

IMPROVED OPERATIONAL EFFICIENCY AS A MEASURE
FOR ALLEVIATING PORT CONGESTION AT THE
CAPE TOWN CONTAINER TERMINAL

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**IMPROVED OPERATIONAL EFFICIENCY AS A MEASURE FOR
ALLEVIATING PORT CONGESTION AT THE CAPE TOWN
CONTAINER TERMINAL.**

BY

MICHAEL JOHN POWLES

**A Dissertation submitted in partial fulfilment of the requirements for the
Masters Business Administration degree**

In the

GRADUATE CENTRE FOR MANAGEMENT

CAPE TECHNIKON

SUPERVISOR: PROFESSOR A. SLABBERT

CAPE TECHNIKON

CAPE TOWN

December 2004

DECLARATION

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ABSTRACT

The Cape Town Container Terminal (CTCT) facilitates the handling process of Import and Export containers for the Western Cape and other regions. South African Port Operations (SAPO), a division of the transport parastatal Transnet, is the operator that handles container volumes through the terminal. Due to the nature of its operations, it focuses on service standards within the industry. The International Shipping Industry expects this container terminal to conform by providing the same operational standards and service they receive from other international ports.

Container terminal efficiency and productivity were not providing a reliable and efficient service for vessels calling to CTCT. Delays became so endemic that the shipping lines instituted a seventy-five dollar congestion surcharge on each container being handled. This surcharge was passed on to the consumer therefore increasing the logistical cost of goods and services. The fact that a shipping line was bypassing Cape Town altogether was an indication that the Terminal was experiencing difficulty in maintaining its port status as a prominent and efficient container terminal at the southern tip of Africa.

S A companies importing goods and applying the Just in Time Principle (JIT), such as BMW and Volkswagen, had to adjust their stock management systems due to these delays. Lead times for stock ordering of import and export goods increased by four to five days, increasing inventory costs, pushing up prices that affected inflation.

Cape Town was the basis of the study and the researcher wanted to demonstrate how improved operational efficiency benefited terminal users. The cause and effect analysis identified terminal inefficiency in peak times. This study revealed that terminal users had an impact on operational efficiency and with their participation and involvement, reasons creating inefficiency and port congestion were highlighted and the implementation of possible solutions would reduce vessel delays, and in turn terminate surcharges.

The recommendation of a concerted focus on increased capacity has resulted in additional 950-reefer container plug-in points being constructed for 2004/05. The terminal's implementation of fixing standardised procedures has led to improvement of its core competencies, ensuring improved turn around of vessels.

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KEY WORDS USED IN THE SHIPPING INDUSTRY:

List of Abbreviations.

ABBR	INSTITUTION	DEFINITION/DESCRIPTION
SAPO	South African Port Operations	Controlling body of all operations within the Ports of Southern Africa
NPA	National Port Authority	Controlling body of all assets within the Ports of Southern Africa.
TEU's	Container Terminology.	Twenty-Foot Equivalent Units. A container measurement whereby all containers are measured as twenty - foot units, (6m) therefore a (12m) container occupies 2 spaces of twenty foot lengths.
CTCT	Cape Town Container Terminal	Container terminal providing a service for vessels calling at the Port of Cape Town.
ILO	International Labour Organisation	International Organisation providing advice and best practices within the Shipping Industry.
ISO	International Standards Organisation	International Organisation that sets agreed service standards within the shipping industry
IMO	International Maritime Organisation.	An organisation providing and regulating best practices within the maritime sector.
SAECS	South African European Container Services	Provides container services to respective continents
SACOB	South African Chamber of Business	Pursues specific strategic objectives and thereby assists industry indirectly.
DCT	Durban Container Terminal	Container terminal providing container services for vessels calling at the Port of Durban.
PECT	Port Elizabeth Container Terminal	Container terminal providing container services for vessels calling at Port Elizabeth.
IMP	Container Terminology	Goods imported to SA from other countries
EXP	Container Terminology	Goods exported from SA to other countries
CALL SIZE	Container Terminology	The total number of import-export containers on vessels calling at ports.
TRANSSHIPMENTS	Container Terminology	Containers landed from the pre-carrier vessel, waiting for the on-carrier vessel.
mph	Container Terminology	All movements on/ off a vessel for one hour.

CHAPTER 1

THE PROBLEM

INTRODUCTION

1.1 BACKGROUND.

Over the past decades much has been achieved technologically with the handling and transportation of goods (Ports of Southern Africa. 2002 152:157). The concept of container transport emerged on international routes bringing with it the most significant and radical changes in transport technology in modern times (IMO. 1999 Containerisation. 1:6). This new transport technique had a profound effect on all that are involved with the marketing, packaging, distribution and transportation of goods.

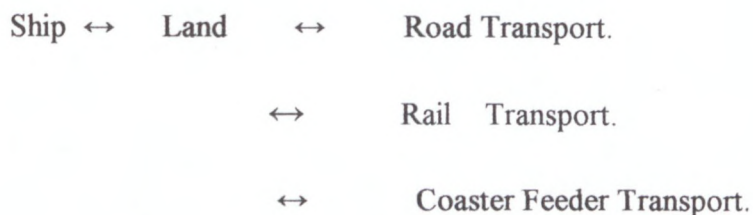
Containerisation is a cargo handling and transportation system whereby cargo is consolidated into large standard containers to facilitate mechanised handling and rapid transfer from one mode of transport to another. A whole new approach world-wide was needed. Existing practices had to be disregarded and the transportation industry had to redesign systems, vessels, and introduce new facilities and handling equipment (IMO. 1999 Containerisation. 1:20). Universally container equipment can automatically handle six or twelve metre length containers, repeatedly, and at an acceptable rate. The very nature of the service calls for complete mechanised handling of the units, which demands investment in mechanisation, computerisation and automation.

The International Standards Organisation (ISO) is a world-wide federation of national standards. This organisation, of which SA is a member body, has accepted international container sizes and masses for universal use. The ISO developed and introduced an international identification marking code system for freight containers which is intended to provide information on both

containers themselves and the documentation and communication associated with their movement. This information is presented in such a manner as to be meaningful to operations personnel as well as those carrying out visual inspections and data processing (ISO. 1994 Containerisation. 1:20).

