

UNIVERSITY OF GHANA

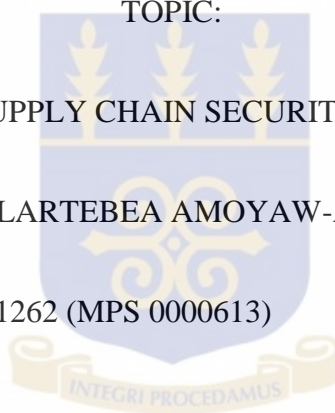
REGIONAL MARITIME UNIVERSITY

TOPIC:

ANALYSIS OF SUPPLY CHAIN SECURITY IN TEMA PORT

ADLINA LARTEBEA AMOYAW-AZIDOKU

10431262 (MPS 0000613)



THIS THESIS/DISSERTATION IS SUBMITTED TO THE UNIVERSITY OF GHANA,
LEGON IN PARTIAL FULFILLMENT OF THE REQUIREMENT FOR THE AWARD OF
M.A PORTS AND SHIPPING ADMINISTRATION DEGREE

DATE: APRIL 2015

DECLARATION

I Adlina Lartebea Amoyaw-Azidoku, the author of this project report ‘Analysis of Supply Chain Security in Tema Port’ do hereby declare that except for references to other people’s work duly cited, this work was done by me in the Department of Port and Shipping Administration, Regional Maritime University. This work has never been done or presented either in whole or in part for any degree in this University or elsewhere.

STUDENT:

ADLINA LARTEBEA AMOYAW-AZIDOKU

SIGNATURE:..... DATE:.....



SUPERVISOR:

MR.BERNARD SAM CUDJOE

SIGNATURE:..... DATE:.....

ACKNOWLEDGEMENT

My gratitude goes to the Almighty God, the Beginning and the End who took care of me and saw me through this programme. My heartfelt thanks goes to my supervisor, Mr. Bernard Sam Cudjoe who guided me and shed more light on my project as well as the Head of Department (Mr. Abebrese) and all staff members at the Department of Port and Shipping especially Mr. Jonas Aryee and Dr. Manuel for their numerous support

I am also grateful to the workers of Ghana Ports and Harbours Authority for providing the time to complete the questions and for been a source of advice and counsel to me throughout the project.

My sincere gratitude also goes to Ghana Customs, Exercise and Preventive Service (CEPS) and all stakeholders of the Port who supported with their rich contribution to the realization of the output of this dissertation.



DEDICATION

I hereby dedicate this research to my late Husband, Peter Atsu Azidoku for his support in my education. My special gratitude also goes to Mr. Carlos Ahenkorah and David-King Boison who have made this day possible, to them I say God bless you and continue to increase you in all aspect of life.

To my mum, daughter (Christabel), siblings, friends and loved ones, especially those who helped me in diverse ways to make this dream come to reality I say thank you and God richly bless you.



ABSTRACT

Business today operates in a global environment. The flow of goods and services along the logistics chain in the port industry is critical for the survival of businesses. The study was based on the Analysis of the Supply Chain Security in Tema Port. The main objective of the study was to assess the applicability of some of the selected Supply Chain Security Programs in Tema Port.

A number of Supply chain security programs were reviewed and one of these were identified as the ISPS Code which Ghana Ports and Harbours Authority is a signatory to, Ninety five (95) respondents were selected out of the population of one hundred and ninety (190) which encapsulated GPHA, CEPS and Importers/Exporters/Clearing and Forwarding Agents. Stratified sampling strategy was adopted. Questionnaires were administered in addition to on-site observations from the berthing of a vessel to the delivery of cargo to the customer. Questions administered were analyzed using tables, pie charts and graphs.

General findings covered security and safety of vessel at anchorage, vessels at quay, devanning of cargo and access control systems in the port. It was discovered that there is a significant level of security and safety in the areas enumerated above and some huge investment have been made by GPHA in the acquisition of patrol boats , mobile cranes and reach stackers to protect our territorial waters, discharge and devan of cargo safely respectively. . It was also discovered that Tema Port had gone through various reforms especially in the advancement of Information Technology systems through the introduction of Automatic Ship Identification System, Vessel Tracking Management System, Optical Character Recognition and other Information Technology Systems which promises to inject efficiency and ensure the security and safety of cargo. These interventions were considered to be in line with compliance to the ISPS Code.

It was recommended that Tema Port measures its ISPS Code compliance level with the levels prescribed in the Code and ensures its full compliance. The display of the port security and safety level at conspicuous areas in the port was suggested. It was also recommended that, the port should embark on serious campaign to educate port users on strategies employed to achieve full compliance with the ISPS Code.

Table of Contents

DECLARATION	ii
ACKNOWLEDGEMENT	iii
DEDICATION	iv
ABSTRACT.....	v
CHAPTER ONE	1
INTRODUCTION	1
1.1 Background Information	1
1.2 Research/Problem Statement	3
1.3 Research Objectives	3
1.4 Research Question.....	4
1.5 Significance of Study	4
1.6 Scope of the Study	4
1.7 Organization of Work	5
CHAPTER TWO	6
LITERATURE REVIEW	6
2.1 Introduction.....	6
2.2 Supply Chain Security in the Global Trade	6
2.3 Supply Chain Security (SCS) Programs	12
2.4 Supply Chain Voluntary Programs	19
2.5 Other Significant SCS Programs/Projects.....	22
2.6 Implication of the Review Literature on the Study	24
2.7 Conclusion	25
CHAPTER THREE	26
RESEARCH METHODOLOGY.....	26
3.1 Introductions	26
3.2 Research Design.....	26
3.3 Sources of Data.....	27
3.3 Research Population Sampling Technique.....	28
3.4 Data Gathering Procedure.....	29
3.4 Method of Data Analysis	30

3.5	Ethical Considerations	30
3.6	Conclusion	30
CHAPTER FOUR.....		31
DATA ANALYSIS AND INTERPRETATION		31
4.1	Introduction.....	31
4.2	Demography.....	31
4.3	Safety and Security of Vessels.....	33
4.4	Safety of Cargo at the Quay	37
4.5	Safety and Security of Cargo during Unpacking/Devanning.....	40
4.6	Identification of Vehicle and Persons in the Port.....	41
4.7	Presentation of Observation	43
4.8	Revisiting the Objectives	49
4.9	Conclusion	52
CHAPTER FIVE		53
DISCUSSIONS ON FINDINGS, CONCLUSIONS, RECOMMENDATIONS AND CONTINUED RESEARCH.....		53
5.1	Introduction.....	53
5.2	Findings and Conclusions	53
5.4	RECOMMENDATIONS.....	55
APPENDICES A		57
<i>References</i>		57
APPENDICES B.....		60
APPENDICES C.....		67
Abbreviations.....		67

LIST OF TABLES

Table 1: Compulsory SCS Programs	13
Table 2: Sampling Technique	29
Table 3: Identification of Vessels in territorial waters	34

LIST OF FIGURES

Figure 1: Sea supply chain network	12
Figure 2: Data Collection Strategy	29
Figure 3: Demography Information	31
Figure 4: Types of SCS Programs	32
Figure 5 : Vessels Call at Tema Port	33
Figure 6: Marine Accident/Incident	34
Figure 7: Piracy Issues	35
Figure 8: Safety and Security of Vessels in Ghana Waters	36
Figure 9: Safety in Discharging Cargo at the quay	37
Figure 10: Incident of cargo damage	38
Figure 11: Implemented systems on cargo security	39
Figure 12: Safety of Unpacked/Devanned Cargo	40
Figure 13: Systems to identify vehicles and persons in the port	41
Figure 14: Tracking of Vehicles with Cargo	42
Figure 15: Overall rating security and safety of the Port	43
Figure 16: Vessels at Anchorage	44
Figure 17: GPHA Security Patrol Boat	45
Figure 18: GPHA CCTV Control Room	46
Figure 19: Newly Acquired Mobile Harbour Cranes for Tema Port	47
Figure 20: Newly Acquired Reach Stackers for Tema Port	48
Figure 21: Optical Character Recognition Eastern Gate	49

CHAPTER ONE

INTRODUCTION

1.1 Background Information

Responding to the demands and opportunities of globalization is one of the most pressing challenges for businesses today. Many industries have already moved a long way towards truly global operations. Supply Management is the management of upstream and downstream relationships with suppliers and customers to deliver superior customer value at less cost to the supply chain as a whole. Supply Chain Security can be described as measures undertaken to improve security of the supply chain. In this concept, threats such as terrorism, piracy, theft, and smuggling of illegal goods are addressed. And in particular, the disruption of the supply chain and the use of the supply chain for moving illegal goods (and potential weapons and their precursors) must be prevented.

Tema Port over the last decade has experienced piracy on vessels in our waters or at anchorage begging for space to berth and discharge cargo. Furthermore, the importation of narcotics into the country through the port has also been a worrisome issue confronting the port and Nation as a whole. A typical example of such events is the MV Benjamin Cociane saga 2006, the Asem Dakey missing 77 parcels of cocaine in February 2012 and the recent 200kilogrammes cocaine stopped at the port which was alleged to have been imported by 2 Nigerians valued at 12 million US Dollars on February 25th 2013 among others (Essuman, 2012). There have also been reported issues on theft and missing cargo in Tema Port for some time now and this has affected most firms who depend solely on imported raw materials for production. The rippling effect is the inadequate of finished products/goods on the market, high prices and layoffs of labour. Similar events have been reported in the West Africa Sub region and the World at large.

Supply chain manager around the globe have become conscious of a new operating environment after the September 11 attack on the world trade centre and the Pentagon in 2001.

Furthermore, these events began to expose the more significant interdependence that exist amongst Firms in the supply network. Companies have always dealt with disruptions that affect efficiency of their supply chain. Wills and Ortiz, stressed that disruptions can arise from a number of sources such as natural disasters, terrorist attacks, industrial or direct action, accident, or operational difficulties (Wills & Ortiz, 2004). Rice et al indicated that their effects can be the delay or unavailability of materials from suppliers, the violation of the integrity of cargoes, the delays or unavailability of communication infrastructure. Some governments and international organizations have already established binding regulations which have been described as voluntary supply chain programs to be followed by some of the participants in international supply chains for instance: ISPS code for ports and ships and the 24 hour Advance Manifest Rule for traders wanting to export to the United States of America (Rice & Caniato, 2003)

Supply chain security programs are the various initiatives taken by international organizations to prevent disruption in the transportation of cargo from a port of origin to a destination port and are often termed as vulnerable supply chain security program This vulnerable supply chain security programs aims at ensuring safety and security of cargo, protecting countries from terrorist attack and preventing the importation of narcotics. Sheffi, affirms that these regulations represent only a small part of all the other to secure the global movement of goods (Sheffi, 2001).

He further argues that companies will need to adjust their relations with suppliers and customers, contend with transportation difficulties and amend their inventory management strategies.

Rice et al, identifies a set of security measures implemented by major global companies from different industry sectors as a response to this new threatening environment (Rice & Caniato, 2003).

The measures range from basic initiatives such as controlling access to facilities and employee background checks to advanced initiatives such as the creation of emergency control centres and a comprehensive security strategy. In addition to these individual responses from the business sector, several governments and border agencies are promoting voluntary supply chain security programs as a concrete option for public-private collaboration intended to enhance security.

The study will also find out if Ghana Customs and GPHA have signed on to some of these Supply Chain Security Programs initiatives and to which extent has it help in ensuring cargo security and clumping down terrorism.

1.2 Research/Problem Statement

Cargo security in Tema Port has been a crucial issue to importers and exporters as well as the government. Most often cargo from the Port of Loading to the Port of Discharge are stolen, damaged, tempered with or delayed for unexplained reasons. The Ghana government is also saddled with inadequate logistics at the entry points to trace and eliminate terrorism (import and export of arms) as well as harmful drugs (cocaine, heroin etc.). These are serious issues that pose a threat to manufacturers, suppliers, customers and the government as a whole in their supply chain network because eventually the global supply chain network is disrupted.

1.3 Research Objectives

Generally the study seeks to assess supply chain security in Tema Port. Specifically the study seeks to:

- Examine common supply chain security programs worldwide.

- Identify which of the Supply Chain Security programs is adopted in Tema Port.
- Assess to the extent to which Tema Port has complied with the adopted Supply Chain Security program.

1.4 Research Question

In view of the above objectives, the followed questions would be asked

- RQ₁: What is the essence of supply chain security in the global trade?
- RQ₂: What are some of the supply chain security programs practiced worldwide?
- RQ₃: Which of these supply chain security program is applicable to Tema Port?

1.5 Significance of Study

The study is significant in the following ways:

- It will help unearth the essence of supply chain security in the Maritime global Trade.
- It will help GPHA and Customs to review their Supply chain security programs to identify the gaps and initiate the necessary corrections
- Policy makers and formulators in the Port industry can use this study as a guide in formulating policies on supply chain security programs.
- It will serve as an additional literature on the subject matter to researchers and students who would undertake studies in this area because of the few literatures in this area of study

1.6 Scope of the Study

The study will cover the confines of Tema Port and will further select nine supply chain voluntary security programs for examination .Customs Staff, GPHA staff and a cross section of importers

and exporters view would be sorted on the study.

1.7 Organization of Work

The Study would be organized into five (5) chapters. Chapter one will discuss the Introduction which includes background of the study, the statement of problem, objective of the study, research questions, significance of the study and organization of work and ethical considerations. Chapter two reviewed the related literature and the theoretical framework on the study which drew salient conclusions. Chapter three, the methodology i.e. research design, sources of data , sampling techniques, data gathering procedure, method of data analysis, method of hypothesis testing and ethical considerations. In addition to this, the profile of the Stakeholders, their vision, mission and other relevant information would be captured. Chapter four analyzed the data to ascertain the results. Chapter five covered the discussion of the findings, conclusions, recommendations and continued research.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

The researcher will go over a number of literatures and studies relevant to the present study in different journals, articles, books and reports. This will include the review of some literature pertaining to the topic under study which will help make a fair and informed assessment of the study. The literature studies which have a bearing on the study are herein cited under the following headings:

- Supply Chain Security in the Global Trade
- Supply Chain Security Program across the globe
- The Port Cargo Clearance Process

2.2 Supply Chain Security in the Global Trade

Liberalization, Privatization and Globalization (LPG) of the economies and companies has powered the competitiveness among businesses. A number of factors have led to the increasing globalization of the world economy and as a result, the competitive environment faced by the businesses has changed dramatically since the last decade. The drivers of globalization include: decreasing tariffs, improved transportation, communications and information technology, global manufacturing of products and availability of services across markets. These changes have enabled the global competitors to make the products and services available to customers worldwide, and the results have been a proliferation of choices for consumers and a need for the companies to offer greater products and service quality at lower costs in order to remain competitive.

