects: such as the procurement of food on board liner ships (journal of shipping by Tsz Leung Yip, 2017), the concept of quarantine service 2004, dry docking services, ballast water discharges & pollution, fresh water, fuel, spare parts, etc. are reported so far but nothing resembles the topic of the study. The comprehensive review of the academic literature in procurement & supply management theoretical foundations and contents (e.g., Zheng et al., 2007; Wynstra, 2010; Spina, Caniato, Luzzini, & Ronchi, 2013; 2015); understate where & supply management currently stands (e.g., Ellram & Carr, 1994; Spina et al., 2013). Thus, the one I found understated is this new area of research “ship husbandry supplies procurement & handling practices. In the so far empirical review little researches are reported in the subject “Evaluating Procurement and Handling Practices of Ship Husbandry Supplies”. Even if the subject under study holds broad concept, it is found untouched in the so far research reports. Therefore, the imperative to conduct this research

is to fill this literature gap. It is conducted to highlight some ship husbandry items & services procurement practices of Ethiopian Shipping & Logistics Services Enterprise with special procurement practices therein.

Ship husbandry Supplies procurement: the word “ship husbandry supplies” is known in early World War I & II when American fighting navies are being supplied by landing small ships & landing crafts infantry armaments, soldiers, food clothing, and other maintenance services to fighting ships (History of USS Naval Fighting Ships, 1977-1991). The practice of ship husbandry supplies are said to be acceptable if they meet the Regulations stated in IMO, ILO, ISM, SOLAS and other maritime regulations as well as the seaworthiness .

Ship husbandry inventory handling

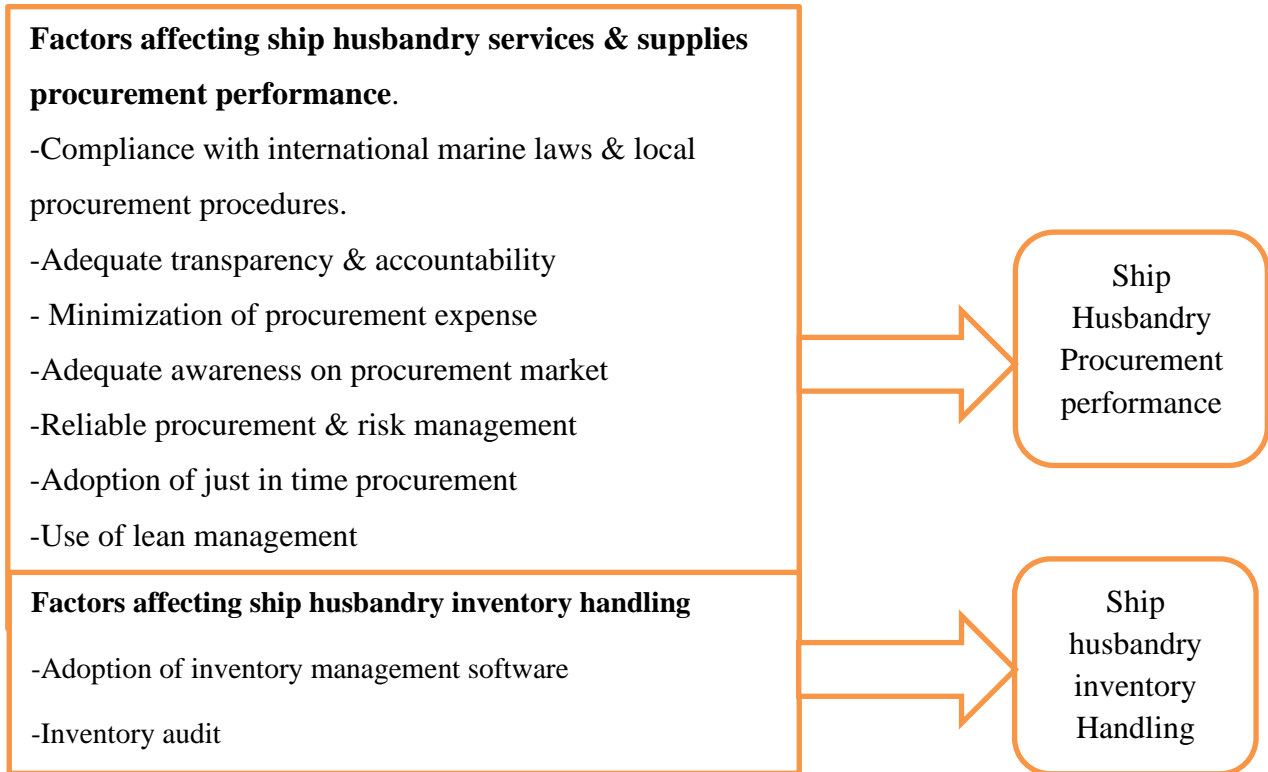
In the late 1959 there was no acceptable method for handling the inventories rather organizations’ inventory system was traditionally decorated after order points which might open door to misapplication of inventory handling (Jalel B. & et al, 2013). In any industry or organizations the concept of inventory handling is same that is to keep inventories for efficient consumption (retrieved from internet).The handling or management of inventories with in ships store which are provided for crew & ship operation purpose for a given voyage requires safe handling as stipulated in IMO, ILO, SOLAS, ISM, & MARPOL 73/78 regulations. The acceptable practices are proved if they are properly handled as per the detailed regulations in the above sentence as well as companies stock handling procedures.

2.11-Conceptual framework

In this research study the writer is intending to show the local procurement laws & regulations, as well as international marine rules with regard to ship husbandry procurement & handling supplies. The study will also investigate the procedural practices & the special facilitation activities of the agent in ship husbandry procurement practices. In addition the technology that the enterprise practices with regard to procurement & handling practices of ship husbandry supplies if any will be assessed. Finally the researcher will try to identify the enterprise performance as compared to procurement key performance indicator set & approved by the concerned office of the enterprise & failures if any.

Independent Variables

Dependent Variables



(Source George S. 2000, Jonathan N. et al, 2019)

CHAPTER THREE

Methods of the study

3.1-Introduction:

In any research study it is important to clearly specify all the methods & techniques used to conduct the research. These are the research type that is used in the study whether descriptive, explanatory or exploratory; the methods of data collection, like survey or experimental. The data analysis techniques quantitative, qualitative or mixed; data sources & types: primary, secondary or tertiary; & data collection procedures such as interview, questionnaire or observation. These will be useful guides to readers on the type of research that the writer is going to synthesize.

3.2-Research Methodology

The study adopted both qualitative & quantitative research method. The researcher followed a descriptive inquiry research design to indicate what characteristics do the factors have in affecting ship husbandry procurement & handling practices. The design was used to describe: 1. the characteristics of the independent variables (high level of compliance with local & international procurement & handling regulations, adequate transparency & accountability, minimization of procurement expenditure, ensuring quality of procured goods & services, adoption of just in time procurement, use of lean management, adequate awareness in procurement markets, procurement contract administration) against the performance of ship husbandry items & services supply; 2. To describe the characteristics of the independent variables (adoption of best inventory management software & inventory audit) against ship husbandry inventory handling performance.

3.3-Target Population & Sampling Technique

The target population for the study encompasses technical & supply division staff including higher officers from crew members and selected audit service staffs that have direct involvement in the audit of ship husbandry supplies procurement performance & ship spare parts inventory handling in ESLSE vessels. In this work non probability sampling technique is used by the writer's judgment as to who are to fit the purpose. Thus, all supply & technical division staffs under shipping sector along with crew officers not assigned on board, targeted audit service senior

auditors who annually involve, in auditing the two divisions performance with regard to ship husbandry supplies were the entire models who were pertinent to the process, function and decision making & auditing ship related procurement function in ESLSE. These were the entire group and target group of the study.

3.4-Sample Size Determination

According to Solvin's formula for finite population size, the margin of error denotes the allowed probability of committing an error in selecting a small representative of the population. Thus, sample size determination formula is estimated by the following formula.

$$n = N/1+Ne^2$$

Where

n = sample size

N = Population

e = Margin of error (5%)

$$n = 52/1+52(0.05)^2$$

$$n = 52/1+52(0.0025)$$

$$n = 52/1+0.13$$

$$n = 52/1.13$$

$$n = 46$$

3.5-Sources of Data & Data Collection Tools

The sources of data were primary collected by conducting interview to division managers, & senior auditors & through distributing questionnaires to respondents consisting of 46 employees of which only 38 respondents fill the questionnaires. In these study secondary sources like journal articles, books & dictionaries which are related to the subject are reviewed.

3.6-Method of Data Analysis & Presentation

The study employs descriptive data analysis. The analysis is done by Statistical Package for Social Sciences version 20 to show indicators. The reliability & consistency of the test to measure the indicative factors to procurement & handling of ship husbandry practices of ESLSE will be verified by Cronbach's Alpha.

3.7-Description of the study area:

The study area will be at head quarter of "Ethiopian Shipping and Logistics Services Enterprise" & is located in the heart of Addis Ababa, specifically called legehar.

3.8-Ethical Considerations: the study will be conducted by informed consent & voluntary participation of interviewees; with promises to keep confidentiality of their information support. In addition the study concentrates on relevant issues & with no anonymity & plagiarism.

CHAPTER IV

DATA PRESENTATION, ANALYSIS & DISCUSSION

4.1-Introduction

In this chapter the assessed practices of the procurement & handling results are discussed with the collected data in a manner to see the shortcomings & to support recommendations. The statistical results of the respondents are analyzed. That is each statistical result of demographic data is detailed & interpreted. The reliability of the constructs and their indication to the performance results of ship husbandry supplies procurement & handling performance is also analyzed & discussed. The interpretation of results & discussion is going to be thorough in a way that can give readers how the analysis is done aligning the research objectives towards providing viable reactions to raised research questions.

4.2-Reliability Analysis

In this study there are ten constructs which are indicators of ship husbandry supplies procurement & handling performance, eight of which to show their tendency in what way they can affect ship husbandry supplies procurement performance & the remaining two indicators to show their effect they have on the performance of ship husbandry inventory handling practices. The recorded results of the variables from a Cronbach's Alpha statistics show reliability above 0.7. This describes and assures the indicator variables are reliable to study & measure the topic under study. The reliability statistics for these ten pointers are presented in sum & in detail in the Tables below.

Reliability statistics in sum.

Cronbach's Alpha	Number of items
0.781	10

Reliability statistics in detail.

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
compliance wth inter.loc.proc law	31.24	13.159	.620	.741
adequate transparen. accountab.	31.13	13.523	.516	.754
minimization of procurement expendi.	31.24	12.942	.669	.735
ensure quality of procured goods & servi.	31.26	13.118	.513	.754
use of lean management	31.39	15.056	.226	.789
adoption of just in time procurement	31.42	14.521	.309	.780
adequate awareness on procure. Market	31.16	13.488	.607	.745
reliable procurement risk management	31.32	14.600	.343	.775
adoption of best inventory management soft ware	31.47	14.256	.371	.773
Best inventory audit	31.47	13.986	.367	.774

4.3-Demographic Information

The statistical result regarding gender shows 97.4% of the respondents were males while the remaining 2.6% was female. The statistics is shown in the table under.

Gender of the respondents

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid m	37	97.4	97.4	97.4
f	1	2.6	2.6	100.0
Total	38	100.0	100.0	

In this result male respondents’ account 37 in number & female respondent is only one. Thus male respondents dominate.