At a port container terminal the largest and most varied modal interchange takes place throughout the container transport system.

Diagrammatically this occurs as follows:



Currently 350 million tons of cargo is transported in containers, 47% of all international trade (ILO. 1999 Port Development Programme. 1.1). The maritime transport of all international trade is 85% and the growth forecast of containerised cargo year 2000 (47%) to year 2004 (73%) is expected to increase by 26% (ILO. 1999 Port Development Programme. 1.1).

The Port of Cape Town is strategically positioned on the world's sea routes being on the major southern ocean trade routes. It is fully equipped to handle all types of general and containerised cargo via its specialised terminals. It has the benefit of a wide variety of well-equipped cargo terminals linked to a vast inland infrastructure and complements a rail and road transport network, which contributes towards the logistical chain for containerised and other cargo (Ports of Southern Africa. 2002 152:157).

The port's primary aim is to facilitate trade and make a valuable contribution to the economic growth of the region and country. The mission is to render a service on an on-going process that seeks to raise productivity levels, to reduce vessel turnaround times and to be

recognised as an efficient port, for vessels calling (The Port of Cape Town. 2001 Handbook and Directory. 18:19).

1.2 STATEMENT OF THE PROBLEM.

Cape Town's Container Terminal (CTCT) efficiency and productivity were not providing a reliable and efficient service for vessels calling at the Port of Cape Town.

Delays had become so endemic that the shipping lines instituted a seventy-five dollar congestion surcharge on each container being handled. This surcharge had been passed on to the consumer, therefore increasing the logistical cost of goods and services.

1.3 BACKGROUND TO RESEARCH PROBLEM.

Bottlenecks at the Cape Town and Durban container terminals had become so bad that they were limiting the country's export drive. The situation had deteriorated to the extent that most major container shipping lines classified the two container terminals as "congested terminals". The average delay for ships waiting to berth at CTCT had risen from 70 hours to 85 hours (Samantha Enslin. 2003. Ships queue up for Cape Town. Business Day. May 13).

The Europe | S.A. Conference and the U.S. | S.A. Conference levied a \$75 and \$100 surcharge on all import and export containers at each container terminal respectively. This surcharge was levied against the freight payer.

Both conferences said the surcharge would remain in place until the average delay to vessels waiting to berth in each port, as measured over a two-month period, was reduced to below 16 hours. As from the 7th June 2003, surcharges were enforced. Importers and exporters incurred heavy costs as a result of vessel delays and surcharges (Samantha Enslin. 2003. Business Day. May 13).

CTCT, Management Information Systems Department (MIS), stated that within May 2003, vessels calling to Cape Town were being delayed on a running average of 48 hours (CTCT. 2003. Performance Report: Operations. 15:30 May 10).

Table 1.1 Average Delay Scenarios.

▪ Vessel arrives at the Port	06h00	2003 05 13
▪ Vessel anchors and waits for a berth	0-48 hrs	2003 05 15
▪ Vessel lifts anchor and berths	08h00	2003 05 15
▪ Vessel starts work	09h00	2003 05 15
▪ Vessel completes work	04h00	2003 05 16
▪ Vessel leaves the berth	05h00	2003 05 16
▪ Vessel leaves the Port	06h00	2003 05 16

Vessels calling with an average call size of 495 containers allocated sixteen hours to complete spent four days of non-earning revenue time at port, increasing the operating cost of the vessel.

The cost for a cellular container vessel with 2500 TEU's, three times in port, according to the International Labour Organisation, 1999, was as follows:

Table 1.2 Maritime of Transport Costs.

International Maritime Transport Costs (calculated in foreign exchange)			
<u>COSTS</u>	<u>ANNUAL</u>	<u>IN PORT</u>	<u>DELAY AT PORT</u>
CAPITAL COST	\$ 9,500,000	\$ 3,187,000	\$5,225,000 (55%)
RUNNING COST	\$ 3,000,000	\$ 1,000,000	\$1,650,000 (55%)
PORT DUES	\$ 1,800,000	\$ 1,800,000	\$1,800,000
FUEL	\$ 2,500,000		
STEVEDORING	\$ 3,000,000	\$ 3,000,000	\$3,000,000
TOTAL	\$ 19,800,00	\$ 8,987,000	\$11,675,000
PERCENT of COST		45.39%	58.96%

Within the month of May 2003 the average vessel delay for container vessels waiting to be worked was 60 hours, with a container call size of 451 containers, completing work in 22 hours (CTCT. 2003. MIS Department. August 13).

The ship's operators could not afford to carry the entire cost of vessels being delayed. Therefore costs had to be passed onto the industry. As at the 1st August 2003, the exchange rate of one dollar (\$1) was exchanged for seven rand, forty -five cents (R7.45).

Therefore each container being handled at the CTCT incurred an additional cost of five hundred and fifty- eight rand, seventy -five cents, (R558.75) which importers and exporters passed on to the consumer.

Evergreen, one of the major shipping lines, bypassed Cape Town altogether, causing the export trade of this region to become pressured. Goods did not reach designated markets on time.

S A companies importing goods and applying the Just in Time Principle (JIT), such as BMW and Volkswagen, had to adjust their stock management systems due to these delays. Lead times for stock ordering of import and export goods increased by four to five days, increasing inventory costs, pushing up prices that affected inflation.

1.4 OBJECTIVES OF THE STUDY.

The study established that terminal infrastructure; equipment and terminal users had an impact on the operational efficiency of the terminal. User participation and involvement assisted in identifying the reasons creating inefficiency and port congestion.

The study established:

- Reasons for poor terminal efficiency and productivity in peak periods.
- Possible solutions for the problem.

1.5 SIGNIFICANCE OF THE STUDY.

The volume of containers handled at the CTCT for the months of April to July, 2003 according to the terminal's MIS department, August 4, was 102 000 TEU's. If port congestion and vessel delays were reduced to within the laid down measurement of 16 hours, the additional logistical cost of R5.6 million would not become the burden of the shipping industry trade for 2003. The surcharge was subsequently waived in August 2003 for Cape Town only.

The researcher's thesis would provide a future reference and research guide as to the reasoning and rationale at the terminal in times of congestion. Bottlenecks identified at the terminal could be tracked and monitored if the same symptoms arose.