Globalisation has compelled companies to strive to gain competitive advantage. Interruption in the flow of goods from the supplier to the customer is a major concern as it frustrates most businesses because it increases the lead-time from the transfer of goods. The pattern of managing and regulating security in global supply chains is changing. Before 2001, security management decisions such as security measures, investments and documentation, etc. – were primarily taken at individual business level, with no or very limited interaction with other supply chain participants or governmental agencies (Rice .Jr, 2003). Since 2001 the situation has changed: governmental agencies, mainly the customs administrations, have entered the field, with their vested interest to protect their respective nations against terrorism and other serious international crime. The first country to move was the US (C-TPAT program since 2002), followed by Australia, New Zealand, the European Union, and a few.

After the bombing of the World Trade Centre and the Pentagon on September 11, 2001, firms are starting to realize that the threat of terrorism is affecting their ability to operate and successfully carry on their business. Not only several firms have been directly hit by the destruction of the Twin Towers, having their offices inside those buildings, but as Andel, puts it, almost every supply chain was affected by the closing of US airspace grounding of the planes and by the closure of the borders that immediately followed (Andel, 2003). Ford, for example, had to shut down five of its U.S. plants, partly because it could not get enough parts from suppliers in Canada. The result was a 13 percent drop in production in that quarter. There has been also countless number of pirates attack on vessels on the sea over the past decade. This is worrying because nearly 80% of cargo is carried by sea according to UNTACD and for that matter the activities of pirates on the ocean create serious disruptions in the global sea trade (UNTACD, 2006).

In recent years, a huge number of initiatives have been taken that have the aim of improving security in the supply chain. The base to this is that the risk of terrorist attacks directed at the supply chain is considered to be high. Even if no such attacks have yet taken place, but have instead mainly targeted private persons and public means of communication, there is no guarantee that what may appear to be a somewhat unrealistic threat today cannot occur in the future. Therefore, transport security has become an important global issue.

After the year 2001, a large number of countries and organisations have presented further security initiatives. Parts of these initiatives are statutory obligations, others are voluntary certification programmes. However, the voluntary programmes can be experienced by companies as essential for trading activities and for maintaining tempo in the supply chain. Apart from improved security, motivations for companies to participate in the initiatives can include the possibility of obtaining smoother customs treatment; requirements made by partners, and pure marketing considerations. No company wishes to see its name associated with a consignment that contains terrorist weapons. On the other hand, being associated with security initiatives can be seen as a sign of professionalism, thereby strengthening the name of the company.

Another dimension to the need to strengthen security measures in global maritime trade is the canker of piracy. Resource scarcity and resource constraints remain an area of ongoing concern, and a key aspect of ensuring resource availability is distribution. But distribution depends on the perception of risk, which therefore regulates price and availability. When can distribution be risky? Surely it's just a matter of moving goods from point A to point B? The overall cost of global piracy

– ultimately borne by consumers of commodities – has been estimated at USD15-25 billion per year (Jones, 2014). During 2011, a huge increase was observed over 2010; in the first quarter, pirates attacked 142 vessels, seized 18, including three tankers over 100 k deadweight, murdered seven crew members and injured 34 – an all-time high in only three months. The war zone was predominantly the 2.5-m square nautical miles off Somalia, which has increased from 1.5 m two years ago (Feldman, 2011). As a result of maritime piracy, the study is not just looking at increased prices of commodities carried by sea –it is looking at matters of life and death for seafarers, as maritime pirates become more aggressive and violent. The further they venture out, the more desperate they become to successfully attack and hijack ships. Even “suicide bombers” are now taking to the seas, navigating small crafts packed with explosives directly alongside their targets. This obviously dissuades mariners from taking on the risk of sailing in pirate-infested waters, pushing up crew wages with “danger money”. To a certain extent, private navies and security guards on ships are dissuading pirates from attacking – but these also pose a major cost.

2.2.1 Supply Chain Management

Supply chain management is the pattern that is changing business and business relationships. It reflects the realization that the product or service pipeline for a business extends from the vendor/supplier right through to delivery to the customer. This makes managing such a supply chain a collective effort of suppliers and customers to develop and exploit the savings, service and benefits of SCM. According to Martin Christopher, supply chain management is “...the management of upstream and downstream relationships with suppliers and customers to deliver superior customer value at less cost to the supply chain as a whole” (Christopher, 2005).

A supply chain (SC) consists of all stages involved, either directly or indirectly, in fulfilling a customer request. It also includes manufacturer, supplier, transporters, warehouses, retailer, third-

party logistic provider, and customer. The objective of supply chain management is to maximize the overall value generated rather than profit generated in a particular supply chain (Larsen, 2003). Some other authors have defined supply chain (SC) as encompasses all activities associated with the flow and transformation of goods from the raw materials stage (extraction), through to the end user, as well as the associated information flows. Materials and information flow both up and down the supply chain. Supply Chain Management is the integration of these activities, through improved supply chain relationships, to achieve a sustainable competitive advantage (Cambridge International College). In any case, what is clear from these definitions is that supply chain management as a management philosophy seeks to bring together all networks of partners in a closely linked partnership in order to facilitate the flow of material/service in the system, with the end result of satisfying the customer.

The ultimate objective of supply chain management is to achieve a ‘strategic fit’ between the firm’s competitive strategy and supply-chain strategy. This strategic fit can be achieved by Understanding the customer demand, which helps the company to define costs and service requirements and understanding the supply chain that helps the company to design and manage its supply chain in accordance with the customer’s demand. If any mismatch exists between what the supply chain is capable of doing with respect to customer demands, the company can either alter the structure of the supply-chain design or alter its strategies.

2.2.2 Global Port Supply Chain Network

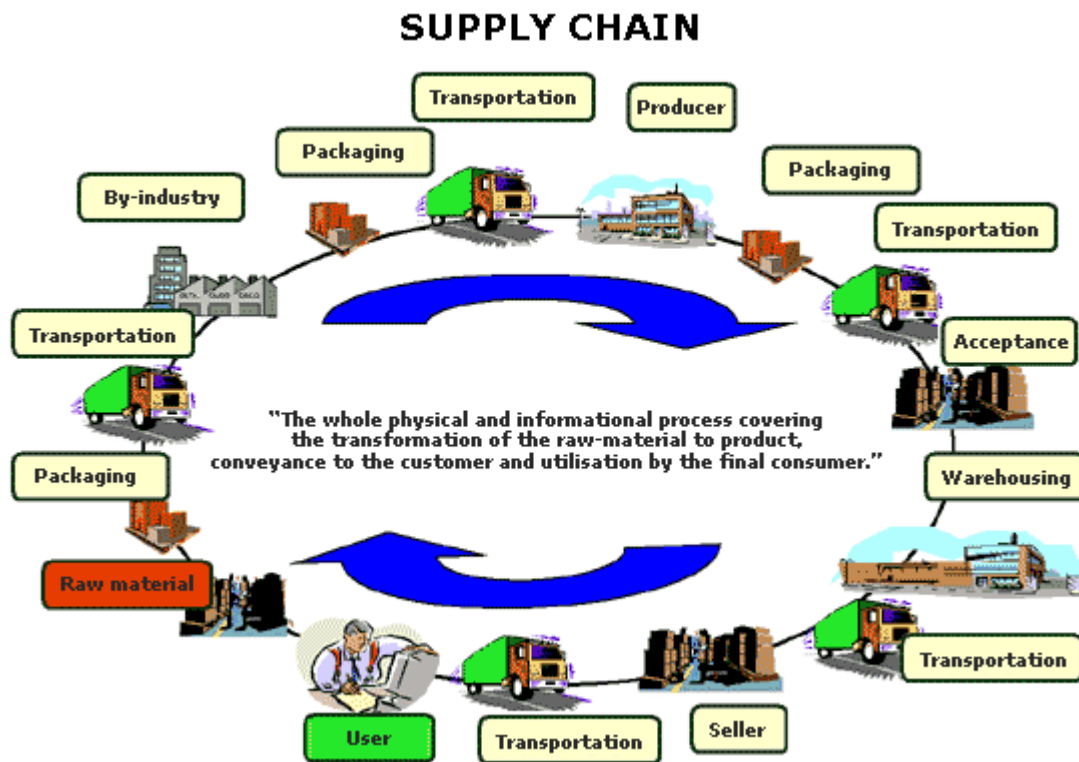
European Commission in their report specified that there are approximately 4.7 million companies in the EU that are involved in the supply chain, according to data provided by Eurostat. The supply chain is also very extensive in volume. During 2005 the volume of

goods transported in containers was 114 million TEU (Twenty-foot Equivalent Unit – a standard measure for containers) (Anyanova, 2007) .

A very large proportion of the transports that are necessary for the production systems of today are made in the form of containers. A container is a reinforced steel box with a double door. It can be modified to transport refrigerated and frozen goods, gases or liquid substances, or specially equipped, for example to transport clothes. Where international trade is concerned, the intermodal container transport chain functions rather like the circulation of blood in the body. Bram J et al indicated that the system has proved to be very effective and relatively secure and there are possibly further gains, financial and environmental, to be made by strengthening intermodality and nodes (Bram, Haughwout, & Orr, 2002).

One typical illustration of the way goods are moved between producers and consumers is a chain of goods, transports and information – a supply chain. The idea is that a raw material or a product is produced, sold and transported to a firm which in turn sells it onwards in the chain. This firm can be an importer or a wholesaler, which distributes the good either directly or through further distributors to the final customer. In a chain of this type the parties involved are the original producer, the transporter, the wholesaler/importer, possibly further distributors, the retailer and the final customer. It is also possible to add the financial transactions and the associated exchange of information.

Figure 1: Sea supply chain network



Global Supply chain network (www.turkishtransporters.com)

2.3 Supply Chain Security (SCS) Programs

Many types of responses and actions have been undertaken by different governmental organizations, international organizations and businesses to enhance global SCS programs. These responses range from country-specific operational regulations to global research and pilot programs. All have different originating actors and target specific goals.

Supply chain security programs can be compulsory or voluntary. Most major SCS programs has been illustrated in table 1 below.

Table 1: Compulsory SCS Programs

Program	Country	Year
The Advance Cargo Information(ACI) 24 Hour Manifest Rule	US	2003
The International Ship and Port Facility Code (ISPS Code)	Across the Globe	2004
The ACI rules	EU- Japan, Mexico Canada	2009-2011 2007
The ACI US 10+2 rule	US	2009-2010
The ACI rules in China	China	2009
100% scanning		2012

Donner M and Kruk C (2009)

2.3.1 The ACI 24 Hour Manifest Rule

ACI is the concept that reinforces the first compulsory supply chain system requirement, the 24 Hour Manifest Rule implemented by the US Customs in 2003. Additionally, US Customs & Border Protection (CBP) uses an Automated Targeting System (ATS) to support the ACI concept. ATS is in fact an Intranet-based enforcement and decision support tool that is the cornerstone for all CBP targeting and risk management efforts.

CBP uses ATS to improve the collection, use, analysis, filtering and dissemination of the massive quantity of ACI information that is gathered for the primary purpose of targeting,

identifying, and preventing potential terrorists and terrorist weapons from entering the US.

ACI is also an integral part of the World Customs Organization's SAFE Framework of Standards as one of the "four core elements". The WCO states that the "Framework harmonizes the advance electronic cargo information requirements on inbound, outbound and transit shipments". ACI is recognized in the US through the SAFE Ports Act which promotes the use of advance electronic information and origin-to-destination security.

The European Union (EU) has also fused the ACI concept within its Authorised Economic Operator (AEO) program. EU AEO requires the use of advance electronic data, electronic records, and security compliance to the EU Standards, adopts the Single Window concept, allows access to cargo and the control of seals on containers by authorized personnel only, and orders control of cargo from loading to unloading.

Donner and Kruk, indicates that this requirement, hitherto only compulsory for seaborne trade to the US, Japan, Mexico and China, is included in various programs across the world and is expected to be implemented by other countries, notably the EU, in the coming years (Donner & Kruk, 2009).

In most African countries only part of this program has been implemented. In Ghana Port shipping lines sends the manifest 48 hours before the arrival of the vessel but scanning is not done. ACI provided by all the actors in the supply chain via the shipping lines allows Customs authorities to screen the imported containers, and make informed targeting and intervention decisions and to concentrate resources on the high risk issues and cargoes.

This procedure, based on a Risk Management approach is considered one of the "cornerstones" in most SCS programs. The 24 Hour Rule mandates sea carriers and Non-Vessel Operating Common Carriers (NVOCCs) to provide US Customs and Border Protection with

detailed descriptions of the contents of sea containers bound for the US 24 hours before a container is loaded aboard the vessel at the last foreign port. The Rule applies to all vessels which will call at a US port and all cargo destined for the US or carried via US ports to a non-US destination. The rule does not apply to feeder or transshipment vessels without a port call in the US. Nevertheless, the Rule does apply when the cargo is transhipped onto a vessel with a port of call in the US.