Age of the Respondents

In this study the respondents’ age is categorized in four interval group that is the three catagores in the table 3 under & 56 & above. Out of these categories 7.9% is between ages 18-30. Those who dominate are between ages 31-42 and counts 55.3%, 36.8% comprises between ages 43-55 & the last group counts 5.3%. The statistical detail is shown in the table under.

age of the respondents

	Frequency	Percent	Valid Percent	Cumulative Percent
18-30	3	7.9	7.9	7.9
31-42	21	55.3	55.3	63.2
43-55	12	31.6	31.6	94.7
56-60	2	5.3	5.3	100.0
Total	38	100.0	100.0	

In these result respondents between ages 31-42 dominate by 55.3%, the next dominating age of the respondents with 31.6% is between 43-55, the remaining two are groups of respondents

between 18-30 & 56-60 which are the least dominating with 7.9% & 5.3% respectively. All age groups are participated to make the statistical data credible.

Level of Education of the respondents

The level of education was also part of the questions in the questionnaire. And as shown in the research findings 60% of the respondents acquired university degrees, while 40% were master’s degree holders. This indicates the staffs are well educated to understand the questionnaire and so have provided credible results. The evidence is shown in the table below.

educational level					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	degree	27	71.1	71.1	71.1
	masters	11	28.9	28.9	100.0
	Total	38	100.0	100.0	

Job position of the respondents

In the questionnaire respondents were asked to indicate their status in the enterprise. The writer uses short words like “cff” for chief officer, “cfg” for chief engineer, “tcmr” for technical manager, “spmr” for supply manager; “cap” for captain, “si” for superintendent, “asg” for assistant engineer, “eg” for engineer, “spc” for supply coordinator, “tecof” for technical officer & “sau” for senior auditor to ease statistical analysis. The study focuses on top positions of technical division employees of head office as well as crew officers, since ship related items require technical understanding. The study findings revealed that 31.6% of the respondents from chief engineers, five positions (tcmr, spmr, cap, spc, & si) have shown 2.6% each, 21.1% from assistant engineers, 13.2% from engineers, 7.9% from senior auditors, 5.3% from chief officer & the remaining 7.9% from technical officers’ position of the population under study. The statistical evidence is shown in the table below.

Department/ Service	Job title	Frequency	Percent	Valid percent	Cumulative percent
Technical	tcmr	1	2.6	2.6	2.6

Department	si	1	2.6	2.6	5.3
	tecof	3	7.9	7.9	13.16
	cap	1	2.6	2.6	15.79
	cff	2	5.3	5.3	21.05
	cfg	12	31.6	31.6	52.63
	eg	5	13.2	13.2	65.79
	asg	8	21.1	21.1	86.84
	tcmr	1	2.6	2.6	89.47
	spc	1	2.6	2.6	92.10
Audit Service	sau	3	7.9	7.9	100
Total		38	100	100	

Most of the respondents are higher technical officers including captain. Thus the response obtained from such officers is more reliable to statistical analysis.

Descriptive Statistics of Indicators

Frequency							
Procurement Activities	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Mean	Standard deviation
Compliance with Intern. & Local procu. procedures		4	9	25		3.55	.686
Adequate transp. Accountability		3	9	24	2	3.66	.708
Minimization of expense		4	9	25		3.55	.686
Ensure quality of goods & services procured		6	7	24	1	3.53	.797
Adoption of JIT procurement		5	14	19		3.37	.714
Use of lean management		4	15	19		3.39	.679
Adequate awareness in procurement market		3	8	27		3.63	.633
Reliable procurement risk management		3	14	21		3.47	.647
Adoption of best inventory management software		5	16	17		3.32	.702
Best inventory audit		7	12	19		3.32	.775

Source own survey data, 2020

In the above table indicators of procurement & handling of ship husbandry supplies are detailed with the corresponding respondents' results. As it is seen in the above table compliance with international maritime laws & local procurement procedures is a positive indicator of ship husbandry supplies procurement performance with mean equals 3.55, adequate transparency &

accountability is an optimistic indicator of ship husbandry supplies procurement performance with mean equals 3.66, minimization of procurement expense is a positive indicator of ship husbandry supplies procurement performance with mean equals 3.55, ensuring quality of goods & services procured is a constructive indicator of ship husbandry supplies procurement performance with mean equals 3.53, adoption of just in time procurement is a positive indicator of ship husbandry supplies procurement performance with mean equals 3.37, use of lean management is a helpful indicator of ship husbandry supplies procurement performance with mean equals 3.39, adequate awareness in procurement market is an affirmative indicator of ship husbandry supplies procurement performance with mean equals 3.63, reliable procurement & risk management is a positive indicator of ship husbandry supplies procurement performance with mean equals 3.47. On the other hand, adoption of best inventory management software & best inventory audit are affirmative indicators of ship spare parts (ship husbandry inventory) handling performance with mean values equal to 3.32, each.

4.4-Results & Discussions

The study's 1st objective was to examine ship husbandry procurement & handling performance of ESLSE. In the examination the enterprises international laws & local procurement proclamations on which its procurement & handling practices based are examined. The items & the concerned team officers who participate in the job of need assessment & requirement planning of categorized items and services are also inspected. Sourcing & supplier selection in procuring categorized items & services & the individual activities in it are seen thoroughly.

Requirement planning & need assessment in ESLSE: Ethiopian Shipping & Logistics Services Enterprise procurement planning with regard to the procurement & handling of ship husbandry materials & services supplies are done to each item & services before the remaining procurement processes are in action. Inventories & services to be procured to make ship operational are more of technical, thus, such type of planning is performed by concerned technical division staff with the consent of each vessel command & higher administrators on board as per ILO regulations, SOLAS chapters, MARPOL 73/78 regulations, the requirements of port authority control, flag

administration, Insurance corporation, classification societies & other concerned bodies requirements. Thus, planning requirements stems from assessments of the following:

The life of ship, Maintenance records, Seasonal situations: That is there are four seasons which determine the requirement planning related to ship supply needs. The Quiet Season (January – March): this is the time freight volume is down. The weather is not shipping-friendly with low temperatures and snowed highways. The Season from April to July is the time volume of freight shipping is picking up. Carriers have more loads to choose. The Peak Shipping Season (August – October) is another busy season in the transportation industry. Overwhelming produce season is coming to an end. The last season is the Holiday Shopping Season (November – December): Christmas, New Year's. Shippers are hurrying to complete their last orders and get everything in or out before holiday closures.

Frequency & length of trade routes & other things will be taken in to consideration. The plan will be revised before it gets final approval for continuing annual budget preparation (ESLSE procurement procedure manual, 2016).

Sourcing & Supplier Selection in ESLSE: ESLSE collects information on suppliers using its agents abroad then applies bidding procedure & restricted tender for the selection of long term suppliers of the following items: Stores for deck, engine, catering & cabin, (Victuals, paint, chemical, Lubricant, Bunker, Charts, publications, medicines). It also use restricted tender for the selection of service providers of the following services: Communication services (if not direct from Inmarsat) agents, husbandry service providers, auditing services, inspection services, consultancy services & training services. It also keeps up to date information and contact details to its suppliers & service providers both short listed & not short listed suppliers & service providers to use them as a pool for any changes.

Selection of Ships' Maintenance and Repair Service Providers & Dry dock Yards in ESLSE
ESLSE select reliable repair firms & dry dock yards that enables the delivery of quality maintenance services & fits the size of ships. The selection of repair yards for dry docking service starts from gathering list of repair firms by technical division. The selection basis the repair firms specialization and category of repair type. The enterprise maintains different dry dock service

providers list from different ports using different sources such as through its agents & suppliers at different ports. The enterprise up-date list of repair yards in each trade route depending on their reliability and reputation. ESLSE shall identify and incorporate information on specialization, scope of shipyards & the port facility where the shipyards located. However, there is a procedure to be practiced before selecting repair service provider. That is the enterprise's consideration whether the repair can be done under its own on board team or not. ESLSE utilizes its own team on board, as much as practicable for repair and maintenance needs on board ESLSE ships by assigning its own repair squad/team at home port for maintenance and repair, which are within the scope and skill of own expertise for maintenances of ship engine, pumps, electrical wiring, communication systems, refrigerator equipment etc. . If the maintenance work is proofed beyond the capacity of its own crew technicians, ESLSE arrange shore maintenance and repair to be maintained by standard or certified maintenance service providers onboard.

ESLSE endeavors to have contracted service providers for repair and maintenance needs onboard ports where its vessels serve using restricted tender procedure. This is to easily select such contracted supplier when opportunity occurs to execute this advantage. There is another experience to divert from restricted tender selection of service providers that is the situation Where there is no contracted service provider. Thus, ESLSE uses single source/direct or RFQ method per port for selection of ship maintenance and service providers using agents. Prior to all above the enterprise specifically investigate and report major ship equipment, machinery, and hull damage incidents before deciding to be maintained by service provider that is done to claim from insurance if the case is so.

Selection of Ships' Equipment and Spare Parts Supplier in ESLSE

Ship spare parts take great portion in shipping industry & its importance to on board preventive maintenance is a great concern of all ship owners since it plays a pivotal role in smooth cargo fleet operation. Thus, ESLSE purchases and arrange direct delivery of spare parts for ships machinery or equipment from original manufacturers, their representatives or authorized dealers. In cases of emergency the enterprise purchases ship equipment direct or based on RFQ from firms having class certificates as per planned requirements & as per its procurement procedure manual aligning its safety management system.

Contract award & Contract administration in ESLSE: In procurement process Ethiopian Shipping & logistics Services Enterprise notify its winner suppliers as per bidding procedure of its procurement procedure manual to award contracts for a variety of products & service requirements in both public & private sectors. Ethiopian Shipping & Logistics Services Enterprise undergo Bidding process using procurement policy & procedure manual synthesized as per public EFDRE procurement law 649/2009 & aligning its international safety management system to award contract to winner suppliers. During transition period, which is the initial period between contract award and the start of contract implementation, ESLSE may involve a changeover from a previous contractor to a new contractor when forcing circumstances occur or to use cost effective its advantage from cost perspective. Contingent on the nature and circumstances of the contract, the transition may require planning. ESLSE settlement procedure for on credit purchases of ship husbandry supplies & services one of the activities in contract administration is to settle payment to suppliers. The enterprise when procuring ship husbandry materials & services from suppliers on credit bases, it promises to pay on terms & conditions stipulated in the contract of sales based on the terms & conditions pay its debt. Becomes & practices procurement using approved methods of procurement for a single time or long term supplies. Ethiopian Shipping & Logistics Services have suppliers who provide items & services on credit bases. The credit sales are made by signing binding contract which necessitates both parties to be abided by. Thus, the technical division when receiving invoices from creditors shall record in the respective log book by having the details, such as received date, invoice number, invoice date, invoice amount etc. The division, before submitting to finance & accounts department to effect payment, ensure whether supporting documents confirm to supplied items & services & signed & sealed by concerned department head on board & by master of the vessel.

There is a procedure to effect payment to suppliers & service providers through the agent abroad by electronic mail. In such conditions the agent's disbursement account submitted to technical division will be verified. There is also a situation where the supplies & services are provided by underwriters & so separate invoice & endorsement attached by salvage association surveyor is to be attached. After all such documents are thoroughly checked payments shall be authorized using

payment request authorization form. The technical division then updates the status to close the contract.

Advance Payment Practices The enterprise involve in purchase of ship husbandry supplies & services which requires advance payment in case when the supply or service is to be accomplished to help fleet operation. Then once the payment gets approval by delegated authority, technical department shall effect payment either through ESLSE finance & accounts department or through ESLSE agents abroad. All the remaining procedures with regard to supporting documents, insurance related documents, delegation of authority in payment authorization etc. are the same as the procedures followed in settlement of credit purchases. Sealed or electronically delivered restricted bid documents shall be submitted to pertinent committee members to be opened, verified & initialed.