1.6 CRITICAL FACTORS ENSURING TERMINAL EFFICIENCY.

The local community and terminal stakeholders were not aware of the critical factors that influenced and affected the terminal's efficiency. These factors required an integrated relationship to ensure terminal efficiency and customer satisfaction.

The factors were:

- Accuracy of information.
- Terminal layout and design.
- Container Equipment.
- Human Capital.
- Systems and Processes.
- Continuous Improvements.

1.7 RESEARCH METHODOLOGY.

In regard to the registration and completion of this thesis, SAPO seconded the researcher to a Technical Task Team (TTT) to audit Cape Town and Port Elizabeth container terminals as to the primary causes for their inefficiencies. Extracts from these reports under a protection clause and with permission from SAPO are incorporated in this thesis.

Terminal role players were approached to participate in assisting the researcher with demographic and cross case analysis of terminal inefficiencies. Personal interviews were scheduled with management, supervision, ground level staff, union leaders, terminal users and technical personnel.

Additional information was sourced from institutions such as Cargo Systems.net. Department of Public Enterprises (DPE), International Standards Organisation (ISO), containerisation, International Maritime Organisation (IMO), containerisation and the International Labour Office's (ILO) global strategy for container terminals.

1.8 DELINEATION OF THE STUDY

The focus of this study was restricted to CTCT specific. Although S.A's container terminals are generic in nature, processes and systems are aligned to local conditions. Each terminal's capacity, design and layout determine the business operation, business sector, and the surrounding environment. Upstream terminals are excluded due to the fact that they operate their own businesses according to their client's needs.

1.9 EXPECTED OUTCOMES, RESULTS AND CONTRIBUTION

The study would establish the reasons why terminal inefficiency existed and the pressing issues and challenges facing the terminal. Government's response was to immediately appoint an Interim Advisory Board (IAB) to intervene in assisting the terminal in the short term. The auditing of terminal inefficiencies created an opportunity to develop and recommend possible solutions to alleviate port congestion.

1.10 CLARIFICATION OF BASIC TERMS AND CONCEPTS

Various definitions and concepts are used in text of the shipping industry. In order to eliminate any confusion and discrepancy the following will apply:

OPERATIONAL EFFICIENCY

The choice of an operational system within a container terminal, which provides the facilitation and handling of import and export of containers, influenced by the best operating practices to enhance terminal productivity, such as:

- Operational system in use and aligned processes.
- Effective utilisation of labour.
- The management information system in use.
- Productivity (vessel, crane, quay, storage area, and equipment).
- Yard planning and control.
- Types of operation best suited to enhance productivity

PORT CONGESTION.

The status of the port, terminal efficiency, in times of congestion determines:

- Strategies to handle congestion and how to maintain terminal discipline.
- Variables that affect congestion
- Dwell time strategy in times of congestion.
- Management of terminal in times of congestion (ILO 1999. Port Development Programme, C 1.1).

1.11 SUMMARY

Chapter one dealt directly with the problem confronting the container terminal. In understanding the complexity of this problem, the role the container terminal portrays in the logistical supply chain needs to be clarified.

A container terminal is a complex facility that involves a variety of different parts and processes. The physical part consists of berths for ships, cranes for transfer of containers between the terminal and the ship, yard area for storage of containers, gates for entrance and exit and checking of containers.

The processes involved include checking the condition of containers through the gates (in both directions), transporting containers between gate and storage area and between the storage area and the cranes, and hoisting the containers on and off the ship.

Chapter two relates to the activities, functions and performance measurements the terminal has to perform in providing the shipping industry a reliable service. The operational background study within this chapter identified that internationally container terminals are generic in activities and functions due to ISO national standards of practice. SA's container terminals (CTCT, DCT, and PECT) key performance indicators are aligned to that of other international terminals.

CHAPTER 2

OPERATIONAL BACKGROUND

2.1 TERMINALS

“Container Terminals need sufficient reliable staff, equipment availability, integrity of equipment in use and efficient terminal flow when handling containers.”

(APM Terminals. 2003 QuayWords. 3 1:2 March).

“APM Terminals outperformed the overall container market in 2003. Container throughput exceeded 22 million TEU’s.” (APM Terminals. 2003 QuayWords. 3 1:2 March).

The Mail & Guardian states:

Container terminals, being the interface between ship and shore, or where transshipments takes place between ship and ship, are critical to the conduct of seaborne trade world-wide. The terminal operator offloads containers from one mode of transport (ship, train or truck) and temporarily stores or reorganises the containers for transfer to another mode (ship, train or truck). The task is simple, but many things go wrong (Jane Barrett 2003. The gateway to disaster. Mail & Guardian, 2 May 2).

The cornerstone of any container terminal is its operational functionality to transfer containers from land to sea and vice-versa. Due to terminal capacity, design and layout, emphasis is placed on a high utilisation of space, equipment and available manpower. The concept incorporates a product-oriented layout seeking the best capacity, personnel and machine utilisation in a repetitive or continuous production of handling containers at an acceptable rate.

Heizer and Render. (1999 336:338) state:

Layout and design have numerous strategic implications, because they establish an organisation's competitive priority in regard to capacity, processes, flexibility and cost, as well as quality of work life, customer contact and image.

To accomplish container throughput at terminals, combined with the expected dwell times containers will be staged in the terminal, a very dense and compact design is called for. This design requires that containers be moved as few times as possible, yet are in the best position when delivery is needed to truck, rail or vessel. This can only be accomplished through the incorporation of a state of the art customised terminal operation's planning system. This system will handle all aspects of the container cycle in the terminal, starting from the point of origin, to the time that a container is planned for distribution by land or sea. (ILO. 1999 Maritime industries branch. Port Container Strategy. C 1.1)

2.2 TERMINAL OPERATIONS

The Operational Pillars of terminals are:

- ❑ Receiving/Dispatching Container Operation
- ❑ Rail Container Operation.
- ❑ Container Yard Operation.
- ❑ Quay Transfer Container Operation.
- ❑ Ships Container Operation.

The Quay Transfer Operation has a two- legged approach of inbound and outbound:

Inbound transfer occurs when containers are landed from ships to quayside.