In simple terms, the 24 hour manifest rule can be explained as follows: the shipping lines are not allowed to load a container on-board a vessel bound to a US port if they have not previously electronically communicated the basic bill of lading (manifest) details of the cargo contents, shipper and consignee of the container to US Customs 24 hours before loading. If the loading of a container is not expressly rejected by US Customs within 24 hours of the declaration, by default, it is allowed to be loaded to the US. The mandatory information includes the following:

- Shipper's name and address
- Consignee's or Owner's name and address
- Notify Address
- Bill of Lading Number
- Marks and Numbers from Bill of Lading
- Container Numbers and Characteristics
- Seal Numbers
- Cargo Description
- Gross Weight or Measurement
- Piece Count
- Hazmat Code
- First Foreign port/place carrier takes possession

- Foreign Port where cargo is laden abroad
- Foreign discharge/destination port for Immediate Exports and Transportation for Exports
- In-bond data

This mandatory information is applicable in most ports in West African and Africa. However the 24 hour rule has not been implemented in most African countries.

2.3.2 The International Ship and Port Facility Code (ISPS Code)

September 11, 2001's events have shown that no country in the world is immune from terrorism.

Whatever the reasons behind them, acts of terrorism can be committed at any time and at any place. Shipping and ports were, are and will be no exceptions. Unfortunately, all means of transport are preferential terrorist fields. The new, comprehensive, security regime for international shipping entered into force on July 1, 2004, following the adoption, by a week-long diplomatic conference of a series of measures to strengthen maritime security and prevent and suppress acts of terrorism against shipping (IMO, ISPS Code, 2002). This conference was of crucial significance not only for the international maritime community, but also for the world community as a whole, given the pivotal role shipping plays in the conduct of world sea-borne trade.

The ISPS Code is an international agreement between government member states of the International Maritime Organization (IMO), which currently number 167. Being an international code, ISPS imposes itself upon the Governments of the signatory States. The ISPS Code addresses the security of the port installations and vessel components of the supply chain. The objective is to establish an international framework involving co-operation between signatory governments, government agencies, local administrations and the shipping and port industries to. According to IMO, the goal of the ISPS Code is, to establish

an international framework for cooperation between governments, government agencies, local administrations, and shipping and port industries (IMO LEG 88/13,, 2004).

This framework is intended to facilitate the detection and analysis of threats to security and the introduction of preventive measures to meet security incidents that affect ships or port facilities used in international trade. With the help of the Code the roles and responsibilities of all parties shall be defined, at both national and international level, for ensuring maritime security. It shall ensure the early and efficient collection and exchange of information related to security, and provides a methodology for security assessments to enable suitable and proportional measures to be taken as a reaction to changes in needs of security. These goals shall be achieved through the appointment of suitable security personnel on each ship and at each port office and shipping company to prepare and introduce security plans. The ISPS code applies to:

- The following types of ships on international voyages:
 - ✓ Passenger ships, including high-speed passenger craft
 - ✓ Cargo ships, including high-speed craft, of 500 gross tonnage and upwards
 - ✓ Mobile off-shore drilling units
- Port facilities that serve these ships.

According Kommerskollegium, the ISPS Code is in two parts. Part A includes mandatory measures such as the appointment of security personnel and the drawing up of security plans. Part B includes guidelines and recommendations on ways in which security plans for ships and port facilities should be prepared (Kommerskollegium, 2008). The ISPS Code includes security measures at three levels: security level one is the level at which ships and ports

work in normal situations. Where security for ships is concerned, routines shall be introduced for, among other things, access to the ship, control of persons that go on board including their baggage, and the surveillance of decks and areas in immediate proximity of the ship.

Whenever there is a high risk for a security incident, security level two is introduced and the above routines are intensified. Security level three, which is introduced in exceptional cases where there is an imminent risk of a security incident, leads to a further intensification of the routines. The third security level shall only be applied as long as there is an immediate risk of a security incident and, as soon as this risk diminishes, the level shall be lowered.

Part B contains detailed regulations on the security routines that shall be introduced when the security level is changed. Among other things water-side access to the ship in security level two shall be avoided and port patrols shall be encouraged. Under security level three, access to the ship shall only be permitted at one point which shall be under strict surveillance.

In May 2003, the European Commission issued a communication on enhancing maritime security (EU, 2003). Within this communication, the Commission well-thought-out that since the security of a transport chain depends upon its weakest link, then an approach addressing the multimodal dimension in parallel would make possible to improve the security of transport as a whole. Goulielmos and Anastasakos commented that the communication underscored the fact that the European Union's maritime logistics system – including sea-borne freight transport, ports and port handling services – contributed to over two thirds of the total trade between the Community and the rest of the world (Goulielmos & Anastasakos, 2005). It is

therefore important that maritime transport security should be enhanced, and its “competitiveness” maintained, while facilitating trade. The communication refers to a number of areas on which action is in progress such as: security of community ports, enhancing the security of the logistics chain as a whole, monitoring and administrating maritime security, maritime transport risk insurance and international mutual recognition (Goulielmos & Anastasakos, 2005). Of particular shipping policy relevance is the expressed commission’s intention to encourage the establishment of partnership based on mutual and reciprocal recognition of security and control measures with all its international partners, including the USA, so as to promote the harmonious and secure flow of world maritime trade

2.4 Supply Chain Voluntary Programs

These programs are described voluntary because they are not compulsory, in the sense that they are not imposed by a law or international code or convention. In theory, trade and transport operators can still operate – though possibly at a competitive disadvantage – without participating to one of these programs.

2.4.1 Transported Asset Protection Association (TAPA) (1997)

TAPA is a pre- 9/11 program (Donner & Kruk, 2009). They stated indicated the program is a non for profit association which was formed in the US in 1997 and which started working in Europe in 1999 and in Asia in 2000. TAPA’s rationale for coming into existence was motivated by an observed rise in cross-border crime in the United States. According to TAPA, the introduction of the EU’s inner market during this period, made it easier for criminal gangs to move across borders. TAPA EMEA (TAPA Europe, Middle East and Africa) considers this to have had a major impact on crime directed towards the transport of goods with a high value. This program has not been adapted by most companies’ African countries of which Ghana is not an exception.

TAPA's overall goal is to identify the fields in which members experience losses, and to share information on effective routines and practices. The program concentrates its efforts on the transport of high-tech goods; the possibility to become a member of the program is limited for an average sized company. Initially, only companies that produce or export high tech goods could become members, but this was later extended to include companies producing other high value goods.

2.4.2 Customs-Trade Partnership against Terrorism (C-TPAT) (2001)

The C-TPAT program is a joint effort between the US government and businesses involved in importing goods into the US. It is part of the ever-evolving nature of the US CBP post 9/11, and recognizes that border security will be much more efficient if Customs involves businesses in the process of securing and inspecting cargo. The approach, which began in 2001 with 7 large US companies, was geared towards acting against possible supply chain terrorism, especially to do with container security. Since then C-TPAT has grown markedly to the extent that over 8,000 companies are now actively involved with the C-TPAT process. CPB Agents have participated in over 4,000 validation reviews and have met with C-TPAT Partners in over 50 countries.

Membership in C-TPAT is available to most businesses that import goods into the US including freight carriers, brokers, manufacturers, and importers, as long as they agree to the guidelines of C-TPAT membership (Donner & Kruk, 2009).

In addition to supporting the US global war on terrorism, C-TPAT membership also carries a number of tangible benefits. Members are less subject to Customs inspections, and C-TPAT containers that are singled out for inspection go straight to the front of the line, ahead of non-C-TPAT boxes. Ghana and other African countries who do not attract the US market

have not enrolled on this program.

2.4.3 Container Security Initiative (CSI) (2002)

In 2002 the CSI was established by the US CBP to find solutions to the threat to border security and global trade posed by the potential terrorist use of a maritime container (TED Stevens , TOM Coburn, 2005). Participating countries establish a security regime in collaboration with the US CBP to ensure all containers that pose a high risk for terrorism are identified and inspected before they are placed on vessels destined for the US. Moreover, CSI aims to target and pre-screen containers and to develop additional investigative leads related to the terrorist threat to US-bound cargo. As the CBP puts it, the intent is to "extend the zone of security outward so that American borders are the last line of defence, not the first". Prior to the establishment of CSI, there was no foreign inspection of US-bound containerized shipments. The security of maritime containers pre 9/11 was limited to targeting and inspection upon arrival in the US, an approach considered to be burdened with significantly greater risk. The US Department of Homeland Security (DHS) considers that this security regime, designed for the maritime container environment, greatly enhances and complements the Layered Security methodology being employed by CBP in C-TPAT. In the CSI program high-risk shipments are identified and examined by using cargo security measures, such as X-ray and radiation scans.

For example, high security Mechanical Seals and Tamper Evident Tape are applied after the examination of containers in order to maintain the integrity of the container while in-transit to the US. Currently, there are 58 operational CSI ports in Europe, Asia, Africa, the Middle East, and North and South America. This translates to 86% of all maritime containerized cargo destined to the US being covered. A further 35 Customs administrations have committed to

join CSI.

2.5 Other Significant SCS Programs/Projects

2.5.1 Operation Safe Commerce (OSC) (2002)

Operation Safe Commerce (OSC) is a combined effort between the US government, private business and the maritime industry, to develop and share best practices for the safe and expeditious movement of containerized cargo (WSC, 2002). New technologies and initiatives are being implemented in selected global supply chains. These are aimed at improving security during the process of stuffing and deconsolidating containers, physically securing and monitoring containers for transportation, and exchanging timely and reliable communication.

2.5.2 ACE or Automated Commercial Environment

The Automated Commercial Environment (ACE) is the United States' commercial trade processing system designed to automate border processing to enhance border security and foster our Nation's economic security through lawful international trade and travel (TED Stevens , TOM Coburn, 2005). ACE will eventually replace the current import processing system for U.S. Customs and Border Protection (CBP), the Automated Commercial System (ACS). ACE is part of a multi- year CBP modernization effort and will be deployed in phases. ACE provides a solid technology foundation for all border security initiatives within CBP and will

- Allow trade participants access to and management of their trade information via reports
- Expedite legitimate trade by providing CBP with tools to efficiently process imports/exports and move goods quickly across the border

- Improve communication, collaboration, and compliance efforts between CBP and the trade community
- Facilitate efficient collection, processing, and analysis of commercial import and export data; and
- Provide an information-sharing platform for trade data throughout government agencies.

2.5.3 LRIT or Long-Range Identification and Tracking of ships

The Long-Range Identification and Tracking (LRIT) system provides for the global identification and tracking of ships. The obligations of ships to transmit LRIT information and the rights and obligations of Contracting Governments and of Search and rescue services to receive LRIT information are established in regulation V/19-1 of the 1974 SOLAS Convention (IMO, 1974).

The LRIT system consists of the ship borne LRIT information transmitting equipment, the Communication Service Provider(s), the Application Service Provider(s), the LRIT Data Centre(s), including any related Vessel Monitoring System(s), the LRIT Data Distribution Plan and the International LRIT Data Exchange.

Certain aspects of the performance of the LRIT system are reviewed or audited by the LRIT Coordinator acting on behalf of all Contracting Governments. LRIT information is provided to Contracting Governments to the 1974 SOLAS Convention and Search and rescue services entitled to receive the information, upon request, through a system of National, Regional, Cooperative and International LRIT Data Centres using the International LRIT Data

Exchange.

2.5.4 AIS or Automatic Identification System

Vessel Tracking Services (VTS) and ships use the Automatic Identification System (AIS) for locating and identifying ships within a relatively limited range. When AIS is combined with the Long Range Identification and Tracking (LRIT) system, this provides a clear tracking and tracing layer in supply chain security. Practically, the AIS enables vessels to transmit receive and share real-time data covering ship identification, positioning, course, and speed. Additionally, vessels tracking services and maritime authorities can use this information to monitor and control vessel movements accordingly. According to the IMO SOLAS convention AIS must be installed on all passenger ships and cargo ships over 300 gross tons.

2.6 Implication of the Review Literature on the Study

The above reviewed literature can be categorised under the following which in my view can be applied to the study.

The International Ship and Port Facility Code (ISPS Code)

In the reviewed literature, the ISPS Code was identified as part of the supply chain security programs implemented by some ports across the globe. This program guarantees safety of ships, crew members and cargo on board a ship. Other issues like piracy and terrorism were issues the code attempted to address and ensured full compliance by members countries who had signed on to the code. Enshrined in the code is the safety of the port in terms of berthing of ship, unloading and loading of containers, movement/transfer of containers to inland container depot or off-dock terminals and the final delivery of cargoes to customers. The study will examine to what extent has Tema Port complied with the ISPS Code and if there are any challenges.

2.7 Conclusion

In this chapter supply chain security programs in the global maritime industry were discussed. The drivers of globalisation with respect to the global maritime industry were identified as decreasing tariffs, improved transportation, communications and information technology, global manufacturing of products and availability of services across markets among others. The bombing of the World Trade Centre in 2001 was used as the premise for this discussion on supply chain security. It was discovered that a number of programs and initiatives were introduced in the fight against terrorism and the strengthening of security in the maritime supply chain network. Notable among these programs were the ISPS Code, the 24 hour Rule and other programs like the AIS and ACE among others. Ultimately these initiatives were to ensure full protection of the supply chain network in the maritime industry.

In chapter three a methodology based on the reviewed literature was calved and situated in the context of the reviewed literature and its implication to the study. The purpose was to establish a correlation of the reviewed literature and its implications to a method that will aid in achieving the objectives of the study and addressing the research questions.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introductions

The main objective of this chapter was to a method that will achieve the research objectives and answer the research questions in view of the reviewed literature. In view of this, the chapter introduces the research design, sources of data, research population and sampling technique, data gathering procedure, method of data analysis, ethical consideration, and brief profile of Tema Port.

3.2 Research Design

The research design consisted of a field research conducted at Tema Port. This research strategy clearly matches an exploratory research initiative. This seems appropriate since it enables researcher to capture a real picture of the port (Zikmund, 2003). Furthermore, a “case study is a research strategy which emphasizes on understanding the dynamics present within single settings” (Eisenhardt, K. M. and Martin, J. A., 2004). A case study allows researchers to fully understand the dynamic within a given situation, focus on emerging phenomena and eventually induce theories (Benbasat, I. Goldstein, D. K. and Mead, M, 1987). Case studies are also well suited to answer research questions such as “why” and “how” things are done (Yin R. K., 2004).