Procurement of ship husbandry supplies practices to ESLSE ships

Victuals

In doing its ship husbandry procurement Ethiopian Shipping & Logistics Services bases its requirement planning which is compiled considering the additional crew to be employed. Sourcing & supplier selection is done using restricted tendering. The contract administration is made as per detailed above. The responsibility to initiate lies to chief steward, & the mandate to process is with the technical & supply division managers on shore (head office). The procurement process is same & as per the steps stated in this paper.

Spare Parts: Ethiopian Shipping & logistics Services Enterprise procures spare parts basing its annual requirement planning taking in to consideration all maintenance (on board, dry dock etc) requirements using direct procurement method from its selected suppliers. And there is trend spare parts procurement is activated by request for quotation method in case of urgent situation. The procurement is processed by technical & supply division managers at shore with the consent of vessel masters taking it to consideration prior inspection planning with additional expected maintenance need. The procedure for selecting service provider is restricted tendering.

Navigation aids procurement: Ethiopian Shipping & logistics Services Enterprise procures tools & equipment to navigation aid to control collision accidents caused by operational error including navigation as per the requirement in **SOLAS** Chapter V – Safety of navigation. The procurement is processed by technical & supply division managers at shore with the consent of vessel masters taking it to consideration prior planning with additional expected equipment & tools need. The procedure for selecting service provider is restricted tendering. The procurement process bases international laws & local procedures as it stated in the body of this paper.

Maritime communications (Vessel Communication Service): Ethiopian Shipping & logistics Services Enterprise procures communication services from selected service suppliers as per its procurement procedure manual & as per **SOLAS Chapter IV** which includes requirements of GMDSS (Global Maritime Distress & Safety System), SART Search and Rescue Transponder (**SART**) to keep safe operation of its ships. ESLSE as sea transport provider procures communication services from selected & certified suppliers by using restricted tendering method.

Ship Inspection & Audit

Procurement of inspection & audit is made to check whether quarter deck items including food, drinks, & nonfood (medical facilities, solid & medical waste, ballast water, engine room etc.) items are in line with the Maritime Labor Convention 2006, Convention for the Prevention of Pollution from Ships 1973 (modified by the protocol of 1978 relating thereto [MARPOL 73/78]), SOLAS Regulations & IMO International Safety Management System.

Ethiopian Shipping & logistics Services Enterprise procures inspection & audit service to the required areas from selected & certified inspectors to enable its ships keep in the required standard.

FUEL & Bunkering

Marine Fuels: The trend in fuel service procurement in the enterprise obeys MARPOL regulation 73/78 in addition to policies & procedures manuals synthesized as per procurement law 649/2009.

The procurement is made basing the requirement planning. The procurement of fuel focus on quality that is sample fuel type is taken to test the content of purity so as to procure sulphur free fuels for its ships' use.

Dry docking services:

Ethiopian Shipping & logistics Services Enterprise bases its requirement planning & procures dry docking as per Safety of life at sea (SOLAS) code of regulation scheduled maintenance from selected service providers as well as selected ship yards as per restricted tendering. Dry docking service procurement undergoes the usual procurement process.

Quarantine Inspection Service

Quarantine stipulated in the Quarantine Act 1946 under Maritime Regulation, have been made to be in force from 10 May 1946 by the Quarantine Authority at ships port of entry. Thus, Ethiopian Shipping & logistics Services Enterprise undergoes quarantine service procurement as per the enterprises manual & safety management system of International Maritime Organization basing quarantine act regulation as stated above. The procedure to procure such service bases the request from vessel master which is communicated again to technical division. The supply division then makes the necessary arrangements to enable delivery of service through either short listed agents or suppliers. The practice in procurement process is as usual.

Nautical Charts & publications

ESLSE procures nautical charts & publications service to its ships basing its procurement procedure manual in compliance with IMO SOLAS Convention as a requirement for cargo carrying ships for the intended voyage to keep charts and publications up-to-date. The detailed use of charts & publications are cleared in literature review. Therefore, Ethiopian Shipping & Logistics Services Enterprise procures charts & publications from certified suppliers as an aid to its ships navigation passing through the usual procurement process.

Paints & Chemicals: As in other shipping companies ESLSE practices paints & chemicals procurement for on board consumption. The enterprise, in addition to local procurement manual,

bases international legal frame work of Anti-Fouling System (AFS) convention 2001 & 2008 which forbids the use of harmful chemicals & paints in coating hulls of ships. MLC Regulation 4.3 health and safety protection and accident prevention is also another regulation to be considered in the procurement of paints & chemicals.

As a world sea transport provider, Ethiopian shipping & Logistics Services Enterprise uses chemicals & paints to clean hulls & other parts of its ships. The procurement of chemicals & paints are made from certified suppliers passing through the usual procurement process.

Ballast water discharge & Fresh water Services

Ballast water discharge service

ESLSE practices procurement of ballast water service basing its procurement procedure manual in compliance with "International Convention for the Control and Management of Ships' Ballast Water and Sediments" by The International Maritime Organization (IMO) international legislation.

The procurement about the required service is initiated by vessel masters; ESLSE procures ballast water discharge service from selected suppliers in a way not harming the environment & ecosystem that is in line with Marin Regulation 2014 in consideration with MARPOL 73/78. The procurement process is as usual.

Fresh water

The procurement of fresh water in the enterprise is accomplished basing its procurement procedure manual in compliance with Maritime Labor Convention, 2006, along with Food and Catering: Provision of Food and Fresh Water Notice to all ship-owners, masters, all seafarers and other shipboard personnel, for its ships on board consumption such as drinking (potable water or safe water) and washing to ship operation purposes such as machinery cooling and cleaning, to be held in tanks to increase stability and maneuverability during transit (NRC 1996). The need for fresh water requirement is raised from vessel masters & communicated to technical division for the next supply process. The procurement process & supply is made as per the technical & supply division procurement procedure manual.

The 2nd objective of the study was to assess the procurement of ship husbandry supplies in ESLSE. The procurement of most of the items & services are found in compliance with international maritime standards of laws & regulations. It is a customary practice to make scheduled audits by external & internal audit services in every organization to check whether the enforcing procedures are well complied or not. Likewise, in Ethiopian Shipping & Logistics Services Enterprise ship husbandry supplies procurement & handling performances are verified by external inspectors (international certified inspectors) & the enterprise's internal audit against set procedures of both International Maritime Organization (IMO), International Labour Organization (ILO) Conventions, Safety Of Life At Sea (SOLAS) Chapters with their detailed regulations including Safety Management System, Maritime Pollution prevention regulation 73/78 (MARPOL 73/78) & other supporting regulations. For this study purpose & considering the limitations that it is impossible to assure such situations from international inspectors, the writer choses to conduct interview to internal auditors. However, the dry docking services procurement that should be provided to ESLSE vessels as per standard dry dock service schedule of two times per five year period is found not exhaustively complied as per the response from supply division manager & senior auditor to forwarded interview questions. The other assessed procurement practice which is not well complied is contract administration. In accomplishing the task of paying to suppliers there is a gap identified & that is the problem of the enterprise in effecting payment on terms & conditions stipulated in buyer supplier contract. This problem again resulted in not meeting planned marine fleet operation due to supplier refusal to supply the required items on time. In addition, if supply is a must to continue cargo operation items of nonstandard quality will be procured to carry on vessel business as per information from senior auditor. All the detailed problems above are assessed the result of scarcity in foreign currency. As it is seen the effect is consequential to result in failure to comply with contract agreement, delay of ships & unexpected port expenses, nonstandard quality purchase which again is the result of unreliable supply.

The 3rd objective of the study was to assess ship husbandry inventory handling of spare parts with in Ethiopian Shipping & Logistics Services Enterprise's ships' deck stores. As it is said earlier, internal & external audits are conducted to assure compliance towards set goals. One of the audited items to check is stock handling procedure compliance. Even though the items of

audits are numerous in the enterprise internal auditors annual scope of audit is confined to spare parts inventory. The assessment of inventory handling practices is investigated to result in the following gaps:

-In the enterprise's ships' deck stores there is no proper shelving of the various spare parts to easily retrieve when needed.

-In the so far practices of on shore inventory handling there was no feasible software to continuously track & trace inventory status.

-No responsible crew is assigned to be held responsible for the day to day consumption of spare parts. The practice assessed & found is every crew is given additional assignment to hold & use his respective items when needed but with no control mechanism.

-The audit conducted by internal auditors is not all encompassing so that the auditing practice is assessed inefficient.

The 4rd objective was to identify factors affecting ship husbandry supplies procurement & handling practices of Ethiopian Shipping & Logistics Services Enterprise. In the results above whether the procurement & handling of ship husbandry supplies are complying with International Maritime Laws & regulations as well as the enterprises procurement procedures incompliance factor is investigated. In addition, there is another gap investigated in the management of contract administration which again confirms to failure to comply with settlement of debt procedure. The other consequential factor detected is procurement of substandard quality spare parts which happens due to due to delay in supply. That is failure to pay to supplier the response from technical & supply division managers in not exhaustively meeting scheduled dry docking maintenance service procurement, senior auditor assures that the scheduled maintenances with regard to dry docking services procurement does not comply with international maritime safety of life at sea regulations which states mandatory dry docking services for ship owners two times per five years period.

In addition, the statistical analysis in the reliability table at the beginning of chapter four shows the indicating factors (Compliance with International Laws & Local procurement Procedures, Adequate transparency & Accountability, Minimization of expense, Ensure quality of goods &

services procured, Adoption of JIT procurement, Use of lean management, Adequate awareness in procurement market & Reliable procurement risk management) are valid to describe ship husbandry procurement performance. Adoption of best inventory management software & best inventory audits are valid indicators that positively describe ship husbandry inventory (spare parts) handling performance.

In ensuring Quality of goods & services researchers respond differently but the end result of all is consistency in quality (Deming, 1986; Juran 1988; and Crosby, 1979). In this research, greater emphasis was placed on continuous process improvement and increasing the capability of organizational processes. Organizations should strive in enabling them to produce high-quality goods and services in a faster, cheaper, and better way than their competitors by using their competence that leads them towards competitiveness (Ulrich, Nason, & Von Glinow, 1999). Ensuring quality through ship Inspection & Audit: Ensuring quality of items & services is proved during inspection & audit which is made to check whether quarter deck items such as food, drinks, & nonfood items such as medical facilities, solid & medical waste, ballast water, engine room etc. items are in line with the Maritime Labor Convention 2006, Convention for the Prevention of Pollution from Ships 1973/78(MARPOL 73/78), SOLAS Regulations & IMO International Safety Management System. Ethiopian Shipping & logistics Services Enterprise assures quality of items & services procured through inspection & audit service to the required areas from selected & certified inspectors to enable its ships keep in the required standard. Ensuring quality of procured FUEL & Bunkering: The trend in fuel service quality assurance in the enterprise obeys MARPOL regulation 73/78 which commands ship owners to procure sulphur free fuels for ships' use. Ensuring quality of dry docking services: Ethiopian Shipping & logistics Services Enterprise ensures the quality of dry docking service as per Safety of life at sea (SOLAS) code of regulation scheduled maintenance from selected services & as per maintenance specification here under: providers as well as selected ship yards undergoing the usual procurement process.