Outbound transfer occurs when containers are loaded from the yard for quayside shipment onto ships.

The Container Yard Operation incorporates the terminal yard planning with regard to: storage of containers, receiving of containers, delivery of containers via road or rail, build up of container stacks per vessel and in-house terminal container movements (ILO. 1999. Port Container Strategy. C 1.1).

2.3 TERMINAL LOGISTICAL PROCESS

The Outbound Logistical Process of a container terminal has an integration of Receiving, Storage, Loading, and Waterside Operations.

- Each container entering the terminal is captured into the terminal management system, physically checked and tracked via the Container Receiving Operation.
- The accepted container is planned within the Storage Container Yard Operation.
- Loading of the container for Quay Transfer transpires when vessel calls.
- The Waterside Operation ensures that the container is planned and shipped onto the vessel. (ILO. 1999. Port Container Strategy. C1.1).

The Inbound Logistical Process follows a route of Discharge, Storage, Dispatch and Landside Operations.

- The Discharge Operation of container from the vessel is integrated with the Quay Transfer Operation.

- Storage of container is structured in the Container Yard Operation.
- The Dispatch of container incorporates the Delivery Operation.
- Landside Operation involves container dispatch via Road or Rail Operation. (ILO. 1999. Port Container Strategy. C1.1).

2.4 TERMINAL MANAGEMENT PRINCIPLES

The management principles of a terminal are Information, Communication, Planning, Control and Supervision.

- Information Principles:

An effective terminal Management Information System (MIS) has been structured according to the conditions of service to prompt comprehensive, reliable and up to date information for the terminal according to statutory document requirements. Accurate record keeping of vessels calling, container movements, terminal performance and efficiency are monitored.

- Communication Principles:

This principle is structured on the grounds of open door policy, regular meetings with terminal stakeholders, briefings and informative sessions, distribution of relevant terminal documents, radio, telephone, e-mail and personal contact and wrap up meetings.

- Planning Principle:

A Planning and Control Department has been established to plan every activity in advance, yard control, and

monitoring of all activities. A terminal management system aids in the planning and control of stack capacity.

- **Control Principle:**

All container movements are monitored and controlled and instructions are issued via the management system whenever there is any movement. Special requests must abide by prior approval requirements and a written instruction of approval.

- **Supervision Principle:**

The supervisory role ensures that resources are deployed at the start of each shift. All activities are monitored; rules, regulations and procedures are obeyed. The workforce is motivated and the spirit of teamwork is enhanced and there is a prompt response to minimise the impact of downtime in operations (ILO. 1999. Port Container Strategy 1.1).

2.5 TERMINAL PRODUCTIVITY

Terminal operational reports measure their performances for the following reasons: to monitor all container movement activities; to check on terminal efficiency; to compare present with past performance; to compare present performance with target performance; to compare performance with competitors; to adjust targets; and to promote the terminal business.

The use of technology, sufficient facilities and ensuring that the workforce is knowledgeable maintains the best competition.

The Commission on Engineering and Technical Systems (CETS). 1986 Improving productivity in U.S. marine container terminals. 1 5) states:

“Productivity is commonly measured in monetary terms, since management often views increases in productivity as a means to increase profits. Within a given terminal such measures do have considerable relevance. However, different terminals may well be in different labour markets, use different currencies, and be subject to different physical and environmental constraints. Thus, it is not clear that monetary measures of productivity are meaningful or useful when comparing different container terminals. Most productivity measures involve physical quantities such as crane moves per man- hour.”

The development of container terminal facilities has been analysed since 1994, in terms of the number of quayside container gantry cranes and the length of quayside devoted to container handling. These series are compared with yearly throughput to generate productivity indicators of TEU's per berth metre and per gantry crane. The anticipated supply and demand for container handling is quantified in terms of planned terminal capacity and forecast throughput on a yearly basis

(<http://www.bharatbook.com/searchdetail/productivity> August).

Container Terminal's mandatory activities are generic in nature, container arrival, container storage, and container departure. Categories of terminal performance usually considered are container traffic and container throughput.

- Container Traffic measures containers per hour, tonnage per hour, cargo value per hour, and revenue per hour.
- Container Throughput measures ship container throughput, quay transfer container throughput, and container yard throughput and receipt and delivery container throughput.

Any movement within the container terminal, related to its activities, should be classified as equivalent container movements in order to calculate what movements are being performed and how it affects terminal efficiency (ILO. 1999. Port Container Strategy. C 1:6).

By introducing sophisticated and specialised container handling equipment, designed to handle 40-50 lifts per hour and by ensuring the accurate flow of information, sufficient capacity and trained personnel, container terminals influence its customers to use there facility.

To use such equipment optimally, there has been an increased emphasis on systems-driven and even computer-controlled environments.

The quarterly publication, QuayWords, for employees of APM Terminals, regularly report on their terminal performances.

By deploying 7 Noell gantry container cranes having twinlift-pick up capability on the vessel Skagen Maesk on the 15th February, 2003 at the Tan Jung Pelepas Contianer Terminal, it was able to smash its previous record of 211.4 moves per hour (mph).

The terminal obtained 4,613 berth productivity moves at 45.3 mph for each crane, within 10.18 hours. The management system ensured that all the containers were stacked in their proper places as allocated in the yard. Its Differential Global Positioning System (DGPS), stacking containers 5 high, which is satellite guided, allowed the Rubber Tired Gantries (RTG's) to be steered automatically. Effective forward planning and seamless teamwork contributed to this success (APM Terminals. 2003 Tan Jung Pelepas breaks container record. QuayWords. 3 17 March).

The night shift staff of the Oakland Terminal set a new single crane productivity record in the closing week of 2003, by handling 336

containers on the Maersk Trieste in only 6.5 hours, averaging 51.7 mph. Within a fortnight, the day crew responded with 53.4 mph. The same night crew bounced back with 60.8 mph.

“This is a productivity level that can stand in the company of any other terminal in the world. You can only feel humble when you obtain results of this calibre” stated Oakland’s General Manager, Peter Ford. (APM Terminals. 2003. Oakland Terminal. QuayWords, 3 17 March).