Yin, described five primary strategies by which social scientists collect empirical data. According to him, depending on the research questions, to which extend the researcher has control over behavioral event, the research can choose from the following: Experiment; Survey; Analysis of archival records; History; and Case study (Yin R. K., 2004). In this study, a survey approach was used because the researcher wants to have easy access to information and also to minimize cost.

Shuttleworth, buttresses this point by emphasizing that surveys are used to gather information on a population at a single point in time mainly by the use of questionnaire or interview (Shuttleworth, 2008). In this study questionnaire was employed. Survey technique was considered the most suitable data collection method for this study as the research requires a good understanding of Tema Port activities from berthing of a vessel to the delivery of cargo to the customer. This however will help assess the extent to which the Port complies with the ISPS Code. A set of structured questionnaire was prepared for Ghana Ports and Harbours Authority, Ghana Revenue Authority CEPS Division and the Importers/Exporters. The questions were used to collect the factual information needed to determine variables such as safety of ship at anchorage, safety of cargo, piracy, and security infrastructure among others. In order to ensure that questions answered from respondents' matches the reality on the ground, an observation technique was considered in collecting site data since the study required a good understanding of Tema Port processes for the purpose of assessing the compliance level of the Port with respect to the ISPS Code.

3.3 Sources of Data

In this study, both qualitative and quantitative approaches were adapted in collecting data. The qualitative approach employed questionnaire as a strategy of gathering primary data. These questions were posed in order to gather both quantitative and qualitative data for analysis. Added to this, the cycle of berthing, discharging containers, stacking of containers and the transfer of containers from Tema Port to other ICD's was observed on-site in order to assess the ISPS compliance level of the Port. Primary data was elicited from the questionnaire and on-site observation. Secondary data was collected from the library of Tema Port and Ghana Revenue Authority. Articles and journals from authors in the maritime industry were also sourced. In

reviewing the literature references were made to some other works which were done by World Bank, UNTACD and Goulielmos and. Anastasakos. Other publications by Donner & Kruk and others were not left out in the reviewed literature.

3.3 Research Population Sampling Technique

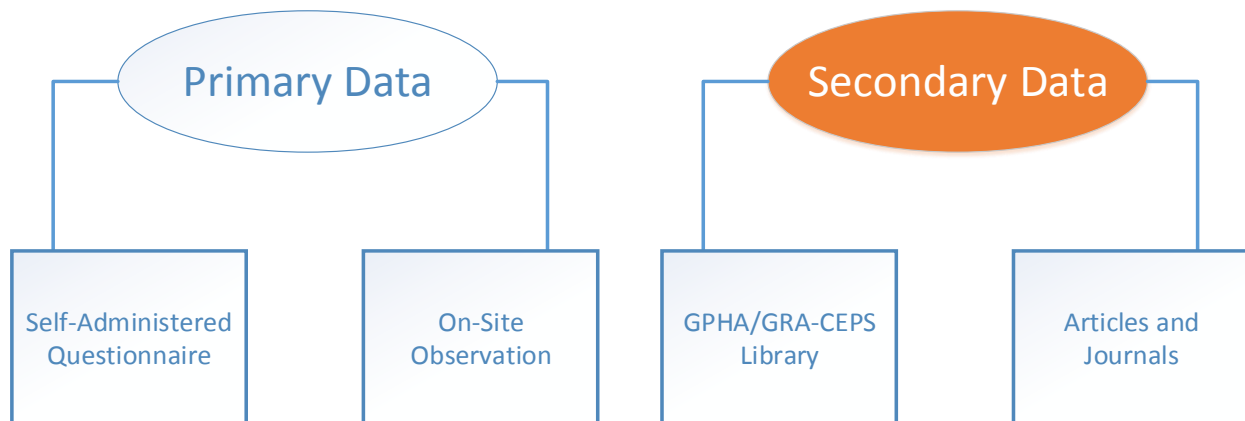
The research population covered mainly the management staff of: Ghana Ports Harbours Authority, Ghana Revenue Authority (CEPS Division) and Importers/Exporters as at December 2013. The sample size drawn from the population is illustrated in Table 2: Sampling Technique. This sample size taken out of the population was 50% from each of the stakeholders in the population and this exceeded the 10% sample size proposed by Godden in his chi-square formula (Godden, 2004). The sampling method was purposive because of it was important to direct questions to those whose work related to the study. Even though the population comprised of only management staff and for that matter random sampling could have been an ideal option, the researcher found out that some the management staff were not directly involved in the core operations of the Port. So it was important to choose purposive sampling even though the sampling technique has an element bias as its weakness. However, the nature of the work in the port industry is more specialized and for that matter there was no room for bias.

Table 2: Sampling Technique

Category	Population	Sample (S)	Percentage (S)	Responded (R)	Percentage (R)
GPHA	60	30	50%	29	96.7
GRA-CEPS	50	25	50%	21	84.0
Importers/Exporters/Clearing and Forwarding Agents	80	40	50%	35	87.5
TOTAL		95		85	

3.4 Data Gathering Procedure

Self-administered questionnaires, interviews, observation, interaction, among others were used to collect primary data for the research. The secondary source was desk research thus using books, internet, and articles among others. The data collected from these sources direct the conclusions, as it provides the major empirical evidence. Figure 2 illustrates the data gathering strategy.

Figure 2: Data Collection Strategy

3.4 Method of Data Analysis

The questionnaires collected for the purpose of this study will be analyzed mainly using the Statistical Package for Social Sciences (SPSS). These completed questionnaires will be coded and inputted into the SPSS software to form the main data that was used in the chapter four in performing the analysis. These inputted data was screened using the necessary statistical tools to ensure the research data is free from erroneous and extreme values. Tables, frequency tables, charts and graphs were used to analysis simple qualitative and quantitative data. The on-site observation was discussed with pictorial information as a separate section. In this section observed data on the structures put in place by Tema Port to attain ISPS compliant was discussed along with the results from the questionnaires.

3.5 Ethical Considerations

Ethical issues with this research work were handled carefully and circumspectively in way which did not exposure respondents' confidentiality. Data integrity was the hallmark of this research.

3.6 Conclusion

In this chapter a detailed methodology was developed in line with the objectives of the study. The survey approach was chosen as the best approach for the study in view of the reviewed literature. A suitable sample size and sampling technique was adopted. Data analysis were the inputs from questionnaires administered and on-site observations. In chapter four data collected were reported and discussed in detailed.

CHAPTER FOUR

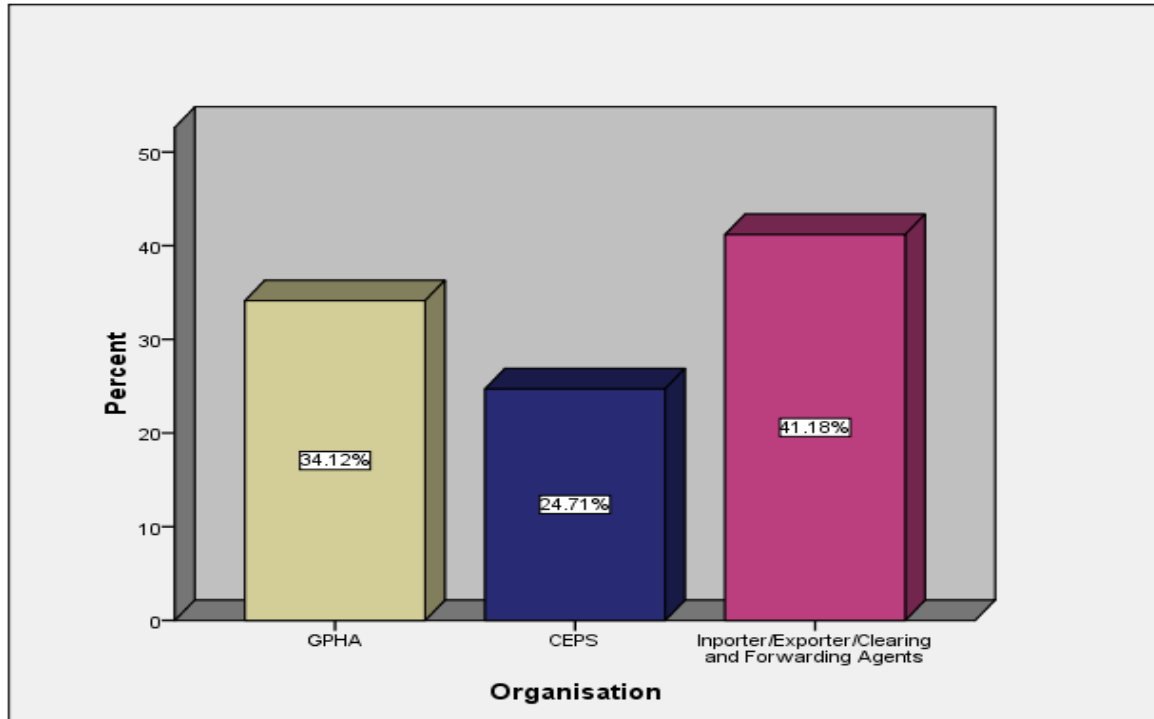
DATA ANALYSIS AND INTERPRETATION

4.1 Introduction

This chapter presents the results found during this study. Samples views were solicited through the administration of questionnaires. Questions were administered were made up of both closed and open-ended questions. Likert scale methodology was applied to sample the views of respondents on the questionnaires. On the average valid administered amounted to 97%. The other 3% was due to refusal of respondents to provide answers to the questions. The process was observed.

4.2 Demography

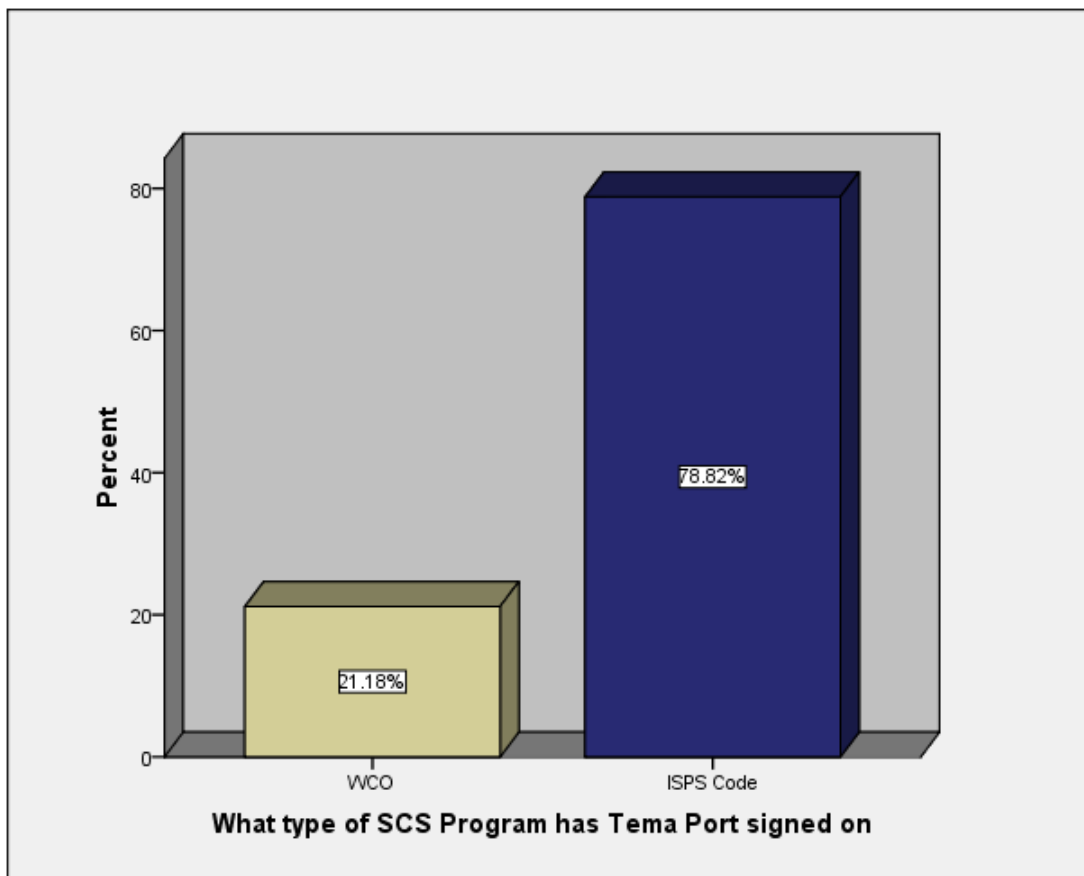
Figure 3: Demography Information



Field Data 2014

Data collected on responses from the respondents revealed that 34.12% of the responses came from GPHA, 24.71% emanated from CEPS and 41.18% came from the importers/exporters and clearing and forwarding agents. This implies that to some large extent the responses from the respondents represented the core stakeholders whose activities are directly connected to the service delivery and who are expected to have a fair idea about supply chain security issues in Tema Port (See Figure 3: Demography Information)