Factors affecting procurement & handling of ship husbandry supplies in ESLSE

In this study the factors affecting the enterprise's ship husbandry supplies are detailed in the constructs. The eight indicator variables have effects in ship husbandry supplies procurement

performance. However, non-compliance with international marine laws & local procurement procedure has consequential effects to ship husbandry supplies procurement performance. That is seen in settlement of payment to supplier. This problem forces the enterprise not to effect payment on time thus suppliers will not be willing to provide the next supply to our ships at port calls. The problem again has consequential effects to the enterprise to incur unnecessary demerage & other port expenses which is extra expense. This is not the only problem, ships stay at port call will never wait until supplier responds to the enquiry of supply need, rather spare parts of not standard quality will be bought to enable ship to rush to move to usual operation. This in turn again affects quality purchase of spare parts, reliability of supply. Thus, as per the information from technical division manager, such a gap is an obstacle to the enterprise to maintain strong supplier relationship to obtain responsive supply as intended & to efficient cargo operation. This external problem makes the enterprise incur unnecessary cost by causing ESLSE ships stay at port call. Demerage, down time costs & other port expenses the enterprise incur unnecessarily makes procurement practices inefficient.

Inventory management in the enterprise's ships is practiced in a manner that does not much the enterprise's technical division inventory handling procedure manual. The enterprise has set procedure to record inventories on time, control day to day consumptions & stock outs follow up & yearly audit. However, the actual practice is not in line with the set procedure. The enterprise has no crew specifically assigned to manage of ship inventories day to day consumptions; rather each crew is assigned additional duty to hold his respective inventories for consumption without any assigned responsibility for the proper consumption of such items. Absence of software inventory management in the so far activities & poor inventory audit with practices which are not encompassing the various inventory items makes inventory handling operation inefficient. Even if ESLSE has synthesized procedures to efficiently manage spare parts inventories held in ships stores, the procedures are not being complied as per technical division manager & senior auditor. The witness for such non-compliance is assured in the yearly audit of spare parts at port of Djibouti where ESLSE ships berth. As per auditor information spare parts in ships stores are not properly shelved in a manner that can easily be retrieved when needed & so found melted & obsolete. In addition, additional purchase is made only because retrieving is difficult. These deviations from the set inventory performance have remained costly to the enterprise.

The open ended questions are another questions raised to respondents to further describe the independent variables. Only fifteen percent of the respondents give answers to open ended questions & the outcome is not that supporting to describe the study subject. Thus, the writer is obliged to exclude the results of open ended questions from statistical analysis.

CHAPTER V

SUMMARY OF FINDINGS CONCLUSION & RECOMMENDATIONS

5.1. Introduction

In this chapter the researcher describes to readers the major findings from chapter four in the form of summary; and based on the objectives of the study the author gives conclusive remarks. The writer then presents recommendations as an input to policy & procedural reforms made to change the situation in the existing practice towards narrowing investigated gaps & to researchers to elaborate the multi-dimensional subject further.

5.2. Summary of findings, Conclusions & Recommendations

Summary of findings & Conclusions

As it is stated in the study's 1st objective the enterprise's practices with regard to legal framework (International & local) are well identified. The enterprise's procurement practices in the three phases of procurement (need assessment & requirement planning, sourcing & supplier selection, contract award & contract administration) & the activities within are highlighted. The special activities of the agent in shipping industries with regard to ship husbandry supplies procurement practices are described. The responsible board officers in the requisition & the remaining procurement process handlers in onshore supply departments are also justified. The procurement practices of items & services stated in the scope are somehow highlighted. In addition the gaps that cause the research work to be in action are also investigated.

CONCLUSION

This paper analyzed the results of the so far ship husbandry procurement & handling practices of Ethiopian Shipping & Logistics Services Enterprises. The results of ship husbandry procurement & handling assessments revealed that the practices with regard to dry docking service is not in strict compliance with SOLAS regulation which stated scheduled dry docking service to ships safety twice per five year period. The other examined gap encountered is the inefficient handling of ship spare parts at deck stores. An analysis of these ship husbandry supplies procurement &

handling practices evaluation resulted in identified opportunities for improving the earlier loose procurement practices of periodic dry docking service. That is procuring on time dry docking service as per the schedule. The analysis also resulted in exhaustive implementation of stock control procedures of the enterprise as a means towards efficient handling & use of spare parts within ships' deck store. In addition the analysis indicates the gap in contract administration; & at the same time the effective contract administration as a means to improve ship husbandry procurement performance by avoiding the consequential negative effects.

Recommendations

The following are basic recommendations:

- 1- Exhaustive Compliance with international maritime laws & local procurement procedures since it contributes to the entire procurement & handling process of ship husbandry supplies to ESLSE.
- 2- Effective implementation of supplier contract administration.
- 3- The technical department is advised to endeavor to procure quality standard items & services even in urgent situation.
- 4- Even if there is foreign currency shortage, it is recommended that payment to supplier be effected as per terms & conditions in the contract so as to reduce the related unnecessary costs incurred due to delay in supply. In addition, allowing world private shipping companies to work together with the enterprise is an alternate, towards increasing the economic capacity of the enterprise to eliminate foreign currency problem.
- 5- It is worthwhile to have exhaustive inventory audit & accompanying inventory management software so as to exercise efficiency of ship husbandry inventory handling performance in ESLSE.

Future Research Direction

It is known that the study covers those items & services supplies provided to Ethiopian Shipping & Logistics Services Enterprise as stated in the scope of this study. The study only highlights the procurement & handling practices of these services & materials supplies which need further elaboration. In addition, the various services & supplies that are to be delivered for ESLSE ships

are not yet reported by research scholars. Therefore, I suggest further elaboration of the studied items of this paper as well as new research areas of the remaining items & services supplies.

Références Referencias

Aketch, J., & Karanja, P. (2013), Factors Influencing Procurement Performance in Constituency Development Fund (CDF): Case of CDF Use in Makadara Constituency. *International Journal of Social Science & Entrepreneurship*,

Appiah, B. (2010), Impact of Training on Employee Performance. In unpublished thesis submitted to the Department of Armstrong. *Inventory Control Can Help Reduce Waste. Supply Journal*, 9 (2).

Armstrong M. and Baron, (1995) *Job Evaluation Handbook*. London. Institute of Personnel Development.

Armstrong T., 1952, *The Northern Sea Route, Soviet exploitation of the North East Passage*.

Baily, P., Farmer, D., Jessop, D. & Jones, D. (2005), *Purchasing Principles and Management*, (9th Ed.). London: Prentice Hall.

Banda, E. (2009), *Politics and Economic Consequences*. (1st Ed). Washington D.C.: Center for Study of Responsive Law.

Basheka, B. C., & Mugabira, M. I. (2008), *Measuring Professionalism Variables and their Implication to Procurement Outcomes in Uganda*. The 3rd International Public Procurement Conference Proceedings.

Batenburg, R., & Versendaal, J. (2006), *Alignment Matters-Improving business functions using the procurement alignment framework*, Utrecht.

Berger, E. & Humphrey, N. (2007), *Simple Buying Methods*. (1st. Ed.), Nairobi: East Africa Education Publishers.

Brotherton JM et al. (2003). A large outbreak of influenza A and B on a cruise ship causing widespread morbidity. *Epidemiology and Infection*, 130:263–271.

Burt, N. D., Dobler, D. W., & Starling, S. L. (2004). *World Class Supply Management: The Key to Supply Chain Management* (7th ed.). New York: McGraw Hill.

Centers for Disease Control and Prevention (1999). *Preliminary guidelines for the prevention and control of influenza-like illness among passengers and crew members on cruise ships*. Atlanta, Centers for Disease Control and Prevention.

Charles G., 2007, “Who’s Who In The Arab World”, Publitec Publications, Lebanon.

Choy KL, Lee WB. (2002), on the development of a case based supplier management tool for multinational manufacturers. *Measuring Business Excellence* 2002; 6(1): pp.15–22, 2002

Cohen, L., Manion, L., & Morrison, K. (2000). *Research methods in education* (5th ed.). New York: Routledge. Chapter 10

Cramer EH, Gu DX, Durbin RE (2003). Diarrheal disease on cruise ships, 1990–2000: the impact of environmental health programs. *American Journal of Preventative Medicine*, 24:227–233.

Cramer EH et al. (2006). Epidemiology of gastroenteritis on cruise ships, 2001–2004. *American Journal of Preventative Medicine*, 30:252–257.

Crosby, P. B. (1979). *Quality is free*. New York: McGraw-Hill.

Dahl E (2004). Dealing with gastrointestinal illness on a cruise ship—Part 1: Description of sanitation measures. Part 2: An isolation study. *International Maritime Health*, 55:19–29.

Dale, K. (2010), *Measuring Service Quality*. (1st Ed.) London: Pitman Publication. Information Research 7(1) 234-245. © 2016 Global Journals Inc. (US) 42Global Journal of Management and Business Research Volume XVI Issue III Version I Year 2016 G

Deming, W. E. (1986). *Out of the crisis*. Cambridge, MA: MIT Center for Advanced Engineering.

Department of Defense (2007). USD (AT&L), AT&L human capital strategic plan, Version 3.0, Washington, DC: Author, 2007. Department of Defense Inspector General (2007). FY 2006 DoD Purchases Made Through the U.S. Department of Veterans Affairs. Washington D.C.: Author, D-2008-036. December.

Eriksson, P. E. Westerberg, M. (2011), Effects of cooperative procurement procedures on construction, project performance: A conceptual framework, *International Journal of project Management*, 29 (2011) 197–208.

Garrett, G. A. and Rendon, R. G. *Contract Management Organizational Assessment Tools* (McLean, Virginia: National Contract Management Association, 2005).

Giunipero, L., Handfield, R.B. and Eltantawy, R. (2006), Supply Managements Evolution: key skill sets for the supply manager of the future”, *International Journal of Operations and Production Management*, Vol.26,

Great Britain House of Commons, 1787,”*Journals of the House of Commons on Shipping Agent*”.

Great Britain House of Commons, 1803,”*Journals of the House of Commons on Shipping Agent*”. 18th ed.

Groenlund Scholten, M., Martin, A., Weinrich Thorlaksen, P., Oxfeldt Andresen, A, & Nielsen, J. (2003) A Tie-Coat Composition Comprising at Least Two Types of Functional Polysiloxane Compounds & a Method for Using the Same for Establishing a Coating on a Substrate, Patent EP1670866B1, Hempel A/S, (Retrieved from <https://patents.google.com/patent/EP1670866B1>)

Gudipati, C.S., Finlay, J.A., Callow, J.A., Callow, M.E. & Wooley, K.L. (2005) The antifouling & foul-release performance of hyperbranched fluoropolymer (HBFP) – poly (ethylene glycol) (PEG) composite coatings evaluated by adsorption of biomacromolecules & the green fouling algae *Ulva*, *Langmuir*, 21, 3044-3053, DOI: 10.1021/la048015o

GUNIO, 1996/2, *The Guide to Navigating Through the Northern Sea Route*, GUNIO Nr 4151W

Gunnarsson B., 2012, Arctic Shipping: What will Influence the Short to medium Term Scenarios, 5th Harsh Weather Summit 22-23.

Hadfield, M.G. (2011). Biofilms and marine invertebrate larvae: what bacteria produce that larvae use to choose settlement sites? *Annu Rev Mar Sci*, Vol 3,453–470. DOI:10.1146/annurev-marine-120709-142753

Hamilton, T., Green, G.E. & Williams, D.N. (1998) *Fouling Inhibition*. Patent EP 1042413 B1, Akzo Nobel Coatings International BV. Huggett, M.J., Nedved, B.T. and Hadfield, M.G. (2009).

Effects of initial surface wettability on biofilm formation and subsequent settlement of *Hydroides elegans*. *Biofouling*, Vol 25,387–399. DOI: 10.1080/08927010902823238 II

Hansson, N. (2015) The problem of marine growth and its solutions. Retrieved from <http://lup.lub.lu.se/luur/download?func=downloadFile&recordId=7584475&fileId=7584476>

Hines, T. (2006), *Supply Chain Strategies: customer-driven and customer focused*”, Butterworth-Heinemann

Hotterbeekx, J.M.H. 2013. Determining contract management professionalism within Rijkswaterstaat, Master thesis project, TUE. School of Industrial Engineering.