There is clear recognition among the efficient container terminals world-wide that the future growth in productivity will have to come from advances in the employment and training of human resources. Maintaining and motivating the labour force is viewed as essential. In order to improve and compete in productivity people skills and enhanced technology in engineering are critical success factors (CETS. 1986. Improving Productivity in U.S. Marine Container Terminals.1 5).

In the Southwest of U.S. the Charleston container port serves as a gateway for the export of a range of commodities. International shipments across its berths amount to 33 billion US dollars.

Its infrastructure consists of 8 postpanmax container cranes servicing its berth of 1290 metres handling lifts amounting to 300 000 TEU’s at a guarantee of 44 moves per crane hour. The yard capacity allows for 7628 TEU groundslots able to stack containers 5 high and 7000 groundslots for handling empty containers. 420 reefer plug-in points, allow for cold chain cargo packed in containers to be plugged in and temperatures to be monitored.

At the entrance of the terminal 12 inbound lanes offer an Express Gate service with 6 outbound lanes for containers leaving the terminal.

A marine stowage and yard location system (SPARCS) manages the terminal (APM Terminals. 2003. Charleston. QuayWords, 3 19 March).

In the country of Germany, The North Sea Terminal Bremerhaven (NTB) handled a record volume of 1.6 million TEU's in 2003. Each of its 10 postpanmax container cranes, service 1.11 metres of berth at 14.5 metre depths. The gantry cranes have twin-lift capabilities guaranteeing 40-50 mph for vessels with container cell-guide structures.

The terminal guarantees its customers annual container throughput of 2.6 million TEU's having an equipment fleet of 1 mobile harbour crane, 20 straddle carriers able to stack containers 3 high, 25 others able to stack 4 high. 3 empty reach stackers, and yard capacity incorporating 13 500 TEU groundslots and 5 000 TEU empty groundslots. 1 500reefer plug in points.

“A recent expansion at this terminal has resulted in a 40% increase in quay length and 35% additional yard space. With this capacity extension the terminal can confidently promise and provide excellent services to its clients in the years to come. Furthermore they are provided with the necessary security for long term planning business prospects with the terminal.” (APM Terminals. 2003. Bremerhaven Terminal. QuayWords, 3 11 March).

Terminals need to anticipate and develop sufficient terminal capacity to meet the ever-growing needs of their customers. Best practices and new innovations to enhance productivity and agreed service levels to users are the order of the day.

In Shanghai, the Wai Gao Qiao 4-container terminal has the facility of four berths served by 14 container cranes across a 1.436m quay (1 crane per 100m) designed to handle more than 3 million TEU's

per year (APM Terminals. 2003. Wai Gao Qiao Termial. QuayWords, 3 : 10 March).

The CTCT has the facility of six 40-ton shore gantry cranes respectively servicing 1150 metres of five deep-sea berths (600-604) with depths of 10.7 to 14.0 meters respectively. It is supported by a fleet of equipment consisting of 23 straddle carriers, 3 lift reach stacker trucks, 58 internal tractor hauliers, 68 bathtub chassis trailers and a stacking yard area of 4410 TEU ground slots, stacking 2.5 high, able to handle 4024,000 TEU's throughput per year. The container terminal has a guaranteed productivity level of 18 mph (Ports of Southern Africa. 2002 161:162).

A permanent integral reefer stacking area within the terminal allows for 950 reefers. The reefer yard area is designed to accommodate the plugging-in of reefer containers with cold chain cargo temperature monitoring, allowing dwell times of three days in the terminal.

Figure 2.5.1: Photograph of CTCT.



The Terminal's operational philosophy of:

Discharge container; transport container via chassis system (bathtub) to yard area; transfer container via straddle carrier to stack area; dispatch container via straddle carrier to truck or rail transporter; and vice-versa when the loading operation occurs, is the choice of its Operation System. This philosophy was influenced by the initial capital, available land (capacity), container volumes and operating costs. Although integrated, defined roles of Operations and Technical equipment functions are critical to its efficiency (Ports of Southern Africa. 2002. 161:162).

In a response to a request by the U.S. Maritime Administration, the Committee on Productivity of Marine Terminals was formed to identify and assess issues related to the productivity of U.S. marine terminals handling containerised cargo.

The Committee reached the following findings:

Improvements in technology and engineering design will be critical in terminal performances. Terminals will have to build on existing structures and employ state-of-the-art technology.

“The best U.S. terminals are not as productive as foreign terminals for many reasons. An important factor influencing productivity is the state of labour-management relations, which runs the gauntlet in the U.S. from good to very bad.” (CETS. 1986. Improving Productivity in U.S. Marine Container Terminals. 1 5).

The committee identified shortcomings in the planning and control of terminal activities and poor management and labour skills. Frequently management had abdicated its planning responsibility to labour who in turn were not adequately trained nor motivated to perform this function.

“One important exception delaying improvement to container productivity is the poor flow of information to container terminals” (CETS. 1986. Improving Productivity in U.S. Marine Container Terminals.1 5).

Information is the glue that holds the operation together, linking the customer, management, and the work force. Reliable information provides all levels of the terminal with the vital information needed to improve the rate and the doing of work and provides the basis of integration between management and terminal workers.

For each operation in the terminal a specific container must be moved from a known location to a rearm destination. Any improvement in this process of identifying locations and containers will not only help the planning of yard and vessel moves, but will also provide feedback to assess the quality of the operation for future improvements (CETS. 1986. Improving Productivity in U.S. Marine Container Terminals. 1:6).

Productivity is only one measure of a terminal’s success.

Partnerships with labour, port authority and customers by ensuring that they are aligned to terminal objectives improve efficiency.

Building a family environment is critical.

The key to any successful operation is the quality and motivation of management and labour. Participative management must encourage labour to contribute to improvements in methods, equipment and working conditions. Increased share of the work force under regular employment, the proper mix of individual responsibility, job satisfaction, information availability, clearly defined employment conditions, proper training, and safety procedures lead to proper motivation and increased productivity

The most promising area for improvement lies with better employment of people. This includes labour / management relations, the quality of management and supervision; the quality

and flexibility of the work environment and improved information systems able to assist in the control of operations and the facilitation of documentation (CETS. 1986. Improving Productivity in U.S. Marine Container Terminals.1 5).