Figure 4: Types of SCS Programs



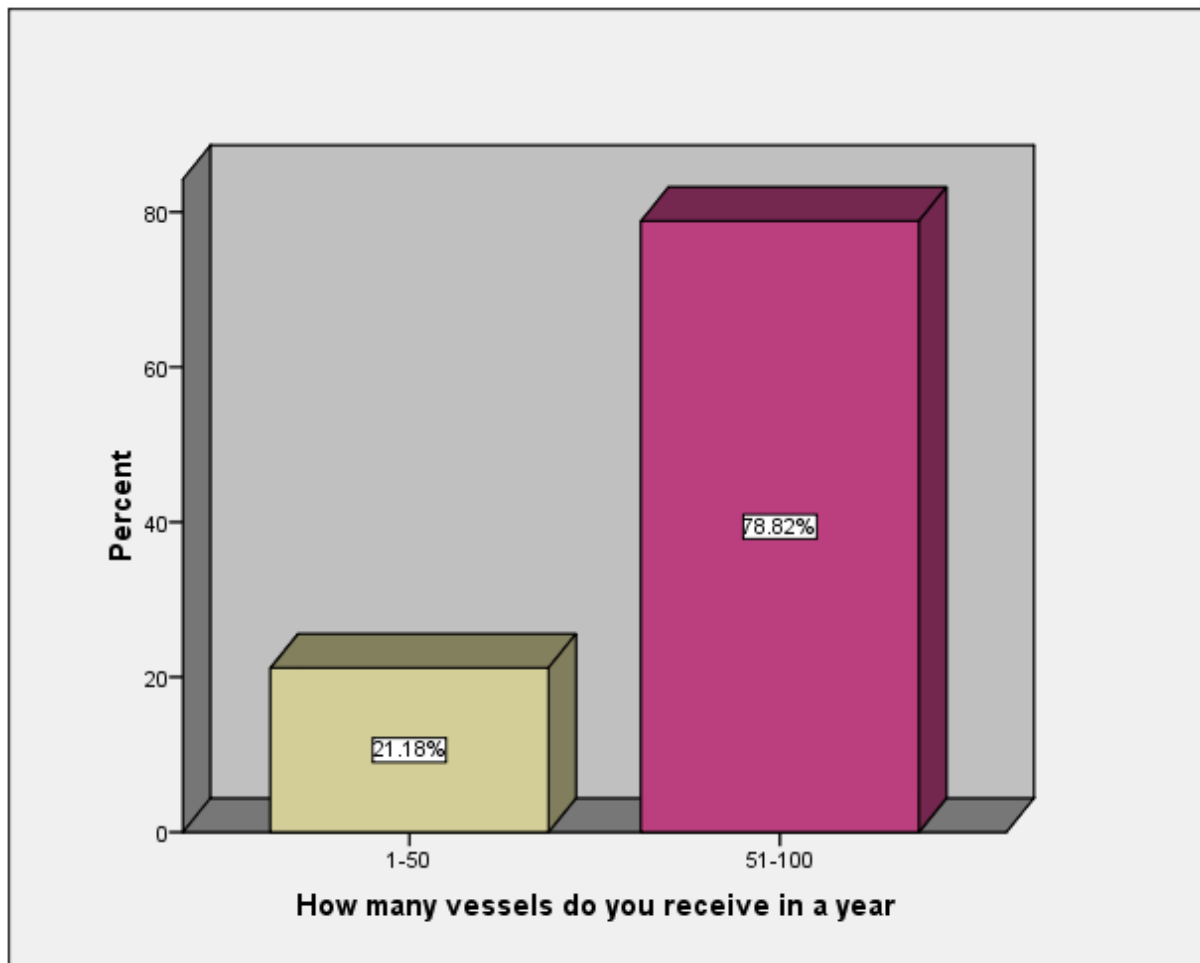
Field Data 2014

Data collected from the field on revealed that 78.82% conceded to the fact that Tema Port has signed on to the ISPS Code, whilst 21.18% agreed that Tema Port has signed on to the WCO program. It appears that majority of the respondents understand to some large extent the SCS programs being implemented in the maritime industry and for that matter were able to point out

two important SCS programs which most ports in west Africa were practicing(See Figure 4: Types of SCS Programs).

4.3 Safety and Security of Vessels

Figure 5 : Vessels Call at Tema Port



Field Data 2014

On vessel call on Tema Port, data gathered from respondents revealed that 78.82% agreed that between 51-100 vessels call at Tema Port within a year, whilst 21.18% said it between 1-50 vessels. The disparity in option was expected especially from the view port of the importers/exporters who do not keep vessel statistics, however majority of the GPHA and CEPS

respondents were in the majority and that may have contributed to the 78.82% responses (Figure 5 : Vessels Call at Tema Port).

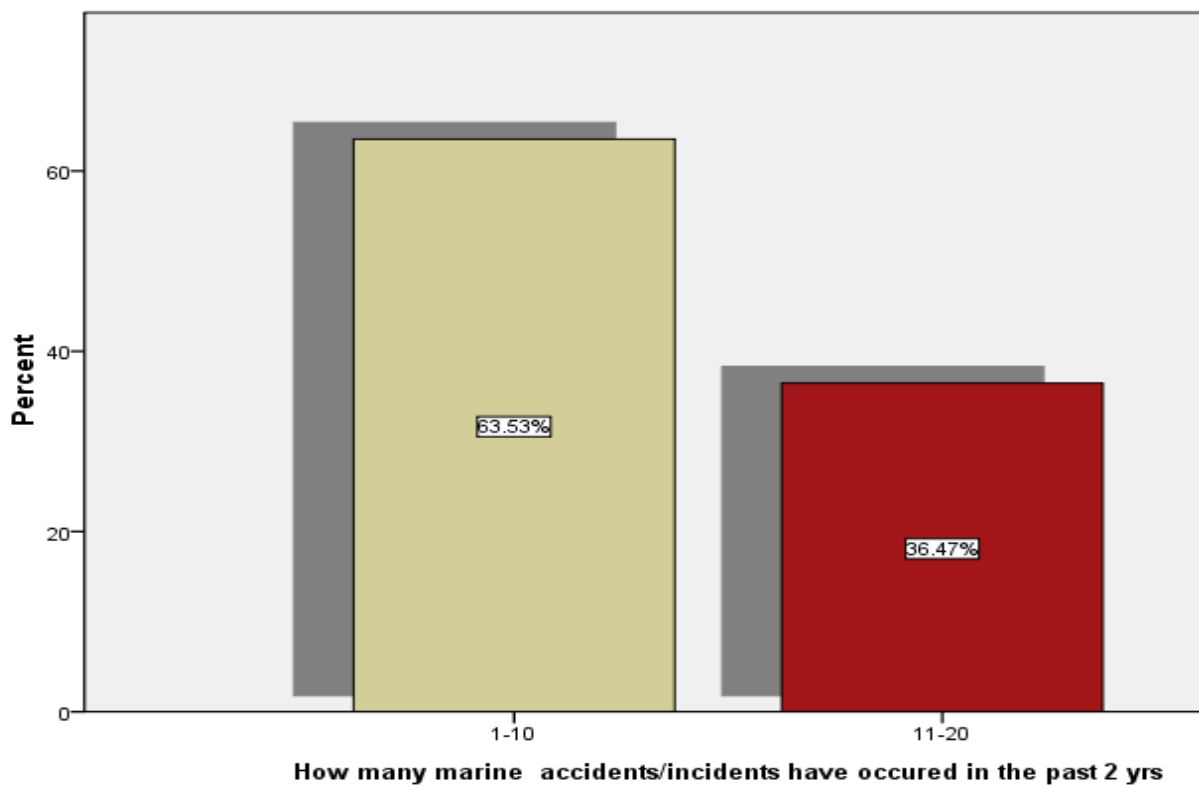
Table 3: Identification of Vessels in territorial waters

Are there any systems in place to identify vessels in your territorial waters		
	Frequency	Percent
Yes	72	84.71
No	13	15.29
Total	85	100

Field Data 2014

It was detected that, 84.71% agreed that vessels were identified once they come into our territorial waters, 15.29% disagreed. This suggests that vessels in the territorial waters of Tema Port are identified by means of some systems (Table 3: Identification of Vessels in territorial waters).

Figure 6: Marine Accident/Incident



Field Data 2014

On marine accident/incident, it was discovered 63.53% agreed that marine accident/incident that had occurred was between 1-10, whilst 36.47% were of the view that it was between 11-20 accident/incidents. This results poses another question about the documentation of accident/incident and near misses. It appeared that only documented accident known to of the respondents were probably scored high and for that matter there were some accidents which were not documented that amount to the 36.47% who believed that the range was between 11-20 (Figure 6: Marine Accident/Incident).

Figure 7: Piracy Issues



Field Data 2014

On piracy issues 84.71% of the respondents agreed that there had not been any seizure and robbery of vessel in our waters for the past two years. 15.29% had no idea about the question. It appears that marine security in Ghanaian waters over the past has been very good (See Figure 7: Piracy Issues).

Figure 8: Safety and Security of Vessels in Ghana Waters



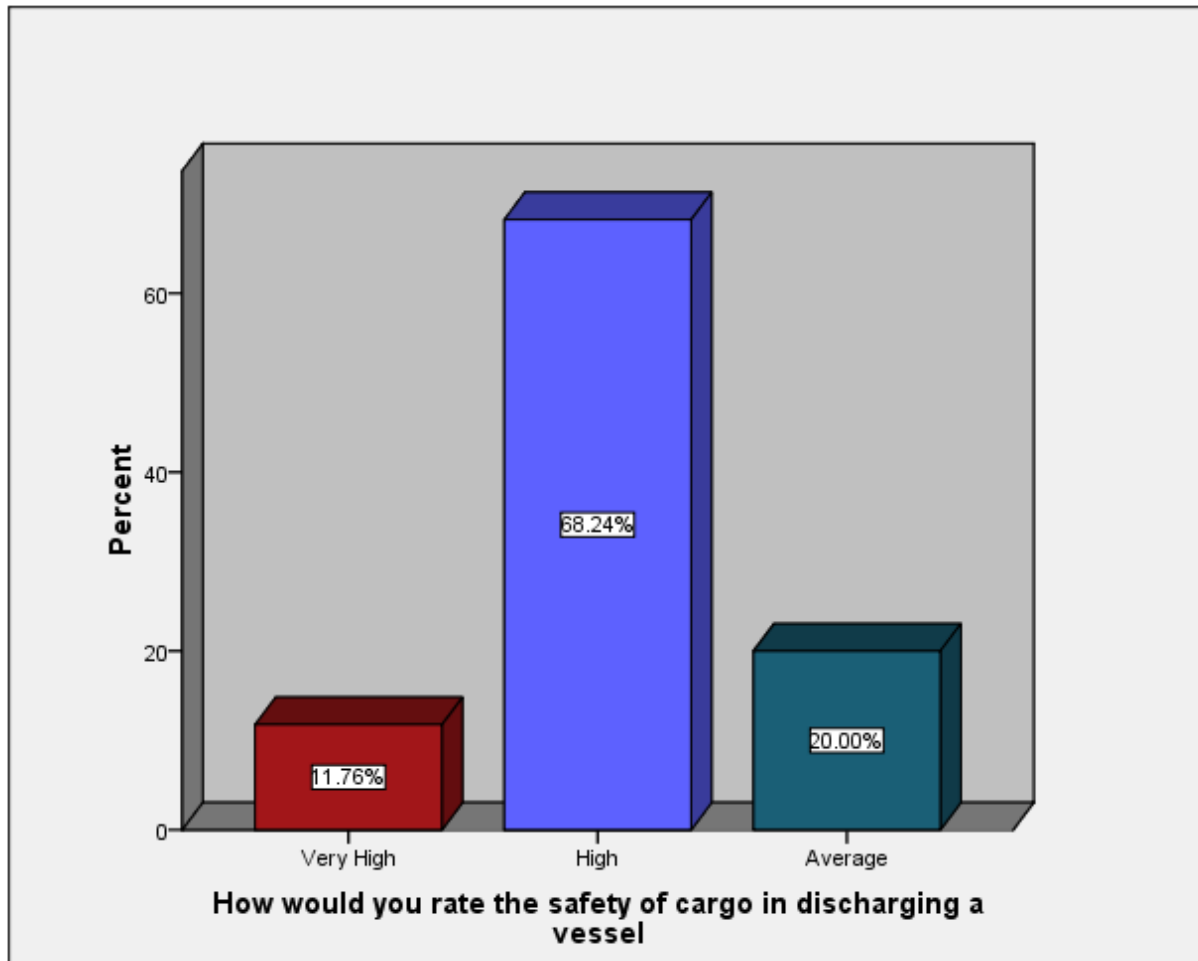
Field Data 2014

On the level of safety and security of vessels in Ghanaian waters, 8.24% of the respondents scored high, 85.88% rated very high, whilst 5.88% scored average. It appeared that safety and security of vessel in Ghanaian waters is significantly high. This finding confirms Figure 6: Marine Accident/Incident and Figure 7: Piracy Issues results that safety and security in Ghanaian waters

have been phenomenal of the past two years (See Figure 8: Safety and Security of Vessels in Ghana Waters).