<https://www.shmgroup.com/blog/dry-docking-procedure-scope-and-advantages>.

IMO. (2018a). Anti-fouling Systems. Retrieved July 5, 2018 from <http://www.imo.org/en/OurWork/Environment/Anti-foulingSystems/Pages/Default.aspx>

IMO. (2018b). Focus on IMO Anti-Fouling Systems. Retrieved July 10, 2018 from <http://www.imo.org/en/ourwork/environment/anti-fouling-systems/documents/fouling2003.pdf>

Inglis, G., Floerl, O. & Woods, C. (2012) Scenarios of vessel biofouling risk and their management. MAF Technical Paper No: 2012/07. Ministry of Agriculture and Forestry, Wellington, New Zealand. 122 pp. [Available on-line from: <https://www.mpi.govt.nz/document-vault/4029>]

Intergovernmental Panel on Climate Changes, 2013, The final draft Report, dated 7 June 2013, of Working Group I contribution to the IPCC 5th Assessment Report “Climate Change 2013: The Physical Science Basis”, Working Group I – Twelfth Session, Stockholm, 23–25 September, 2216 pp.

James, U. V. (2004), *Public Policy and the African Environment: An Examination of the Theory and Practice of the Planning Process of the Continent* (A.K. ed). Ashgate, England.

Johannessen O.M., Alexandrov V.Yu., Frolov I.Ye., Sandven S., Pettersson L.H., Bobylev L.P., Kloster K., Smirnov V.G., Mironov E.U., Babich N., 2007, Remote sensing of sea ice in the Northern Sea Route: Studies and applications. Praxis Springer,

Jones, G. R. & George, J. M. (2009). “Contemporary Management”, (6th Ed.). New York: McGraw-Hill.

Juma, M. J. (2010), *Lead from where you are: Quarterly PPO Bulletin* (4)1. Nairobi: A publication of Non-Governmental Organizations Procurement Oversight Authority.

Junter, G.A., Coquet, L., Vilain, S. & Jouenne, T. (2002). Immobilized-cell physiology: current data and the potentialities of proteomics. *Enzyme and Microbial Technology*, Vol 31,201-212. Retrieved from <https://www.sciencedirect.com/sci>

Juran, J. M. (1988). *Juran on planning for quality*. New York MacMillan.

Kabaj, O. (2003). *The Challenge of African Development*. Oxford, UK: Oxford University Press.

Kim, M.K, K. K., Lopetcharat, K.K & M. A. Drake, (2013), Influence of packaging information on consumer liking of chocolate milk. *Journal of Dairy Science*, 96(8), 4843-4856,

Koo, B., Lee, Y.-S., Seo, M., Seok Choi, H., Leng Seah, G., Nam, T. & Nam, Y. S. (2017). Image Cytometric Analysis of Algal Spores for Evaluation of Antifouling Activities of Biocidal Agents. *Scientific Reports*, 7, 6908. <http://doi.org/10.1038/s41598-017-07362-x>

Kumar, R. & Markeset, T. 2007. Development of performance-based service strategies for the oil and gas industry, a case study. *Journal of Business & Industrial Marketing*, 22(4).

Lasswell, H. (1971). *A Pre-View of Policy Sciences*. New York: American Elsevier.

Leenders, R. M., & Fearon, E. H. (2002). *Purchasing and Supply Management*, (12th Ed.). Chicago: McGraw-Hill Companies.

Mangan, Lawani, and Butcher, (2008), *Global Logistics and Supply Chain Management*, John Wiley and Sons, New Jersey

Martin C. Smith (2004), *Modern Approach to Procurement Management*, Pearson Education Ltd, Harlow Essex

Michael A. Hitt, R. Duane Ireland and Robert E. Hoskisson, (2007), *strategy management*, 7th Edition, Thompson South Western.

Migai, J. (2010), *Development Partners and Governing Non-Governmental Organizations Procurement in Kenya*. (1st Ed.), Kenya: Macmillan Publishers.

Moncska, R. M., Handfield, R. B., Guinipero, L. C., & J. L. Patterson, (2010), 4th Ed. *Purchasing and Supply Chain management*. 26. Ombaka E. (2009), *Management of medicines procurement in Developing countries*.

Muijs, D. (2004). *Doing quantitative research in education with SPSS*. London: SAGE Publications. pp. 121-122

New South Wales, 1892, *Historical Records of New South Wales: pt.1. Cook, 1762-1780*, C. Potter, Government Printer University of Illinois at Urbana-Champaign, Vol. 1. No. 2. [Cambridge](#), 166 pp.

Nguyen, P. 2013. *Contract lifecycle management on the sell-side, a case study in upstream oil and gas industry*, Thesis, Lahit University of Applied Sciences.

Ombaka E. (2009), *Management of medicines procurement in Developing countries*. Accessed online at

Ouma Danis and Jennifer M. Kilonzo (2014), *Resource allocation planning: Impact on public Sector Procurement Performance in Kenya*; *International Journal of Business and Social Science* 5, 7(1). *Physical testing of Textile*, by B P Saville, 2000 Corporate Blvd, NW

Parsons, W. (1995). *Public Policy: An Introduction to the Theory and Practice of Policy Analysis*. Northampton, MA: Elgar. pp. 2-12.

Patel, V. (2006). *Contract management: The new competitive edge*. *Supply Chain Management Review*, April 1, 2006. Retrieved January 4, 2008, from <http://www.scmr.com/article/CA6329864.html>

Paul C, 2011, *The Epic Battle, Calamitous Loss & Historic Recovery of the USS Monitor*,

Peters, B. (2007). *American Public Policy: Promise and Performance* (7th ed.). Washington, DC: CQ Press. P5.

Peter, H. A (2012), *The Dynamics of Procurement Management, A Complexity Approach*. 1st Edition.

Porter, M.E. (1998), *Competitive advantage: Creating and sustaining superior performance*. New York: Free Press. Köehler Books 210 60th Street Virginia Beach, Virginia 23451.

Primar Stavanger – IC-ENC Working Group on information (PSIWG) 1st edition, 2004: Facts about charts and carriage requirements.

Quentin W. Fleming (2003), *project procurement management*. Quality Books, Inc. First Edition, FMC Press, USA.

Ronald H., 1994, “*U.S. Industrial Outlook*” Diane Publishing, U.S.

Russell, I. (2004). *People Management and Competency Profiling*. South Yarra: Test Grid Pty Ltd.

Saunders, M. (1997), *Strategic Purchasing & Supply Chain Management, (7th Ed.)*. Harlow Essex: Pearson Education Ltd.

Shantanu et al, (2012), *Designing Efficient Resource Procurement and allocation mechanisms; Faculty and Research Working Paper, INSEAD, the business school for the world*.

Sherma et al. 2011. *Supplier Issues for Lean Implementation*. International Journal of Engineering Science and Technology.

Smith, R. & Conway, G. (1993). *Organization of Procurement in Government Departments and their Agencies*. London: HM Treasury Consultancy and Inspection Services Division.

Sollish, F., & Semanik, J. (2012), *The procurement and supply managers’ desk reference (2nd Ed.)*. USA, New Jersey: Wiley & Sons.

Sultana, A. I. (2012), *Impact of Training and Employee Performance*. Inter-disciplinary Journal of Contemporary Research in Business, 4 (6) 646-696.

Triantafillou, P. (2007), *Benchmarking in the Public Sector: A Critical Conceptual Framework*. Public Administration Journal, 8(4), 17-32.

UNCTAD. (2017). *Review of Maritime Transport*. New York & Geneva: United nations publication. Retrieved from http://unctad.org/en/PublicationsLibrary/rmt2017_en.pdf

United States Navy Department Bureau of Ships (1946), “*Ship Control Equipment*”

Van Weele, A. J. (2006), *Purchasing & Supply Chain Management: Analysis, Strategy, Planning and Practice, (4th Ed.)*. Australia.

Vincent, H.L. & Bausch, G.G. (1997) *Silicon fouling release coatings*. Naval Research Reviews, 4,39-45.

Walter N.M, Christopher M, and O. Kepha(2015),*Effects of Procurement Practices on the Performance of Commercial State owned Enterprises in Nairobi*, International Journal of Scientific and Research Publications, Volume 5, Issue 6, June 2015 1 ISSN 2250-3153.

Webster, D. C., Chisholm, B. J., & Stafslie, S. J. (2007). Mini-review: Combinatorial approaches for the design of novel coating systems. *Biofouling*, 23(3), 179-192. Retrieved from <https://doi.org/10.1080/08927010701250948>

Westergaard, C.H. (2007) Comparison of fouling control coating performance to ship propulsion efficiency FORCE Technology report no.107- 24111, part 2 made for Hempel Marine Paints
Wilson, E., &

WHO, 2011, International health regulations (2005): handbook for inspection of ships and issuance of ship sanitation certificates

WHOI. (1952). Woods Hole Oceanographic Institution .US Naval Institute, Annapolis, Iselin, COD. Retrieved from www.vliz.be/imisdocs/publications/224762.pdf

WMU library Wahl, M.& Lafargue, F. (1990). Marine epibiosis. *Oecologia*, Vol 82(2), 275-82. Retrieved from <https://link.springer.com/article/10.1007/BF00323545>

Yebra, D.M., Kiil, S. & Dam-Johansen, K. (2004) Antifouling technology -past, present and future steps towards efficient and environmentally friendly antifouling coatings. *Progress in Organic Coatings*,

Yebra, D.M., Kiil, S., Dam-Johansen, K. & Weinell, C.E. (2006) Mathematical modelling of tin-free chemically-active antifouling paint behaviour. *AIChE Journal*, 52, 1926-1940. Retrieved from <https://doi.org/10.1002/aic.10787>

Yueng, A.K., Ulrich, D.O., Nason, S.W. & von Glinow, M.A. (1999). *Organizational learning capability*. New York: Oxford University Press.

ANNEX: 1

Questionnaire

This questionnaire is developed to support my second degree study in Logistics & Supply Chain Management in Addis Ababa University School of Commerce. The questionnaire is comprised of questions on personal information, open ended questions & likert scale ratings from 1-5; (1=strongly disagree; 2=disagree; 3=neutral; 4=agree & 5=strongly agree). Questions will be responded by putting tick mark (✓) in the appropriate boxes & by brief as well as detailed explanations. It is distributed to sample respondents as a requirement to fulfill academic project on procurement & handling of ship husbandry supplies in the case of Ethiopian Shipping & Logistics Services Enterprise's ships. Respondents are not required to write their names. The respondents' information with regard to the subject of study is kept confidential. The information each respondent provide will have paramount importance to wards successful organization of the thesis. Thus your contribution in providing reliable information will highly be appreciated. Thank you for your willing cooperation in advance.

Section one Personal Information

1. Age of the respondent
 - a) 18-30
 - b) 31-42
 - c) 43-55
 - d) 56 & above
2. Sex of the respondent
 - a) Male
 - b) Female
3. Qualification of the respondent
 - a) Certificate _____
 - b) Diploma _____
 - c) Degree _____
 - d) Master's Degree _____
 - e) PHD or Doctoral Degree _____
4. Job title of the respondent
 - a) Chief Engineer
 - b) Designated Duty Engineer
 - c) Assistant Engineer (1st, 2nd, & 3rd)
 - d) Engineer (3rd or 4th)

6. How is procurement of ship husbandry supplies processed? What role is played by e-procurement?

7. How do you evaluate the procurement of ship husbandry items & services? How you see its responsiveness with regard to quality, cost & timeliness? How reliable it is?