2.6 TERMINAL MEASUREMENTS.

Measurements and statistical review are critical to a port's efficiency status as worldwide ports and terminals are measured according to the service they can provide. It is a time of great and rapid technological change in ports affecting the handling of cargo and information. It is also a time of strong and increasing competition between ports for business, so ports must strive to improve their efficiency. Calculation is done by means of relating to all container terminal activities, container traffic and throughput, productivity and relevant data. Terminal management systems are designed around "Real Time Handling" and track container activities systematically. All terminals measure movements according to a laid out procedure.

CTCT, uses the following guideline to classify a movement:

- Every discharge movement.
- Every loading movement.
- Every container shift ----- once within the vessel, twice via the quay.
- Every restow move ----- once within the vessel, twice via the quay.
- Every container moved in error -- twice (picked up, placed elsewhere).
- Every tranship container – landed, loaded.
- Every vessel hatch covers lifted and replaced.

Not Counted:

- Lifts of lashing cages.
- Lifts of gear and equipment.
- Crane movements along the quayside.
- Container gantry crane booming up and travelling to another bay on the vessel and lowering cranes boom (CTCT. 2003 MIS. Container Movements. 1:2 August).

An example guide of a vessel activity schedule based on the terminal defining its normal traffic and capacity, yard planning and equipment required, could have an activity distribution as follows:

Table 2.6.1: Equivalent Container Moves.

VESSEL ACTIVITY	TOTAL	MOVES	TRAFFIC
Containers discharged	200	200	LOCAL
Containers loaded	300	300	TRAFFIC
Transshipment containers discharged	200	200	700
Transshipment containers loaded	300	300	
Containers shifted via the quay	50	100	EXTRA
Containers shifted in error	20	40	MOVES
Containers restowed via the quay	40	80	580
Containers restowed in the vessel	20	20	
Hatch covers lifted and replaced	20	40	
EQUIVALENT CONTAINER MOVES		1280	1280

The yard planner must consider vessel movements being generated from the working vessel by planning capacity, equipment and resources in advance. Transshipment containers been discharged will have be stored in the yard and await the pre-carrier vessel calling.

Table 2.6.2: Calculation of Additional Movements.

ADDITIONAL MOVEMENTS	
580X 100	45.30%
1280	
IE	
580X 100	82.80%
700	
So each Traffic container	
Generates	1.82
Moves	

As can be seen each traffic container generates 1.82 moves which is representative of 45.3% additional movements in order to land or ship containers. The movements not counted as per SAPO guideline affect the berth occupancy and turn around time of the vessel. Hatch covers closing hatches, are part of the ship's superstructure and are larger, heavier than normal containers count as one movement. They are more time-consuming to handle (CTCT 2003 MIS. Container Movements. 1:2 August).

The terminal is able to calculate the container throughput from the working vessel by monitoring the movements of each activity, which is essential in the planning and control of availability of capacity.

Local traffic moves 1) $500 / 700 \times 100 = 71\%$ of traffic.

2) $500 / 1280 \times 100 = 39\%$ of movements.

3) $500 / 1000 \times 100 = 50\%$ of containers

exchanged via the vessel and the yard.

The guideline of container movements is used to calculate Vessel Productivity by means of moves per hour while vessel is in the port, per ship hour at the respective berth, and per ship working hour. All moves affect the vessel turn around time (TAT) from the time the vessel arrives at the port, until the time it leaves the port.

Any down time, idle time, technical down time, and non-operating delays increases the berth occupancy that the vessel occupies, which delays other vessels waiting to be serviced.

A normal calculation for equivalent container moves of above example would be calculated as follows. Total of 1280 moves allocated terminal equipment of two gantry shore cranes and at an acceptable handling rate of 16 moves per hour (32 moves for both) would be able to determine the following productivity (CTCT. 2003. MIS Department. Container Productivity. 1:6 August).

Table 2.6.3: Calculation of Vessel Turn around Time.

Vessel arrives at the port of Cape Town	06hrs			
Vessel berths at a CTCT berth	08hrs			
Vessel starts container work	09hrs			
Vessel completes container work	02hrs (40hrs)	3	2	1
Vessel leaves the berth	03hr30			
Vessel leaves the port	04hrs			

1. Moves per vessel hour are calculated by referring to the guideline of equivalent moves (1280), divided by the vessel's time in port (44 hours). Therefore: $1280 / 44 \text{ hrs} = 29.0$ moves per vessel hour in port.

2. Vessel time on berth is calculated as follows:

Equivalent moves / vessel time on berth = $1280 / 41.5\text{hrs} = 30.84$
moves per vessel hour on the berth (CTCT. 2003. MIS Department.
Container Productivity. 1:6 August).

3. Moves per gross working hour. Equivalent moves / vessel
working hour = $1280 / 40\text{ hrs} = 32.0$ moves per gross vessel
working hour.

4. Crane Productivity on the berth would be ($41.5\text{ hrs} \times 2\text{ cranes} =$
 83hrs), divided by equivalent moves, $1280\text{ moves} / 83\text{ hrs} = 15.42$
moves per gross crane working hours on the berth (CTCT. 2003.
MIS Department. Container Productivity. 1:6 August).

5. Crane Productivity on the vessel would be ($40\text{ hrs} \times 2\text{ cranes} =$
 80 hrs), divided by equivalent moves, $1280\text{ moves} / 80\text{ hrs} = 16.00$
moves per gross crane working hours on the vessel (CTCT. 2003.
MIS Department. Container Productivity. 1:6 August).

Net working time would be calculated as gross working time (from
start to finish) less idle time. Any delay that affects the working
vessel may be grouped as a common factor, which the terminal is
unable to manage.