4.4 Safety of Cargo at the Quay

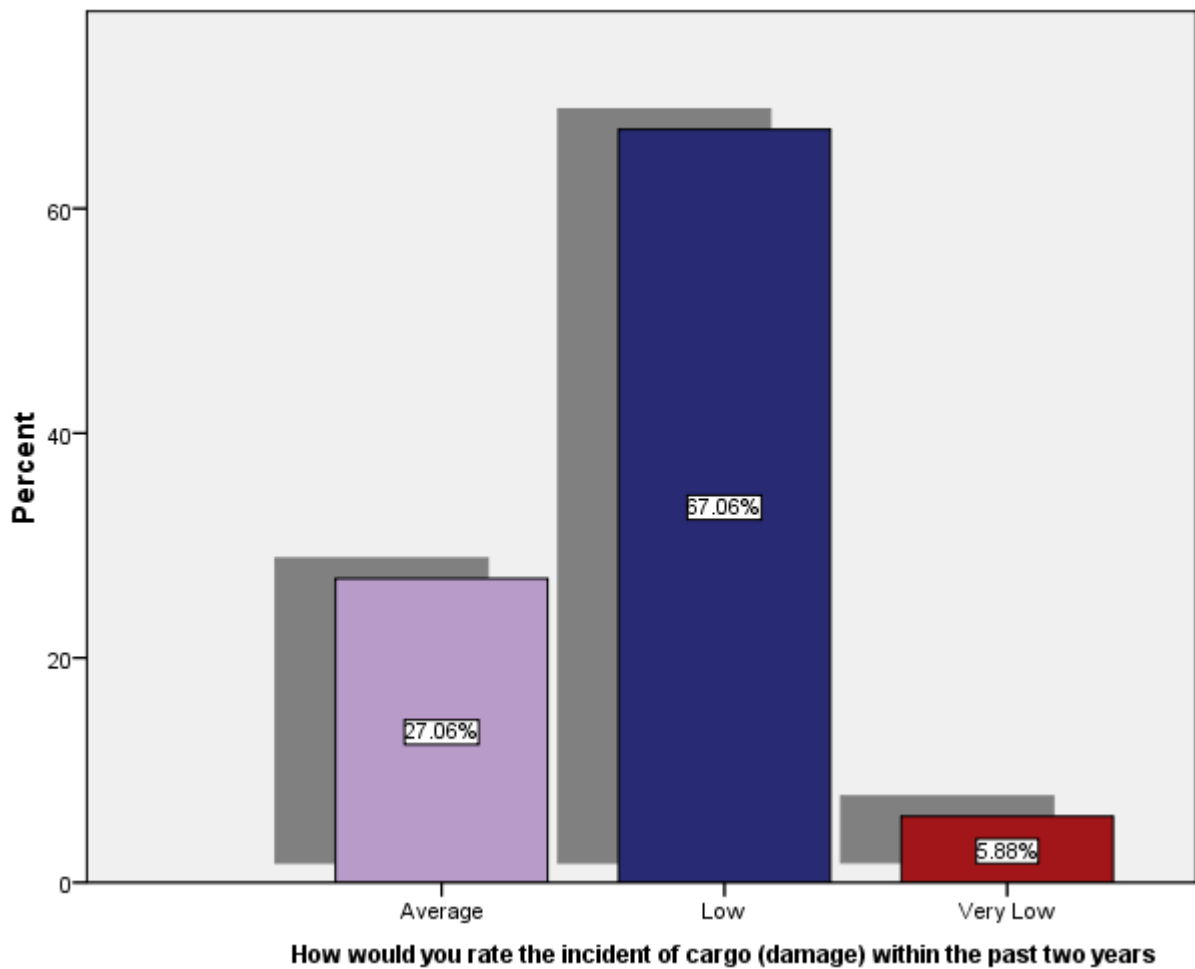
Figure 9: Safety in Discharging Cargo at the quay



Field Data 2014

Data collated from the respondents on security of cargo during discharging at the quay revealed that, 11.76% of the scored very high, 68.24% scored high, whilst 20% scored average. This findings again goes to consolidate the findings on Figure 8: Safety and Security of Vessels in Ghana Waters (See Figure 9: Safety in Discharging Cargo at the quay).

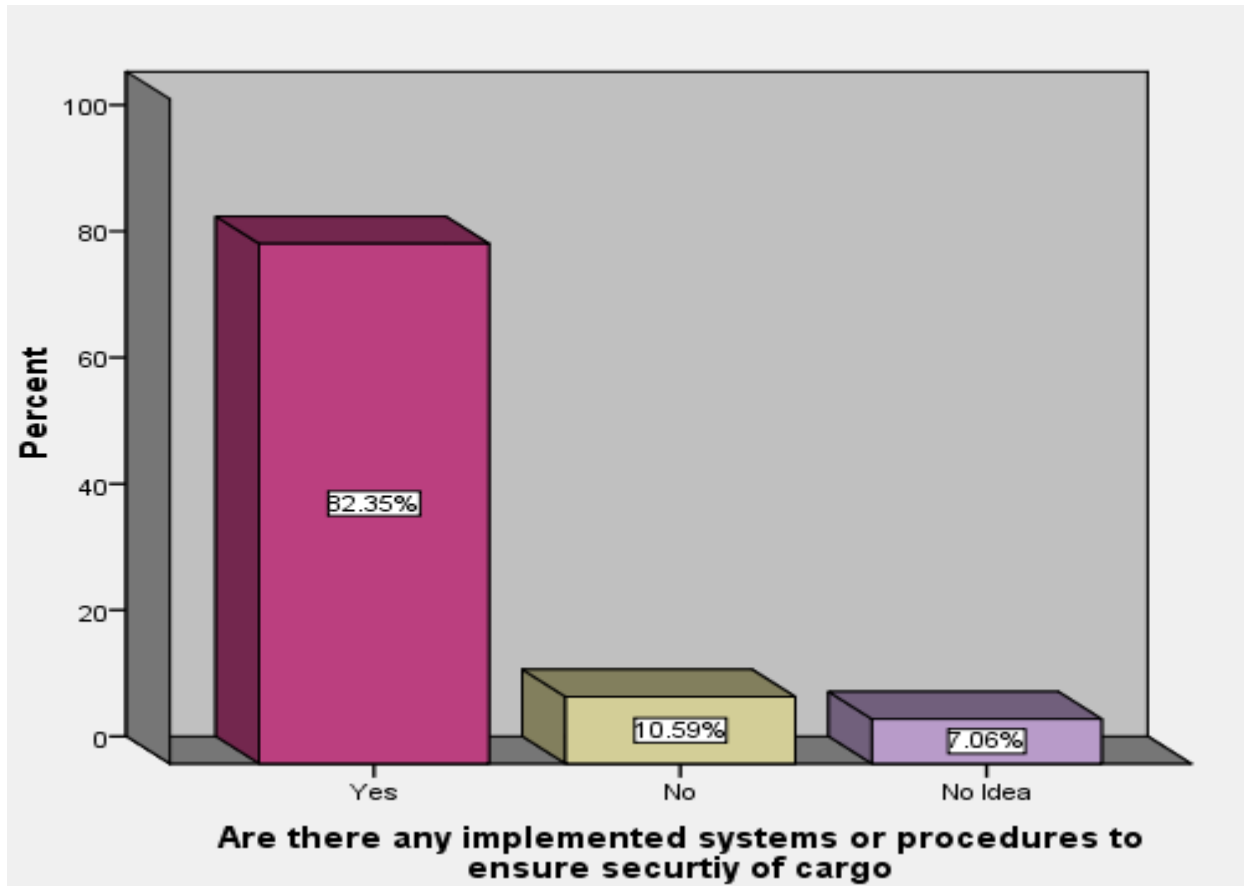
Figure 10: Incident of cargo damage



Field Data 2014

Data gathered on the incident of cargo damage revealed that, 27.06% scored average, 67.06% scored low, whilst 5.88% scored very low. This finding consolidates the results from Figure 9: Safety in Discharging Cargo at the quay (Figure 10: Incident of cargo damage)

Figure 11: Implemented systems on cargo security



On the issue of implemented systems to ensure cargo security, 82.35% responded Yes, 10.59% responded No, whilst 7.06% had No idea. This results goes to affirm the results from Figure 10: Incident of cargo damage which suggests that, damage of cargo in the port is very low and for that matter there might be systems in place to ensure cargo security(See Figure 11: Implemented systems on cargo security).

4.5 Safety and Security of Cargo during Unpacking/Devanning

Figure 12: Safety of Unpacked/Devanned Cargo

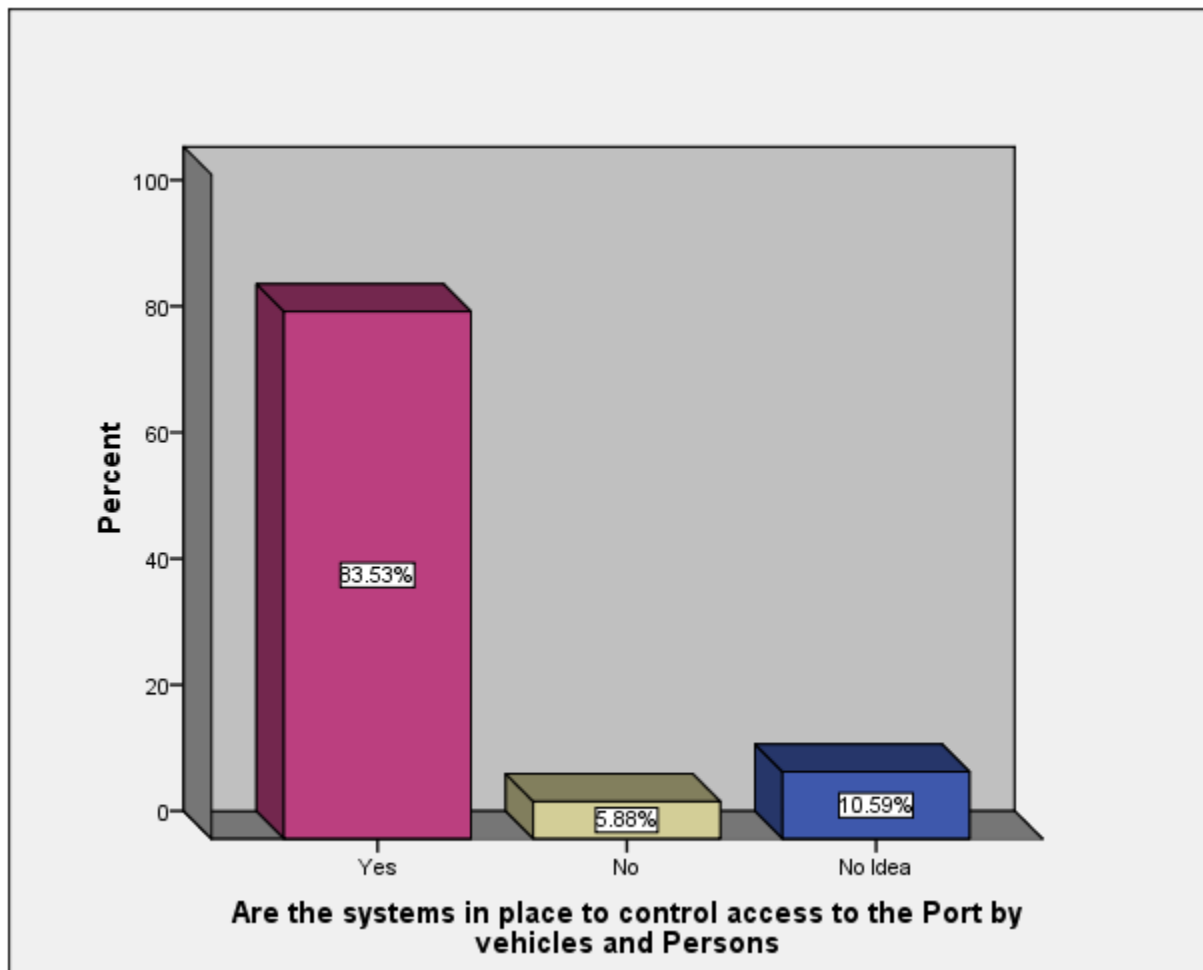


Field Data 2014

Data collated from respondents on safety and security of devanned cargo revealed that 70.59% agreed it was high, 22.35% though it was average, whilst 7.06% thought it was low. This results still confirms the findings on Figure 9: Safety in Discharging Cargo at the quay and Figure 10: Incident of cargo damage (See Figure 12: Safety of Unpacked/Devanned Cargo)

4.6 Identification of Vehicle and Persons in the Port

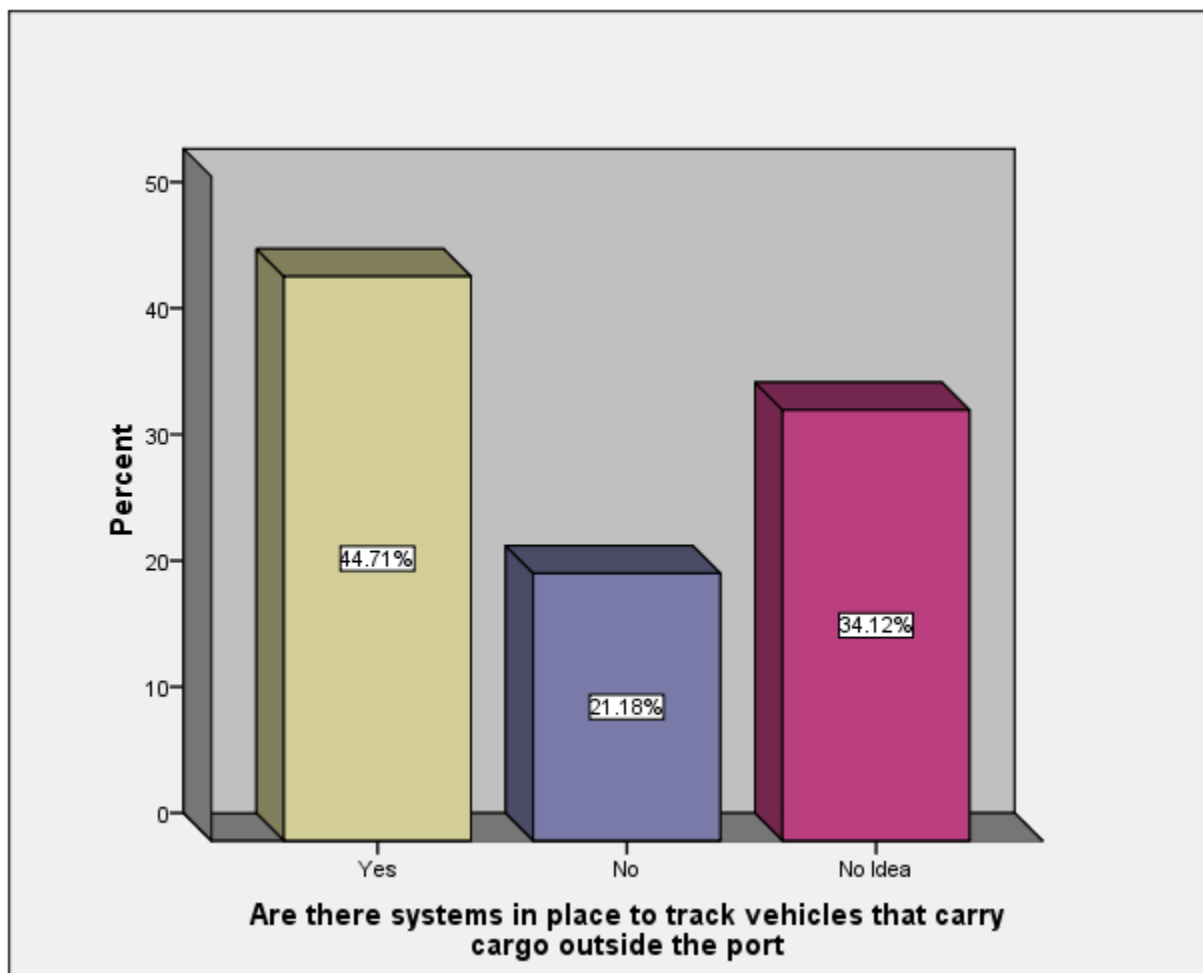
Figure 13: Systems to identify vehicles and persons in the port



Field Data 2014

Data collated from respondents on the implementation of control systems to monitor vehicles and cargo in the port revealed that 83.53% responded Yes, 5.88% responded No, whilst 10.59% said they had No idea. This suggests that to a certain large extent some control systems have been deployed in the port to regulate access to and from the port (See Figure 13: Systems to identify vehicles and persons in the port).