8. How ship maintenance schedules are performed? Is there any obstacle beyond the capacity of the enterprise that hinders compliance with marine regulations? For example dry docking service supply is to be procured two times within five years as per safety of life at sea regulation no 70/78. What obstacles hinder this scheduled activity?

9. How is the enterprise's supplier relationship building capacity with regard to ship husbandry items & services procurement practices?

10. In the procurement of Ship husbandry Supplies what procurement risks (e.g. misrepresentation of facts by potential suppliers, unethical practices, insufficient lead time etc.) are investigated? And how are these procurement risks managed?

11. How are inventories handled (managed) within Ethiopian Shipping & Logistics Services Enterprise's Ships? Is there any software employed to track & trace stock in & out situations of ship husbandry items with in ESLSE Ships stores?

12. In your experience as seafarer how do you evaluate ESLSE's handling of ship husbandry supplies with in ships' stores within the capacity of ESLSE? Do you think inventory handling practices exhaustively practiced to minimize unnecessary inventory costs? Explain?

13. If you find gap in the proper handling of ship husbandry supplies in the above question, what do you suggest to practice better handling of ship husbandry supplies in ESLSE ships stores with in the capacity of ESLSE?

14. Who is responsible to handle inventories with in each ESLSE ships stores? How are inventories audited?

Section Three Likert Scale Rating

In this section of the questionnaire respondents will be expected to rate the level of procurement & handling practices of ship husbandry supplies in the Ethiopian Shipping & logistics Services Enterprise by putting tick mark (√) in the rating columns in their respective choice of ratings. The likert scale has rating scale from 1-5. Use the scale 1= to strongly disagree; 2= to disagree; 3= to neutral; 4= to agree & 5= to strongly agree.

Serial No.	Ship Husbandry Supplies Procurement & Handling Activities in ESLSE	1	2	3	4	5
1.	Ship Husbandry Supplies Procurement Performance					
2.	High level of compliance with local & international procurement & handling regulations					
3.	Adequate transparency & accountability					
4.	Minimization of procurement expenditure					
5.	Ensure quality of procured goods & services					
6.	Adoption of just in time procurement					
7.	Use of lean management					
8.	Adequate control to reduce corruption					
9.	Adequate awareness on procurement markets					
10.	Best supplier relationship with local as well as international suppliers (agents)					
11	Responsive & reliable procurement					
12	Reliable procurement risk management					
1	Ship Husbandry Inventory Handling					
2	Adoption of best inventory management software					
3	Best inventory audit					
4	Effective inventory record management					

Please indicate your views on matters of ship husbandry procurement & handling practices with in Ethiopian Shipping & Logistics Services Enterprise’s ships that you think not included in the questionnaire by the researcher.

(Source for annex 1 is Author’s own idea, 2020)

ANNEX 2

Additional Reference - NAMEPA (North American Marine Environment Protection Association) member of INTERMEPA (International Marine Environment Protection Association) has an incredible free publication that highlights maritime glossary terms, legal regulations, importance in global trade, policy, history, careers, waterways/ canals, ports types of ships and more! It is an incredible resource that we hope our viewers take advantage of. Copy and paste the link into your browser and enjoy! <https://namepa.net/wp-content/uploads/2018/06/FINAL-marine-industry-guide.pdf> Enjoy other resources by INTERMEPA and their members! http://www.intermepa.org/about_us.html



Aframax - AFRA stands for Average Freight Rate Assessment. As the name suggests, Aframax are medium-sized oil tankers with a dead weight tonnage (DWT) between 80,000 and 119,999. Though relatively small in size in comparison to VLCC and ULCC, Aframax tankers have a capacity to carry up to 120,000 metric tonnes of crude oil. They are just ideal for short to medium-haul oil trades, and are primarily used in regions of lower crude production, or the areas that lack large ports to accommodate giant oil carriers.

Aft - the stern (or back) of the ship.

Aggregates - sand, gravel, crushed rock and other bulk materials generally used by the construction industry.

Anti-fouling - a technique used to combat the growth of marine organisms, such as barnacles, on a ship's hull. A special coating is applied to the underside of the ship, which needs to be reapplied regularly.

Approach - the channel of water approaching a port or set of the locks.

Ballast - material, usually seawater, placed in a vessel not carrying cargo to obtain or maintain proper stability, trim or draft. (A ship so laden is "in ballast.") The voyage is a voyage "in ballast." The vessel is said to be "ballasting" to the next port.

Barge - a flat-bottomed boat, either motorised or towed, used to carry products in rivers or canals. In the context of bunkering, a bunker barge is usually a small tanker and not a barge as defined here. A bunker barge will deliver marine fuel to ships, usually in port.

Barometer - an instrument that measures atmospheric pressure.

Barrel - a unit of liquid that is equal to 42 U.S. gallons. It is the standard unit of liquid volume in the petroleum industry.

Beam - width of the vessel at the widest point.

Berth - a location in a port where a vessel can be moored.

Berthing - the action of a ship coming into berth at a port.

Bill of Lading - prepared by the carrier or freight forwarder, the bill of lading is an original shipping contract that lists the dates, services, and actual charges involved in transportation of the goods. It also acts as a receipt for the shipper's belongings. The bill of lading is needed by the buyer to take possession of the goods.

Bollard Pull - refers to a tug's capability to pull, measuring how many tonnes of pull can be applied.

Break-bulk - general cargo stowed conventionally and handled individually, palletised, or unitised, as opposed to bulk and containerised freight.

Bulk Cargo - usually a homogeneous cargo stowed in bulk, that is to say loose and not enclosed in any container.

Bulkhead - a name given to any vertical partition which separates different compartments or spaces from one another. It is like a shore-side "wall."

Bulwarks - the vertical plating running along each side of the vessel above the weather deck helping to keep the decks dry and serving also as a type fence.

Bunker(s) - (Noun) a tank or compartment for storing fuel; also the fuel itself. (Verb) to load fuel into a vessel's bunkers for its own use as distinguished from loading fuel as cargo.

Buoys - a floating object that is anchored to the seabed or attached to another object. It is used as a navigational aid, surface marker, or an a loading point for cargoes (see Single Point Mooring Buoy).



Capesize Bulk Carrier - very large and ultra large cargo vessels with a capacity over 150,000 DWT. They are categorized under VLCC, ULCC, VLOC and ULOC and can be as large as 400,000 DWT or even more. They serve regions with largest deep water terminals in the world and are primarily used for transporting coal and iron ore. Because of their giant size, they are suitable to serve only a small number of ports with deep water terminals.

Captain - an officer who is licensed to command a merchant ship. Also referred to as Master.

Cargo Battens - are strips of wood fitted to the inboard side of frames in the hold or cargo spaces of a steel vessel in order to keep the cargo away from the shell plating and avoid all contact with metallic surfaces. These battens are usually about 6 by 1-1/2 in., running fore and aft and bolted to the frames about 1ft, apart – also called holding sparring, hold battens, sparring battens. A general rule is that when stowing general or mixed cargoes the cargo comes into contact with the cargo battens, not the steel skin or frames of the ship. When carrying bulk cargoes, cargo battens, if fitted, must be removed. They protect the cargo from ship's sweat, heat etc.

Carriage - the transportation, and the associated charges, of passengers, cargo or freight.

Ceiling - a covering, usually wood, placed over the tank top for its protection. (Note the difference from the shore side/non-maritime meaning.)

Charter - contract to hire or lease a ship.

Charter Party - a written contract of hire for a ship or aircraft for the transportation of goods on a specific voyage or flight. In shipping, the charter party is usually made between the Owner of a vessel and a Charterer. The charter party will normally include the freight rates or hire and the ports involved in the transportation.



Chinamax - very large bulk carrier which can't be longer than 360m (1,180 ft), wider than 65 m (213 ft) and her draft can't be more than 24 m (79 ft). The deadweight tonnage of these vessels is 380,000–400,000 DWT. Ship's maximum measurements are defined by the Chinamax standards, allowing ports to determine whether they can accommodate ships in this class. As the name suggests, these ships are often used to move cargo to and from China along several trade routes, such as the iron ore route from Brazil to China.

Chronometer - an extremely accurate time-keeping device that is relatively unaffected by movement or temperature changes. It can be used for determining longitude at sea.

Classification - a ship built in accordance with a Classification Societies' Classification Rules will be assigned a classification, or class, designation by the society on satisfactory completion of the relevant Surveys.

Classification Rules - Classification rules are developed by Classification Societies to assess the structural strength and integrity of essential parts of the ship's Hull and its appendages, and the reliability and the function of the propulsion and steering systems, power generation and those other features and auxiliary systems which have been built into the ship in order to maintain services on board.

Clean Ship - refers to tankers that have their cargo tanks free of traces of the dark persistent oils which remain after carrying crude and heavy fuel oils.

Common carriers - for example, waterborne vessels, airplanes, trucks or railroads. Referred to in freight forwarding.

Compressed - a process of reducing the volume and density of natural gas so that it can be transported. Usually referred to as CNG (Compressed Natural Gas)

Computer Aided Design or CAD - the use of a wide range of computer based tools that assist marine engineers and naval architects in design and construction planning, in a maritime context, of waterborne transport.

Containers - a sealed, reusable metal box used for moving goods in by ship, road or rail. Containers, or boxes, are of standard designs, normally 20ft (referred to as TEU – 20-foot equivalent unit), 40ft (referred to as FEU – 40-foot equivalent unit) or 45 ft in length. Containers

may be ventilated, insulated, refrigerated, flat rack, vehicle rack, open top, bulk liquid or equipped with interior devices.

Crew - a person employed, engaged or assigned in any capacity on board a vessel, aircraft or train.

Crude Oil - unprocessed and unrefined oil.

Cubic Capacity - (Cube) Each ship has two cubic capacities: 1. Grain cubic and 2. Bale cubic. Grain cubic is the maximum space available for cargo measured in cubic feet or cubic meters, the measurement taken to the inside of the shell plating of the ship (or to the outside of the frames and to the top of the beams (or underside of the deck plating). In other words, if a bulk cargo such as grain were loaded, it would flow in between the frames and beams, thereby occupying the maximum space available, or the grain cubic capacity. The Bale cubic capacity is the space available for cargo measured in cubic feet to the inside of the cargo battens, to the inside of the frames or to the underside of the beams. The Bale cubic applies when dealing with bagged cargoes or a general cargo of mixed commodities. In loading hand-stowed cargo, the cargo rests against the frames or against the cargo battens (if fitted); it does not come into contact with (extend to) the skin of the ship.

Currents - a large-scale circulation of water caused by thermodynamics and winds. One example of a well-known current is the Gulf Stream, which carries warm water down the Atlantic and moderates climates in countries that would otherwise be much colder, such as Iceland and the United Kingdom.

Cutter Suction Dredgers - stationary dredgers that have to be towed to their work site by tugs. Once in position, so-called spud poles keep the cutter dredger in place. Winches then lower the cutter head to the seabed and as it turns and is pulled across the bottom horizontally the cutter head cuts into the soil. Loosened material is then dredged up and pumped to its destination via a floating pipeline.

Deadweight (of a vessel) - the number of long tons (2240lbs) or metric tons (about 2204.6lbs) which a ship is capable of carrying in cargo, fuel, stores, fresh water, and crew on the ship's summer freeboard. "Deadweight" and "deadweight all told" are identical in meaning.

Deadweight Cargo Capacity - the weight carrying capacity of a vessel expressed in long tons or metric tons for a particular voyage after allowance for fuel, water, stores and crew at a particular draft and water density.