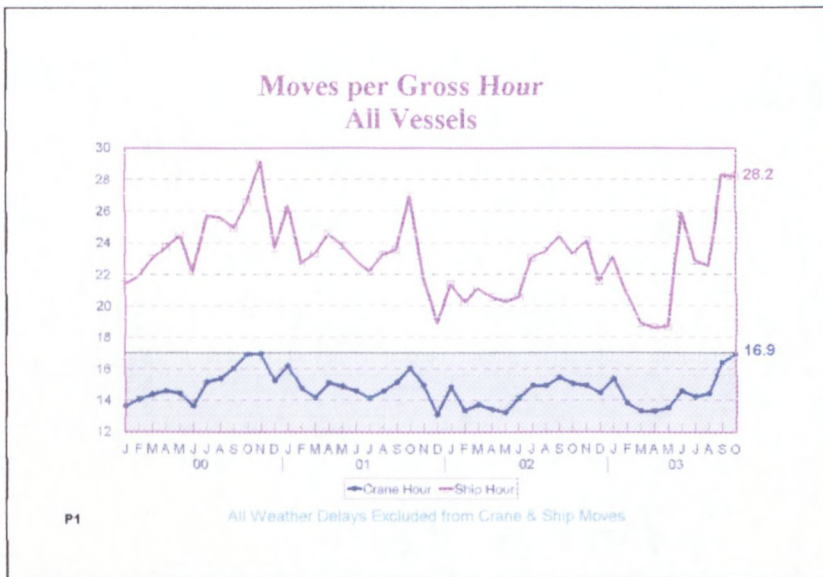
The above manual calculations are systems driven internationally
on a 24/7 basis.

The following key performance indicators are regarded as SAPO's
confidential information. These measurements are aligned to
international standards of practice and the terminal informs its
clients how the terminal performs by applying these measurements.
The information was obtained from (CTCT 2003. MIS
Department. Container Productivity. 1:8 August).

- **Crane Productivity:** The gross crane working time is used
from the time the vessel was planned to start, (total hours
worked: from first movement to last movement including all
downtime).

- **Vessel Productivity:** Total hours worked from the time vessel was planned from first movement to last.
- **Gross containers per working hour:** Vessel total movements divided by gross working hours.

Figure 2.6.1: Moves per Gross Hour of Vessels. (SAPO. 2003 Key Performance Matrix Indicator, presented at the IAB meeting, November).



- **Berth Occupancy:** Total time that the berth is occupied.

Percentage calculation: Actual time on berth divided by possible time on the berth.

- **Vessel Turn around Time:** Total hours of vessel from anchor date and time, to departure date and time.
- **Mean Turn around Time:** Turn around time of vessel divided by number of vessels over period of time.
- **Start Delay Time of Vessel:** Total time from anchor date and time, to first move date and time, minus departure date and time.

Figure 2.6.2: Berth Occupancy Percentage. (SAPO. 2003 Key Performance Matrix Indicator, presented at the IAB meeting, November).

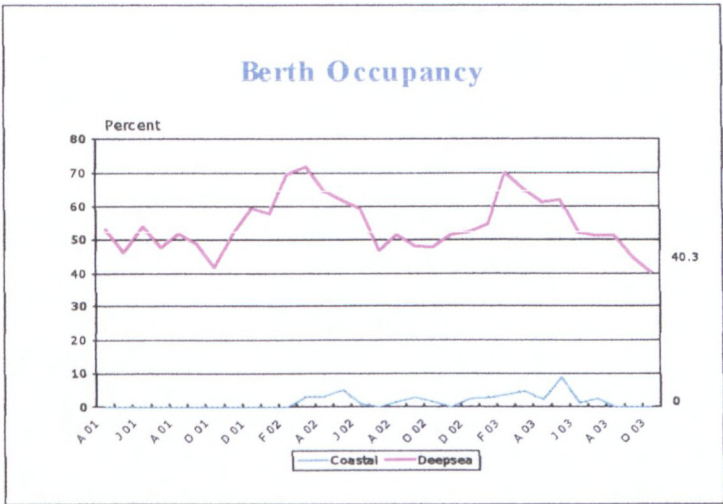
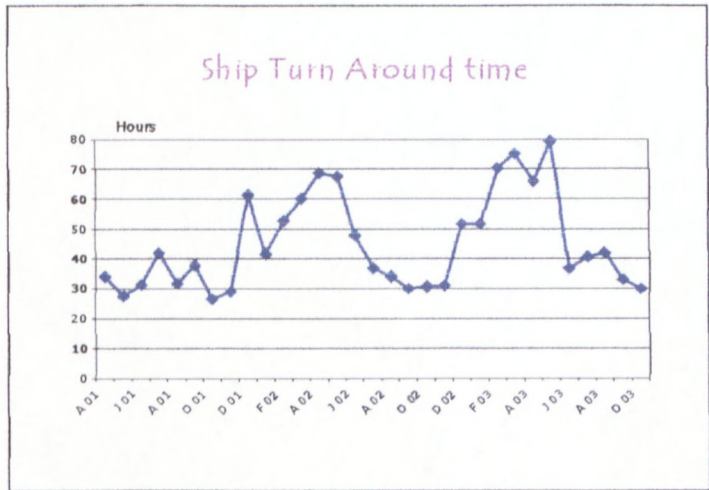


Figure 2.6.3: Ship Turn around Times. (SAPO 2003 Key Performance Matrix Indicator, presented at the IAB meeting, November).



2.7 MEAN AVERAGE DWELL TIME

Terminal container throughput has to be well managed in order to create capacity for receiving and dispatching of containers, therefore containers on the yard need to be strictly controlled as when to allow entry, and removal from the terminal. In order to maintain capacity efficiency for the terminal local traffic generated from the vessel and container throughput needs to be exchanged on a 50 / 50 basis between the quayside and landside.

Industries, market forces, types of cargo for export, and container lengths influence this decision. Laid down standards of dwell-times monitor the terminal yard's stack occupancy of the total of export, import, transshipment, reefer and empty containers in the terminal. Daily movements via vessel, road, rail, are monitored via a formulation of:

- **Import Dwell Time:** total import containers in the stack, divided by movements via the road and rail. A practical example would be, import containers on hand 450. Delivered by road 100. Delivered by rail 50, therefore 150 divided into 450 equals 3, indicative of import containers having a dwell time of 3 days in the stack and 300 containers are carried over to the next day with a dwell time of 4 days.
- **Export Dwell Time:** Total exports, divided by movements onto vessels.
- **Vehicle Turnaround Time:** Total time, from time allowed into the terminal until time of exit
- **Rail Turnaround Time:** Total time, from entry of rail trucks until exit at rail siding.
- **Reefer Container Dwell Time:** Total number of reefer containers divided by the number loaded onto the vessel and delivered by road or rail.