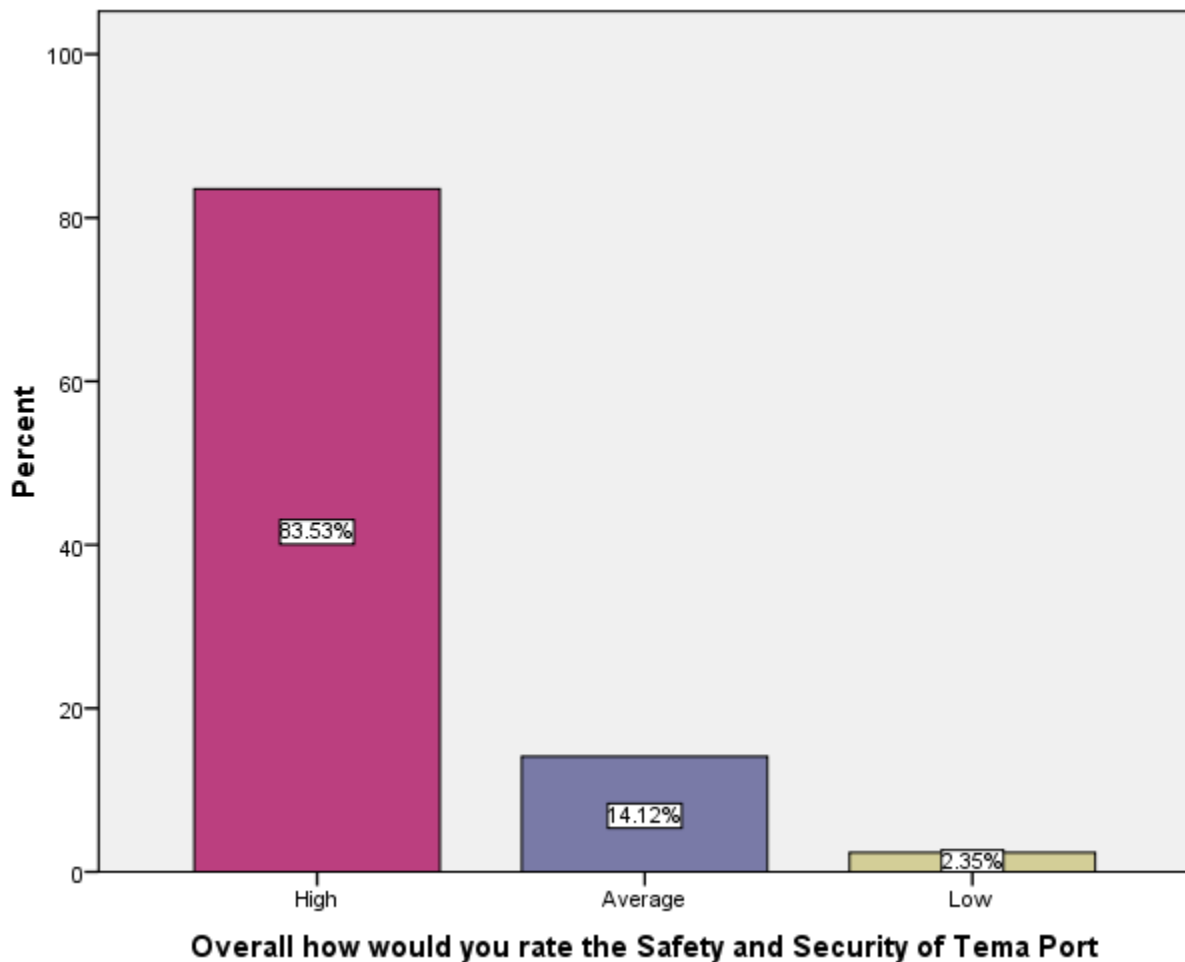
Figure 14: Tracking of Vehicles with Cargo



Field Data 2014

Data gathered on the tracking of vehicles that carry cargo to and from the port revealed that 44.71% agreed that there were systems in place, 21.18% disagreed that such systems existed, whilst 34.12% had No idea about the question. This suggests that there might be possibly a system in place to track vehicle to and from the port but may not be known by port users (See Figure 14: Tracking of Vehicles with Cargo).

Figure 15: Overall rating security and safety of the Port



Field Data 2014

Overall rating of port security and safety revealed the following from respondents; 83.53% rated high, 14.12. % rated average, whilst 2.35% scored low. It appears that security and safety at the port has significantly improved and to certain extent the ISPS code is being complied with.

4.7 Presentation of Observation

4.7.1 Vessels at Anchorage

Observation of the process started from the anchorage where vessels wait for some time for tug boats to pull her to the berth. See below Figure 16: Vessels at Anchorage.

Figure 16: Vessels at Anchorage



Vessels at Anchorage (GPHA, 2009)

It was observed that GPHA have procured pilot launches/boats to patrol their territorial waters. One of these pilot boats was named after a security officer who died in the course of discharging his duties. See below Figure 17: GPHA Security Patrol Boat.

Figure 17: GPHA Security Patrol Boat



Newly Acquired Patrol Boat for GPHA (GPHA, 2009)

A security team has been established comprising: Ghana Navy, GPHA Marine Staff, GPHA Security, Marine Police and Fire/Safety. This team is led by the Ghana Navy and their role is to patrol Ghana's territorial waters 24/7. In addition to this, it was also observed that an Auto Ship identification system and a Vessel Tracking Management System had been installed at Marine Signals/Control Room to detect vessels 24 nautical miles from the signal station. This allows Tema Port to detect any vessel in Ghana's territorial waters.

4.7.2 Cargo Security

The whole enclave of Terminal one and Golden Jubilee Terminal have CCTV cameras installed to track all the activities in both Terminals. Three hundred and fifty cameras have been installed in all at the cost of three million dollars. There has also been significant investments into mobile cranes, reach stackers and forklifts to improve the handling of cargo and also avoid double handling which eventually leads to cargo damage. See below Figure 18: GPHA CCTV Control Room , Figure 19: Newly Acquired Mobile Harbour Cranes for Tema Port and Figure 20: Newly Acquired Reach Stackers for Tema Port

Figure 18: GPHA CCTV Control Room



CCTV Control Room GPHA (2008)

Figure 19: Newly Acquired Mobile Harbour Cranes for Tema Port



Newly Acquired Mobile Harbour Cranes (GPHA, p. 2013)

Figure 20: Newly Acquired Reach Stackers for Tema Port



Newly Acquired Reach stackers (GPHA, 2009)

4.7.3 Access Control Systems

It was observed that an electronic identification system had been implemented to regulate the access into to port. Further to this, Clearing and Forwarding Agents can only clear cargo from the port after they have verified with their electronic identification card (ID) which attaches the cargo details to their details on the ID card. This system enables GPHA to track all cargoes cleared in the port and who cleared those cargoes. Close to fourteen thousand electronic cards has been issued to port users as at March 2014. In addition to this, an optical character recognition system has been installed at Terminal One and GJT to track all vehicles carrying containers to and from the terminals. This system enables the shipping lines to track and trace all containers in and around the port. See below Figure 21: Optical Character Recognition Eastern Gate.

Figure 21: Optical Character Recognition Eastern Gate



GPHA OCR (2013)

Further to this, a Turnstile and Barrier system is under implementation at all gates at Terminal 1 and GJT. The essence is to identify all persons and vehicle that enters and exits the port.

4.8 Revisiting the Objectives

In order to concentrate on the main analysis and to direct the discussion, the research objectives are recapped here. In general, the main objective of this research was to conduct analysis of supply chain security in Tema Port. The more specific objectives include but are not limited to:

- Examine common supply chain security programs worldwide.
- Identify which of the Supply Chain Security programs is adopted Tema Port.
- Assess to the extent to which Tema Port has complied with the adopted Supply Chain Security program.

4.8.1 Examine common supply chain security programs worldwide.

Common SCS programs practiced worldwide were identified as ACI 24 hour Manifest Rule which was promulgated in 2003 in US, ACI rules which came into force in 2007 (Japan and Mexico) and 200-2011 (EU), and the ISPS Code which came into force in 2004 after the horrific September 11 attack on US. The ISPS code is now being practiced worldwide by nearly all ports. This findings was referenced from (Donner & Kruk, 2009)

4.8.2 Identify which of the Supply Chain Security programs is adopted Tema Port.

Tema Port according to the findings had sign on to the ISPS Code which nearly all ports around the world has signed on to ensure the safety and security of vessels and cargo offshore and onshore as illustrated in Figure 4: Types of SCS Programs.

4.8.3 Assess to the extent to which Tema Port has complied with the adopted Supply Chain Security program

Four areas in the supply chain system of delivery of cargo were assess namely: safety and security of vessel at anchorage, safety and security of cargo at quay, safety and security of devanned cargo and access control systems at the port.

4.8.3.1 Safety and Security of vessel at Anchorage

There are systems to identify vessels in Ghanaian waters according to Figure 8: Safety and Security of Vessels in Ghana Waters . Based on the observation, these systems where identified as AIS and VTMS which identifies all vessels 24 nautical miles from the signal station. It was also observed that patrol boats had been acquired by GPHA with the help of other security apparatus to patrol Ghana waters. See Figure 17: GPHA Security Patrol Boat. There was no Piracy issues recorded over the past two years. However marine accident / incident was between 1-10 cases in the last two years. There were no records that these accidents claimed human lives. Safety and Security of vessels in Ghanaian waters was rated at 85.88% by respondents (See Figure 8: Safety and Security

of Vessels in Ghana Waters). This findings rejects Feldman (2011) stands on the increase in piracy issues across the samalia coast which has increase the cost of shipment. The situation in Ghana according to the findings are different as no record of pirate attacks have yet been recorded in the past two years.

4.8.3.2 Safety and Security of Cargo at Quay

It was discovered that safety and security of cargo during discharging of cargo at the quay was high (Figure 9: Safety in Discharging Cargo at the quay). In the same vein, incident/accident of cargo damage was rated low (see Figure 10: Incident of cargo damage). It was also observed that GPHA has acquired three new mobile cranes to handle the discharging and loading of cargo at the quay. It was instructive to indicate that Tema Port has acquired new harbour cranes to ensure safe handling of cargo as well as avoid double handling of cargo.

4.8.3.3 Safety and Security of Devanned Cargo

With regards to safety and security of cargo during devanning or unpacking majority of the respondents responded favourably (Figure 12: Safety of Unpacked/Devanned Cargo) which suggests that there is significant effort being put in place to ensure cargo security and safety during devanning/unpacking. Observed findings revealed that Tema Port has invested recently in the purchase of Reach-Stackers and Forklifts which has improved devanning of cargo tremendously and also the installation of CCTV has heightened visibility and real time monitoring of the movement of cargo in the port. (See Figure 18: GPHA CCTV Control Room).

4.8.3.4 Access Control Systems at the Port

Majority of the respondents (see Figure 13: Systems to identify vehicles and persons in the port and Figure 14: Tracking of Vehicles with Cargo) agreed that there was a system in place to identify vehicles and pedestrians to and from the port. These findings were concretised by observed findings indicating the implementation of an OCR system (Figure 21: Optical Character

Recognition Eastern Gate) and the ongoing Turnstile and Barrier system. Electronic ID systems was also observed to have been implemented. Total electronic ID cards issued to port users as at March 2014 was about 14,000.

4.9 Conclusion

The findings from the questionnaires and observation were presented and discussed in line with the objectives of the study. The essence was to situate the reported findings in the context of general and specific objectives outlined. General findings showed a favorable results indicating high security and safety in Ghanaian waters, at the quay during the discharge of cargo, in the terminals during devanning of cargo and adequate control measures to regulate access to and from the port. In chapter five, summary of the findings were discussed and conclusions arrived at which led to suggested recommendations.

CHAPTER FIVE

DISCUSSIONS ON FINDINGS, CONCLUSIONS, RECOMMENDATIONS AND CONTINUED RESEARCH

5.1 Introduction

This chapter summarizes the findings from the presentation and the discussion of the results from chapter four with the aim of arriving at factual conclusions which will serve as the basis for the recommendations. Findings will include the analysis of supply chain security from the anchorage, quay, terminals and access into the port.

5.2 Findings and Conclusions

5.2.1 Adoption of Supply Chain Security Program

It was discovered that Tema Port is a signatory to the ISPS Code which was promulgated in 2004 after the September 9/11 incident in US. This code enjoins all ports who are signatory to, to ensure the safety and security of vessels and cargo in and within the territorial port limits. The essence is to ensure the free flow of cargo from the port of origin to the port of discharge.

5.2.2 Safety and Security of Vessel at Anchorage

It was detected that safety and security of vessels at anchorage was significantly high. GPHA has procured patrol boats which patrol its territorial waters with the help of the Navy, Marine Police, Chief Pilots and other security apparatus to ensure that unauthorized vessels are arrested. It was further detected that the AIS and VTMS systems were used by GPHA to detect vessels in our waters within the range of about 24 nautical miles. This implies that there is some significant amount of effort by GPHA to protect its territorial waters from piracy and armed robbery within its territorial waters. This has been one of the major issues which the ISPS seeks to address.