Deadweight Scale - a scale on which are plotted the deadweight capacities corresponding to the various drafts of water between light and loaded displacements. (Also called Displacement Scale.) This scale usually is included in the vessel's "Capacity Plan."

Demurrage - the money payable to the owner for delay for which the owner is not responsible in loading and/or discharging after the laytime has expired.

Derivatives - investment products whose value is derived from, or based on, the value (either current or expected) of an underlying security or currency. Examples of derivatives include options and futures.

Derricks - ship's lifting apparatus, used like a crane for hoisting boats, cargo and other heavy weights.

Despatch - the money payable by the owner if the ship completes loading or discharging before the laytime has expired.

Dirty Ship - refers to tankers which have been carrying crude oil and heavy persistent oils such as fuel oil and dirty diesel oils.

Dismantling Slip - a slipway where ships can be hauled free from the water for ship recycling.

Displacement - the weight of the ship and everything it contains (which is the same as the weight of water it displaces.)

Dock - a wharf, pier or quay forming all or part of a waterfront facility, or the action of a ship when they arrive at the berth.

Double Bottom - watertight compartments between the inner bottom plating, or the tank top, and the shell plating, used for the carriage of water ballast, fuel oil, fresh water, etc.

Down to Marks - this expression means that the vessel has been loaded to her maximum permissible draft, either winter, summer or tropical loadline as the case may be. If both deadweight and cubic capacity have been fully utilized, the ship is "full and down."

Draft - the distance a vessel extends below its waterline, measured vertically to the lowest part of the hull, propellers or other projecting point. (Contrast this to depth of water, which must of necessity be a greater figure than "draft," if the vessel is to be afloat.) Traditionally expressed in feet and inches but often routinely in meters.

Dry-dock - an enclosed watertight structure that can be flooded for a ship to enter in a normal fashion. The water is then pumped out allowing the underside of the ship to be inspected, repaired, painted and/or cleaned.

Dunkirkmax - (289 m. max. 175,000 DWT (approx)):Maximum allowable beam = 45 m for eastern harbor lock in Dunkirk, France.

Dunnage - the use of sufficient dunnage (pieces of wood etc.) is one of the principal precautions against damage to stowed cargo. Materials that are not affected by moisture are used as dunnage, such as: boards, matting, burlap, rattan. The dunnage is laid on the ceiling and along the wooden cargo battens and all other places where necessary. The object is to prevent or limit damage by crushing, chafing, shifting of cargo, sweat, moisture, contact with hold pillars, etc.

Economic Speed - this is the speed of a vessel producing the best possible financial results for owners, giving proper consideration to the following: 1. The prices of bunkers in the ports en route. 2. Fuel consumption of the vessel at various speeds. 3. Daily operating costs. 4. The net freight per ton of cargo. 5. Operating profit per day. 6. Subsequent available employment of vessel and anticipated freight.

Electronic Charts - an electronic display of maps designed to assist navigation by sea.

Ex-pipe - used to describe a mode of delivery for marine fuels, or bunkers, to ships. The fuel is delivered directly to the ship at the load or discharge terminal from a pipe.

Export Declaration - A document, prepared by exporter or freight forwarder declaring full details about goods being exported, including the contents, value, and destination of an export shipment.

Feeder (ship) - a ship normally used for local or coastal transport of cargoes, usually containers, to and from major ports not on the schedules of the major liner operators.

Feeders - when liner-type vessels or other non bulkcarriers load grain in bulk, feeders are erected to direct the cargo to the different parts of the holds or compartments. Thereby filling all free space, grain in bulk may settle as much as 5% during a voyage; therefore measures must be taken to prevent the shifting of grain, which could result in the listing of the vessel.

First Open Water - a time in spring or early summer when rivers, lakes or seas are unfrozen and sufficiently free of ice to be open to navigation. The term is normally used in the Great Lakes or Baltic trades and typically refers to sometime in April.

Fixed Operating Expense - the daily or monthly out-of-pocket cost of operating a vessel, which may include amortization and interest, but does not include fuel or any other variable voyage costs.

Fixture - the completed negotiation that results in a charter party.

Flag of Convenience (FOC) - flag of a country which allows the registration of vessels owned by nationals of other countries and which imposes no rigid restrictions on the nationality of the seamen employed or on the nationality of the managers.



Float-on Float-off Vessel - otherwise known as a "Flo/Flo" or Semi-Submerging Vessel is a type of vessel that have a long and low well deck that can go down under water allowing oil platforms, other vessels, or other floating cargo to be moved into position for loading. The tanks are then pumped out, and the well deck rises higher in the water, lifting its cargo, and is ready to sail wherever in the world the cargo needs to be transported.

Fore - the head (or front) of the ship.

Free Pratique - this expression means that the vessel has a clean bill of health from the local health authorities. This is a formality usually executed by the ship's agents before the vessel actually obtains a berth. After berthing, the health authorities may board the vessel in order to verify the "free pratique." Loading or discharge cannot take place until it is obtained.

Freeboard - the vertical distance measured on the vessel's side amidship from the water line to the upper side of the main deck.

Freight - goods transported in bulk by train, truck, ship or aircraft or the transport of the goods.

Freight Rate - a monetary amount charged by a ship owner or operator for moving a commodity from one point to another. Freight rates vary by distance and the type of commodity.

Gantry Cranes - track-mounted cranes supported on wide, high legs used for the loading and unloading of breakbulk cargo, containers and heavy lifts.

Gas - commonly referred to as Liquefied Natural Gas and Liquefied Petroleum Gas in the maritime industry. LNG is natural gas converted to liquid form by cooling to a very low temperature. LPG is a gas consisting primarily of propane, propylene, butane, and butylene in various mixtures, which is stored as a liquid by increasing pressure.

Gear - cranes or other lifting equipment on ships.

General Average - a loss made intentionally to save the total venture. For example, throwing cargo overboard in order to save a ship from a particular peril. All parties involved, eg ship, cargo, and freight, proportionately share the losses resulting from the voluntary and successful sacrifice.

GPS - Global Positioning System - a worldwide radio-navigation system developed by the US Department of Defense, using a system of satellites and receiving devices to compute precise positions on the Earth.

Gross Registered Tons (GRT) - expressed in tons of 100 cubic feet; the entire internal cubic capacity of the hull and erections on and/or above the upper deck to the hull of the ship excepting certain spaces which are considered exempt.



Handymax Bulk Carrier - between 35,000 and 50,000 tonnes deadweight (150 - 200 m length & 11 ~ 12 m draft.) These bulkers are well suited for small ports with length and draught restrictions, or ports lacking transshipment infrastructure. Primarily used for carrying dry cargo such as iron ore, coal, cement, finished steel, fertilizer, and grains etc.



Handysize Bulk Carrier - are small-sized ships with a capacity ranging between 15,000 and 35,000 DWT. These vessels are ideal for small as well as large ports, and so make up the majority of ocean cargo vessels in the world. They are mainly used in transporting finished petroleum products and for bulk cargo.

Helm - the steering wheel of a ship which steers the ship by turning its rudder.

HGV - heavy goods Vehicle, a large road vehicle for the carriage of goods with a maximum laden weight in excess of 7.5 tonnes (common in British use).

Hold - the space for stowing cargo inside of a ship.

Hub - in the context of ports, a hub port caters for the larger ships on the water, allowing smaller Feeder (ships) to transport cargo, usually Containers, from the hub ports to smaller feeder ports. Hub ports have excellent infrastructure links to allow cargo to move to/from the port smoothly.

Hull - the ship frame or body.

Husbandry - managing the ship's non-cargo related operations under the instructions of the Master, Owner or Operator.

International Safety Management (ISM) - International Safety Management Code for the Safe Operation of Ships and for Pollution Prevention. The ISM Code establishes an international standard for safe management and operation of ships by setting rules for the organization of company management in relation to safety and pollution prevention, and for implementation of a safety management system (SMS.) ISM was adopted by the International Maritime Organization (IMO) in 1993 with entry into force depending on the type of ship, commencing from July 1, 1998.

Kamsarmax - (229 m. (max) 82,000 DWT (approx))Maximum size allowed for port Kamsar in Equatorial Guinea.

Keel - the centreline of a ship running fore and aft. The keel is the lowest longitudinal strength member of a ship and is usually the first piece laid, when the ship is constructed.

Knot - a unit of speed. The term "knot" means velocity of one nautical mile per hour. A nautical mile is 1.15 the distance of a land (statute) mile.

Laytime - the period of time agreed between the parties during which owner will make and keep the ship available for loading/discharging without payment additional to the freight.

LCL - less than container load – a Container shipment that is not full. Normally it will be consolidated with other LCL shipments to make an FCL (full container load).

Length Overall (LOA) - the maximum length of a ship from the most forward point of the bow to the aftermost point of the stern.

Less than container load or LCL - container shipments of less than a full container.

Light Displacement - the weight of the ship excluding cargo, fuel, water, stores and other items which are necessary for use on a voyage. This measurement is useful when a ship is being sold for scrap.

Lighter - the general name for a broad, usually flat-bottomed barge, frequently used in loading or discharging a larger vessel at anchor.

Lightering - the act of discharging cargo into a lighter or barge, usually so that vessel which has been lightened can get into shallow berths.

Liner - A cargo-carrying ship operating on a regular trade or defined route between advertised ports of loading and discharge. Not restricted to the container trades.

Linesmen - responsible for all mooring and casting off operations for ships calling at Port.

Liquefied - a process of converting gas to liquid form by cooling to a very low temperature.

Long Ton - a unit of weight of 2,240 pounds (1016.047 kgs.)

Malaccamax - as the name suggests, Malaccamax ships are the largest ships that can pass through the Strait off Malacca which is 25 m (82 ft) deep. As per the current permissible limits, a

Malaccamax vessel can have a maximum length of 400 m (1,312ft), beam of 59 m (193.5 ft), and draught of 14.5 m (47.5 ft).

Manifold - the loading and discharging connections of a tanker, usually located near the midship section.

Marks - refers to the vessel's permitted load line mark (Plimsoll Marks.)

Master - an officer who is licensed to command a merchant ship.

Master's Ticket - Colloquial term for a Master's License - the highest level of qualification available for someone to command a ship.

Mate's Receipt - a document signed by one of the vessel's mates, or someone else on behalf of the vessel, acknowledging receipt of cargo in good order, unless otherwise noted, on board the ship. It determines the contents of a bill of lading, but in itself is not a negotiable document.

Metric Ton - a unit of weight of 1,000 kilograms (2,204.6223 pounds.)



Mini Bulk Carrier - (100-130m length , less than 10m draft & 3000 ~ 23,999 DWT) employed in coastal trade, serving as feeder vessels to large ships. Their main trade consists of short sea voyages, carrying limited quantities of bulk cargoes generally to smaller ports without restriction on size of vessels.

Moored - when a ship is secured to the dock or wharf with cables and/or ropes.

Nautical Charts - a graphical representation of waters (and any adjacent land) that can be navigated. The chart will show water depths, heights of land, natural features of the seabed, coastline detail, navigational hazards, locations of natural and man-made aids to navigation, information on tides and currents, local details of the Earth's magnetic field, and man-made structures such as harbours and bridges.

Nautical Mile - the standard unit of measure for marine navigation composed of 1852 meters (6076.1 feet) thus, approximately 1.15 statute miles.

Newbuilding - a new ship being built or a ship that has been contracted to be built, although the actual construction has not yet started.

Newcastlemax - (Usually Capesize) 185,000 DWT (approx) Maximum allowable beam = 47 m for port of Newcastle in Australia.

Ocean Marine Insurance - Ocean Marine Insurance policies (wet policies) generally insure against loss or damage to three separate interests: the hull or the ship itself; the cargo; and the freight which would be received for the carriage of the goods.

Officer - a person authorised to serve in a position of authority on a vessel, above ratings in rank.

Oil Rigs - rig used in drilling for crude oil or gas.

Outturn Weight - the delivered weight of the cargo, which is determined after discharge.

Panamax/ New Panamax Bulk Carrier - as the name suggests, Panamax and New Panamax ships are travelling through the Panama Canal. They strictly follow the size regulations set by the Panama Canal Authority, as the entry and exit points of the Canal are narrow. A Panamax vessel can't be longer than 294,13 m (965 ft), wider than 32,31 m (106 ft) and her draught can't be more than 12,04 m (39.5 ft). These vessels have an average capacity of 65,000 DWT, and are primarily used in transporting coal, crude oil and petroleum products. They operate in the Caribbean and Latin American regions. The New Panamax has been created as a result of the expanding plans for Panama Canal locks. Expanded locks will be around 427 m (1400 ft) long, 55 m (180 ft) wide and 18,30 m (60 ft) deep so Panama Canal will be able to handle larger vessels.

Pilings - vertical columns or poles of steel, concrete or timber driven into the ground or seabed to support vertical loads. Used to support docks, quays and wharfs.

Pipeline - a structure that allows the movement of Gas or Crude Oil from an oil field to shore, usually fixed to the seabed.

Platforms - a structure designed to house offshore oil workers and the machinery needed to drill and recover Crude Oil and Gas. Platforms can be attached to the ocean floor or be floating.

Plimsoll Mark - this mark indicates the limit to which a ship may be loaded.

Port - means a protected area within which ships are loaded with and/or discharged of cargo.

Port Charges - a general term which includes charges and dues of every nature assessed against the vessel or its cargo in a port. It usually includes harbor dues, tug boat charges, pilotage fees, custom house fees, consular fees, wharfage, dockage on the vessel etc.

Propeller - a rotating device, with two or more blades, connected to a shaft and powered by an engine to propel a ship through the water.



Q-Max (Qatar-max) - Q-Max's are largest LNG carriers that can dock at the LNG terminals in Qatar. Q-Max ship is 345 metres (1,132 ft) long, 53.8 metres (177 ft) wide and 34.7 metres (114 ft) high, with a draught of approximately 12 metres (39 ft). It has a capacity of 266,000 cubic metres (9,400,000 cu ft), equal to 161,994,000 cubic metres (5.7208×10⁹ cu ft) of natural gas.

Quay - a wharf or bank usually built parallel to the shoreline where ships are loaded and unloaded.

Quayside - the area of land parallel to the shore on a Wharf or bank where ships and other vessels are loaded and unloaded.

Radar - Radio Detection And Ranging – a system that uses electromagnetic waves to determine a distance between an object and a receiver by bouncing radio waves off the object and timing the echo.

Ratings - describes the status of a Seafarer in terms of rank. Ratings are below an Officer in rank.

Recapitulation - sent out by the shipbroker upon completion of a freight deal, recapping what both parties have agreed. Known colloquially as a recap.

Refinery - an industrial process plant where Crude Oil is processed and refined into petroleum products, such as gasoline and jet fuel.

Rig - gear (including necessary machinery) for a particular enterprise, in the maritime context see Oil Rig.

Ro-Pax - roll-on-roll-off passengershship/ferry. Combines the cargo capacity of Ro-Ro ships with the passenger facilities of ferries.

Roll on-Roll off - system of loading and unloading a ship where the cargo is driven on and off ramps. Suitable for wheeled cargo such as cars, trucks and trailers. Commonly referred to as ro-ro.

Seafarers - a person employed onboard a ship; its crew. Includes Officers and Ratings.

Seasonal Summer Zone - area in which during stated period(s) of the year vessels may load only down to their summer marks.

Seasonal Tropical Zone - area in which during stated period(s) of the year vessels may load only down to their tropical marks.



Seawaymax - as the name suggests, Seawaymax ships are the largest ships that can pass through the locks of St. Lawrence Seaway. These ships are 225,6 m (740 ft) long, 23,8 m (78 ft) wide and 35,5 m (116 ft) high, with a draught of 7,92 meters (26 ft).

Seismic - gathering data by reflecting sound from underground and underwater strata. Used in Hydrographic Surveying to give an accurate representation of the seabed.

Setouchmax - (299.9 m. (max) 16.1m draft 205,000 DWT):Maximum size allowed for ports in the Setouch Sea in Japan only.



Sextant - A hand-held navigational instrument used to determine angular distances between objects. Used with celestial navigation to calculate distances taking bearings from the sun, moon or stars.

Shaft - a revolving rod that connects the Propeller and the engine to power the ship.

Ship Chandler - a merchant who supplies vessels with all kinds of stores.

Ship's Company - the entire crew of a ship including the officers.

Shoal - a revolving rod that connects the Propeller and the engine to power the ship.

Short Ton - a unit of weight of 2000 pounds (also known in USA as “net ton.”)

Single Point Mooring Buoys - buoys anchored offshore that serve as a mooring point for tankers to load or offload gas or fluid products. The main purpose of the buoy is to transfer fluids between onshore or offshore facilities and the tanker.

Sisterships - ships built to the same design and under same ownership.

Skin - the hull plating of a ship.

Slipway - an inclined plane on the shore extending into the water.

Sole Trader - a business which legally has no separate existence from its owner, with no limitations of liability. The debts of the business are therefore the debts of the owner.

Spot (vessel) - in both dry cargo and tanker chartering a ship that is immediately available for employment.

Stability - the ability of a ship to return to its original, upright position after displacement by strong winds, sea, or conditions of loading. Stability is concerned with the ship's centre of gravity.

Stack - a pile of containers that have been stowed in an orderly way in a specified place, usually in stacking areas on the Quay. Stacking can also refer to other cargo units when placed one on top of the other, but is more commonly used in reference to containers.

Stowing - accommodating cargo in an area, usually the ship, the Quay or a storage facility.

Suezmax - vessels named after the famous Suez Canal. They are mid-sized cargo vessels with a capacity ranging between 120,000 to 200,000 DWT. They are designed to pass through the majority of the ports in the world. Currently the permissible limits for suezmax ships are 20.1 m (66 ft) of draught with the beam no wider than 50 m (164.0 ft), or 12.2 m (40 ft) of draught with maximum allowed beam of 77.5 m (254 ft).



Supramax Bulk Carrier - vessels have capacity between 50,000 to 60,000 DWT. Due to their small size, they are capable of operating in regions with small ports with length and draught restrictions. They form the majority of ocean going cargo vessels in the world.

Tanktop - plating forming the top of the double bottom. Also called inner bottom. In non-technical terms, it is the flat surface at the bottom of the hold onto which the cargo is loaded.

Tides - the periodic rise and fall of the world's oceans caused by the gravitational pull of the Moon and the Sun on the Earth. Tides are predictable and tide tables are published to plan around tidal movements. The highest tides occur at the new moon and full moon.

Tonne - a British word meaning a metric ton. Used for tanker cargoes in "Worldscale."

Topography - the physical features of land on or under water, including terrain relief.

Topping Off - a term most commonly used in the grain trade. A ship can partially load in one port and "top off" in another port.

Trailing Suction Hopper Dredger - a large ocean-going vessel that Dredges material from the bed of a body of water by suction. Pumps then transfer the sand dredged up by the suction head into the hold or hopper. Excess water is drained off via overflow pipes and when the hopper is full, the ship sails a reclamation area to unload the dredged material.

Tramp (vessel) - the designation commonly used for vessels with no regular employment whose owners send them wherever they expect to, or can, obtain the most lucrative employment.

Trim - the balance of a ship or an aircraft. On a ship this is the way it floats ion the water in relation to the fore and aft line. The trim can be adjusted by rearranging the cargo or adjusting the ballast levels.



ULCC - or Ultra Large Crude Carriers are the largest shipping vessels in the world with a size more than 320,000 DWT. Called Super Tankers, ULCCs are used for long-haul oil crude transportation from Middle East to Europe, Asia, and North America.

Ullage - the depth of the free space left in tanks above the liquid.

Underwriter - an individual or company that researches and then accepts, rejects, or limits prospective risks for the public or for another insurer.

Very Large Bulk Carrier (VLBC) - (270m and more 20m draft or more & 180,000 DWT and more): Very specialized, mainly purpose-built for specific trades.

VLCC - stands for Very Large Crude Carriers. They have a size ranging between 180,000 to 320,000 DWT. They are very flexible in using terminals and can also operate in ports with depth limitations. VLCCs are used extensively around the North Sea, Mediterranean and West Africa.

Waterways - a body of water serving as a route or way of travel or transport, usually used to describe rivers, streams, creeks, drains and channels.

Wharf - a level quayside area built out over the water and supported by heavy wooden or concrete Pilings, where boats can dock or be moored to load or unload cargo.

Wharfage - charge assessed against vessel or cargo for the use of space on or alongside a dock.

Wing Tanks - tanks located along the sides of the ship, usually under the upper deck. When describing the wing tank care must be taken in stating whether they bleed (flow directly into the ship's holds) or whether they must be discharged through on-deck hatches. Wing tanks are used only with free-flowing cargoes such as grain.

Winter North Atlantic Zone - the area in which, between stated dates, vessels may load only down to their WNA loadlines.

Winter Zone - the area in which, between stated dates, vessels may load only down to their winter loadlines.

(Source, all terminologies in annex 2 are retrieved from internet)

ANNEX 3

SOLAS 74

SOLAS CONTENT:

The SOLAS 1974 international maritime treaty comprises of 13 chapters and each chapter has its own set of regulations. The Following are the list of SOLAS all 14 chapters and the regulations they contain:

The International Convention for the Safety of Life at Sea (SOLAS), 1974 describes the requirement for all merchant ship of any flag state to comply with the minimum safety norms laid down in the chapters which are as follows:

Chapter I – General Provisions: Surveys and certification of all the safety items etc are included.

Chapter II-1 – Construction – Subdivision and stability, machinery and electrical installations: Deals with watertight integrity of the ship, especially for passenger vessel.

Chapter II-2 – Fire protection, fire detection and fire extinction: This chapter elaborates the means and measure for fire protection in accommodation, cargo spaces and engine room for the passenger, cargo and tanker ship.

Chapter III – Life-saving appliances and arrangements: All the life-saving appliances and there use in different situations is described.

Chapter IV – Radio communications: Includes requirements of GMDSS, SART, EPIRB etc for cargo and passenger vessel.

Chapter V – Safety of navigation: This chapter deals with all the seagoing vessels of all sizes, from boats to VLCCs, and includes passage planning, navigation, distress signal etc.

Chapter VI – Carriage of Cargoes: This chapter defines storage and securing of different types of cargo and containers, but does not include oil and gas cargo.

Chapter VII – Carriage of dangerous goods: Defines the International Maritime Goods Code for storage and transportation of dangerous goods.

Chapter VIII – Nuclear ships: The code of safety for a nuclear-propelled ship is stated in this chapter.

Chapter IX – Management for the Safe Operation of Ships: The International Safety Management code for ship owner and the operator is described clearly.

Chapter X – Safety measures for high-speed craft: safety code for the high-speed craft is explained.

Chapter XI-1 & 2– Special measures to enhance maritime safety: Special and enhanced survey for safe operation, other operational requirements and ISPS code is briefed in this chapter.

Chapter XII – Additional safety measures for bulk carriers: Includes safety requirement for above 150 meters length bulk carrier.

Chapter XIII – Verification of Compliance

Chapter XIV -Safety Measures for Ships Operating in Polar Waters

(Source, all information in SOLAS chapters in annex 3 are retrieved from internet)