5.2.3 Safety and Security of Cargo during Discharging at Quay

It was detected that safety and security of cargo during offloading and loading was significantly high. In addition to that incidence of cargo damage was low. The low damage of cargo can be

strongly attributed to the acquisition of the new mobile Harbour cranes which has significantly improved the safe handling of cargo and also prevented the double handling of cargo at the quay which most often than not results in incident/accident of cargo damage. The huge investment in the mobile cranes will significantly improve the vessel turnaround time which is a major key performance indicator for port performance.

5.2.4 Safety and Security of Cargo during Devanning/Unpacking

It was discovered that cargo safety and security was high during devanning. This is attributed partly to the introduction of newly acquired reach stackers and forklifts which has significantly improved the handling of cargo. The installation of the CCTV within the Terminals has also contributed to the reduction of thefts and pilferage and has improved visibility in the port to certain extent.

5.2.5 Access Control Systems at the Port

It was also detected that systems has been put in place to restrict movement of persons and vehicles to and from the port. About 14000 port users were given electronic ID cards to access the port. Added to this, there is an OCR system in place to monitor all containerized cargo that enter and exit the port. Furthermore, there Tema Port has initiated a barrier and a turnstile system at the gate which will complement the use of the electronic ID cards .These interventions to some large extent has improved on the safety and security of persons and vehicles carrying cargo into the port.

In summary, the safety and security of Tema Port in compliance to the ISPS code is significantly good and the level of compliance was rated high averagely by respondents. However, it is important that this level rated by respondents compared with the tenets of the standard to ascertain which level the port has reached, even though respondents have applauded Tema Port for high level of compliance to the ISPS Code.

5.4 RECOMMENDATIONS

Even though Tema Port have been rated high by respondents, there are some interventions the port must put in place to ensure full compliance of the ISPS Code.

The security and safety level of the port must be clearly displayed conspicuously at the entry and exit points of the port. This is meant to communicate to port users the level of checks required before a person or a vehicle enters or exits the port.

The issuance of the electronic cards to port users is commendable, however the number of port users who enter the port must be restricted because issuing of cards to nearly 14,000 port users will automatically cause congestion in the port during peak hours. This is meant to stem the problem of accidents, theft, pilferage and other activities which normally occur in the port during peak hours. The aim is to restrict port users' movement into restricted zones where there are movement of machines which can easily cause accidents.

There is the need for the port to create awareness about the compliance to the ISPS Code because it appeared that some respondents were unaware of the huge investments that port had made in acquiring mobile Harbour cranes, patrol boats, installations of CCTV cameras and OCR, the barrier and the turnstile, and some other further plans of the port which is targeted towards achieving full compliance to the ISPS Code. The net effect of the sensitization will go a long way to inspire confidence in the importers and exporters as well as the shipping lines about the safety and security of their vessels and cargo.

The culture of safety consciousness in the port environment is essential, to this end, the port must mount a safety campaign to ensure that port users entering into the port enclave are aware of the “dos and don'ts” in order not to cause any mishap or injury to port users. For example port users

must put on reflective attire and boots before they are allowed into the terminals or other busy areas.

The introduction of the AIS and VTMS are good, however these systems should be connected to the Navy and GPHA patrol boats through a very high frequency (VHF) channel to automatically alert the patrol team of any intruding vessel in our territorial waters.

APPENDICES A

References

- Jones, S. (2014). Maritime piracy and the cost of world trade. *Competitiveness Review*, 24(3), 158-170.
- Andel, C. (2003). SC Response to Terrorism Project. *MIT Center for Transportation and Logistics*.
- Anyanova, E. (2007). The EC and enhancing ship and port facility security. *Journal of International Commercial Law and Technology*, 2(1).
- Benbasat, I. Goldstein, D. K. and Mead, M. (1987). The Case Research Strategy in Studies of Information Systems. *11*(3), 369-386.
- Bram, J., Haughwout, A., & Orr, J. (2002). Has September 11 Affected New York City's Growth Potential? *Federal Reserve Bank of New York Policy Review*.
- Christopher, M. (2005). *Logistics and Supply Chain Management*. (2, Ed.) London : Pitman Publishing.
- Donner, M., & Kruk, C. (2009). *Supply Chain Security Guide, Department for International Development*,. Washington DC: World Bank.
- Eisenhardt, K. M. and Martin, J. A. (2004). Dynamic capabilities: What are they? *Strategic Management*, 21, 1105-1121.
- Essuman, B. (2012, February 14). *PeaceFM Online*. Retrieved from True Account Of Asem Dakey & Missing 77 Parcels Of Cocaine...NPP Govt's Complicity (1): <http://elections.peacefmonline.com/pages/politics/201202/94922.php>
- EU. (2003). Communication (02/05/03) from the Commission to the Council, the European Parliament, the European Economic & Social Committee and the Committee of the Regions on enhancing maritime transport security EU, COM 229 final 0089 (COD),. Brussels.: EU.
- Feldman, D. (2011, June). Scourge of the high seas, 21st century style. *World Trade WT00*, 40-41.
- Godden, B. (2004). *Sampling Size Calculation*. Retrieved April 24, 2014, from <http://williamgodden.com/samplesizeformula.pdf>
- Goulielmos, A. M., & Anastasakos, A. A. (2005). Worldwide security measures for shipping, seafarers and ports An impact assessment of ISPS code. *Disaster Prevention and Management*, 14(4).

- GPHA. (2009). Strategic Direction of GPHA. 6(2).
- IMO. (1974). Safety of Life at Sea. *International Conference on Safety of Life at Sea*.
- IMO. (2002). ISPS Code. *Conference on Port Security*. London: IMO.
- IMO LEG 88/13,. (2004). Report of the Legal Committee on the work of its 88th session. *Point (c): revision of the SUA convention*. IMO.
- Kommerskollegium. (2008). Supply Chain Security Initiatives: Trade Facilitation Perspective National Board of Trade. 5-16.
- Larsen, T. (2003). Challenges of integration: a european case study. *American consortium on European studies*. Retrieved from <http://www.american.edu/aces>.
- Rice .Jr, J. B. (2003, August 8). Supply Chain Response to Terrorism:Creating Resilient and Secure Supply Chains. *Supply Chain Response to Terrorism Project*.
- Rice, J., & Caniato, F. (2003). Building a Secure and Resilient Supply Network. *Supply Chain Management Review*.
- Sheffi, Y. (2001). Supply Chain Management under the Threat of International Terrorism. *International Journal of Logistics Management*, 12(12), 1-11.
- Shuttleworth, M. L. (2008). *Survey Research Design*. Retrieved Febuary 3, 2014, from <http://www.experiments-resources.com/survey-research-design.html>
- TED Stevens , TOM Coburn. (2005). THE CONTAINER SECURITY INITIATIVE AND THE CUSTOMS-TRADE PARTNERSHIP AGAINST TERRORISM: SECURING THE GLOBAL SUPPLY CHAIN OR TROJAN HORSE? *COMMITTEE ON HOMELAND SECURITY AND GOVERNMENTAL AFFAIRS UNITED STATES SENATE* (pp. 15-20). WASHINGTON: U.S. GOVERNMENT PRINTING OFFICE .
- UNTACD. (2006). Sharing Maritime Knowledge.
- Wills, H. H., & Ortiz, D. S. (2004). Evaluating the Security of the Global Containerized Supply Chain. *RAND Corporation*.
- WSC. (2002). Operation Safe Commerce : Docket Number TSA-2002-13827. *Department of Transportation:Transportation Security Administration*. World Shipping Council.
- Yin, R. (2003). *Case Study Research :Design and Methods, Applied Social Research Methods Series* (2 ed.). Newbury Parl CA: Sage Publishing.
- Yin, R. K. (2004). *Case Study Research: Design and Methods,Applied Social Research Methods Series*, (2 ed.). Newbury Parl CA: Sage Publishing.

Zikmund, W. G. (2003). *Business research method*. United States of America: Thomson Learning, South-Western.

APPENDICES B
QUESTIONNAIRE

REGIONAL MARITIME UNIVERSITY

QUESTIONNAIRE

The researchers seek to examine the supply chain security in Tema Port. This study is for academic purpose all information supplied will be treated confidentially and strictly for the purpose for which they have been sort for.

Please tick where appropriate.

1. PROFILE:

1.1 ORGANIZATION

1. GPHA
2. CEPS
3. Importer / Exporters
4. Others

2. SAFETY AT ANCHORAGE

2.1 What type of SCS Programme has GPHA signed on

1. WCO
2. ISPS
3. 24hr rule
4. ACI
5. Others

2.2 How would you rate the safety and security of vessels that calls in your territorial waters?

1. Very high
2. High
3. Average
4. Low
5. Very low

2.3 How many vessels do you receive in a year?

1. 1-50
2. 51-100
3. 101-150
4. 151 and above

2.4 Are there any systems in place to identify vessels in ore territorial waters?

A. Yes

B. No

2.5 If Yes state the name.....

2.6 Has the GPHA in the past five years made any investments in port security?

A. Yes

B. No

2.7 If yes, how would you consider the investment?

1. Very Adequate
2. Adequate
3. Averagely Adequate
4. Inadequate
5. Very Inadequate

2.8 How many accidents/incidents have been recorded in the past one year at anchorage?

1. 1-5
2. 6-10
3. 11-15
4. 20 and Above

2.9 How would you rate security of cargo at the quay side?

1. Very high
2. High

3. Average

4. Low

5. Very low

2.10 Does GPHA have a system which detects any unauthorized activities of vessels in their territorial waters?

A. Yes B. No C. No Idea

2.11 If Yes state the name.....

2.12 Has GPHA recorded any form of piracy within their territorial waters in the past two years?

A. Yes B. No C. No Idea

2.13 If Yes where there any cargo or live lost

A. Yes B. No C. No idea

3. SAFTEY AT QUAY SIDE

3.1 How would you rate damage of cargo in discharging from the quay?

1. Very high

2. High

3. Average

4. Low

5. Very low

3.2 How many accident/incidents of cargo have occurred in the past 2yrs?

1. 1-10

2. 11-20

3. 21-30

4. 30 and Above

3.3 How would you rate the incident of cargo (damage) within the past two years?

1. Very high

2. High

3. Average

4. Low

5. Very low

3.4 Are there any implement systems or procedures to ensure security of cargo at the quay side?

A. Yes

B. No

C. No idea

3.5 How would you rate the safety of devanned/unpacked cargo?

1. Very high

2. High

3. Average

4. Low

5. Very low

3.6 Are the measures in place to control access to the Port by vehicles and Persons?

A. Yes

B. No

C. No idea

3.7 If yes, how would you rate the control measures?

1. Very high

2. High

3. Average

4. Low

5. Very low

3.8 Are there systems in place to track vehicles that carry cargo from the port?

A. Yes

B. No

C. No idea

3.9 Overall how would you rate the Safety and Security of Tema Port?

1. Very high

2. High

3. Average

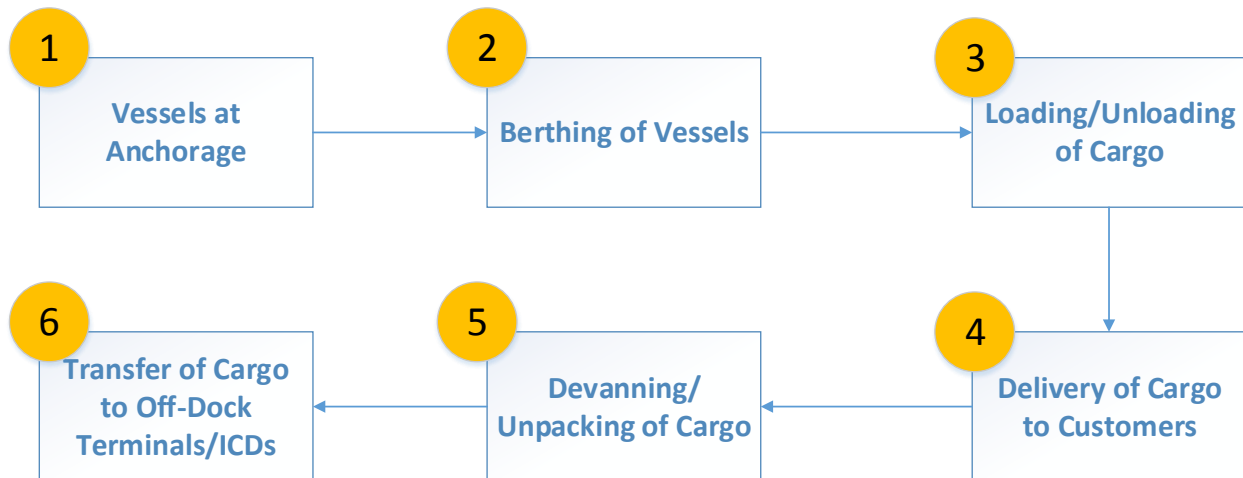
4. Low

5. Very Low

On-Site Observation

Processes observed covered the berthing of a vessel, unloading/loading of cargo, transfer of containers to Inland Container Depot, Devanning/Unpacking Containers and finally delivery of cargo to the customer. The purpose of the on-site observation was to identify the supply chain security program adopted by the Tema Port and the compliance level.

Process Description



APPENDICES C

Abbreviations

- ISPS (International Ships and Port Facility Codes)
- GPHA (Ghana Ports and Harbours Authority)
- LPG (Liberalisations, Privatization and Globalisation)
- SCM (Supply Chain Management)
- SC (Supply Chain)
- SCS (Supply Chain Security)
- IMO (International Maritime Organisation)
- CSI (Container Security Initiative)
- DHS (Department of Homeland Security)
- ACE (Automated Commercial Environment)
- ACS (Automated Commercial System)
- CBP (Customs and Border Protection)
- LRIT (Long-Range Identification and Tracking of ships)
- AIS (Automated Identification System)
- VTMS –Vessel Tracking Management System
- CEPS (Customs Excise Preventive Services)

- SPSS (Statistical Package for Social Sciences)
- CCTV (Closed Circuit Television)
- WCO (World Custom Organisation)
- ICD (Inland Container Depot)
- OCR (Optical Character Recognition)
- IMBS (Integrated Billing Manifest System)
- ACI (Advance Cargo Information)
- SCS (Supply Chain Security)