Due to the Western Cape’s export drive of fruit over a span of six to eight months and the strict protocol with this type of export, the terminal has to manage capacity and container throughput efficiently. In this industry segment there are regulations and procedures that each exporting country must abide by in order to quarantine diseases and insects and insure the quality and sanitation of the fruit. These procedures specify the temperature, at which the fruit must be held, fresh air ventilation settings for containers, pre-cooling temperatures, and handling procedures for containers. (PPECB 2000 Reefer Container Procedures. 1 1:20 April 2).

Figure 2.7.1: Truck Turn around Time.

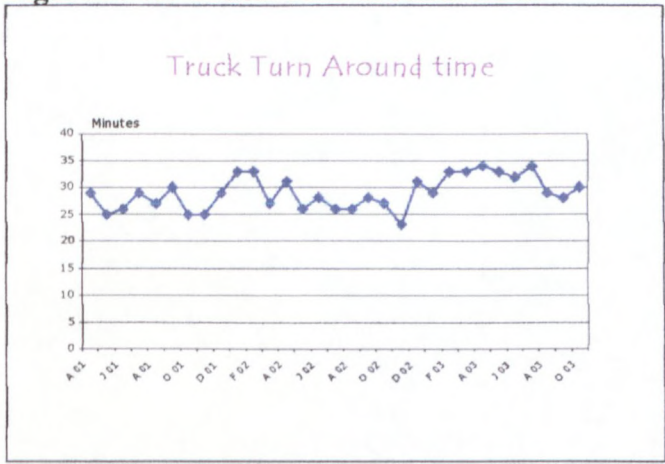
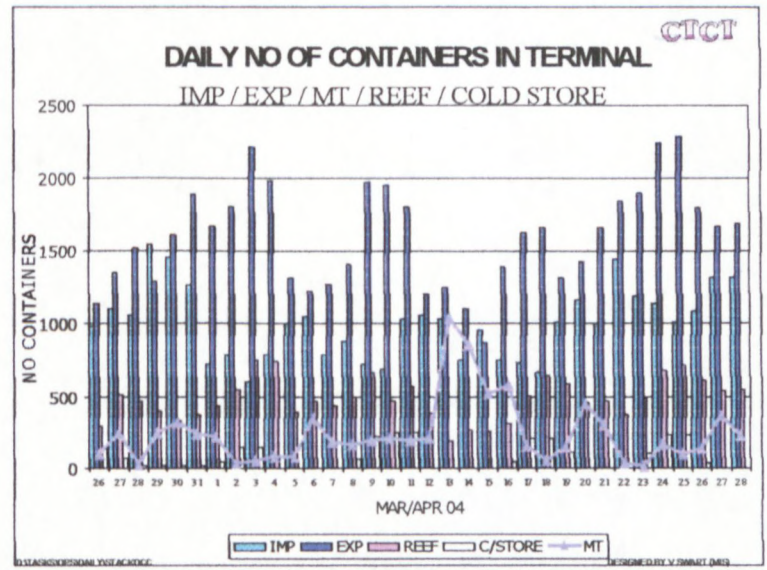


Figure 2.7.2: Daily Number of Containers in Terminal.



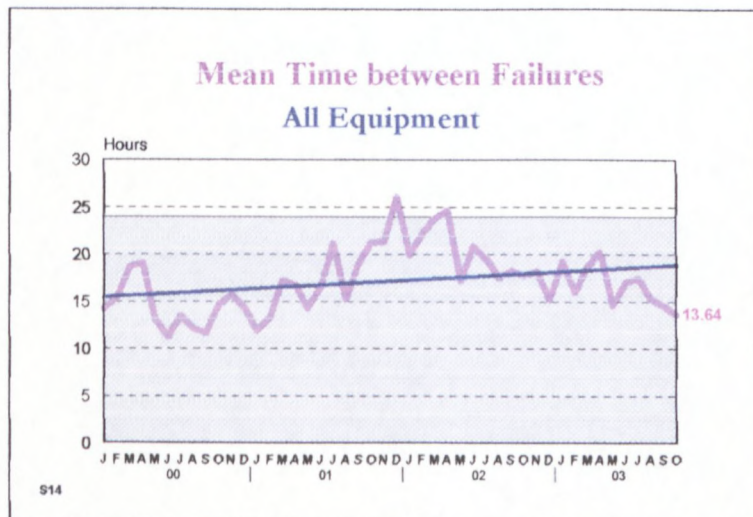
2.8 EQUIPMENT CONTROL MEASUREMENTS

The equipment infrastructure is monitored on a continuous basis by daily reporting of the status of equipment. Maintenance and repair have been implemented to ensure reliability and minimise downtime. Any technical delay that affects turn around time of vessels is immediately analysed. The technical support service responds to malfunctions upon notification.

- **Mean Time to Repair: (MTTR)** the time taken to repair equipment downtime is analysed for trends and rectification.

Figure 2.8.1: Mean Time Between Failures All Equipment.

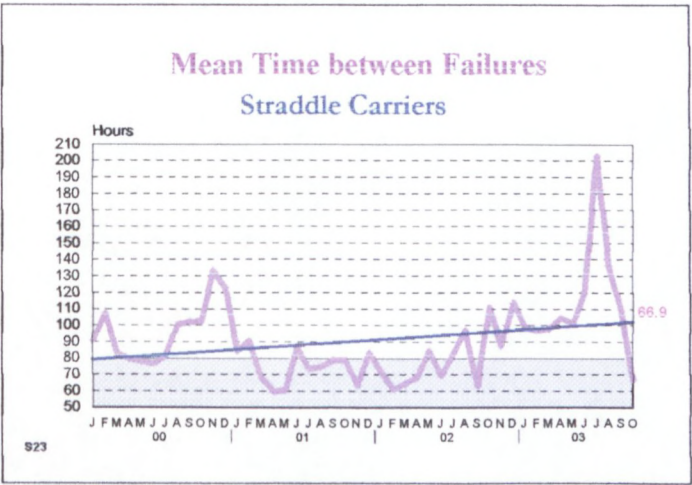
(SAPO. 2003 Key Performance Matrix Indicator, presented at the IAB meeting, November).



- **Mean Time between Failures: (MTBF)** is monitored on straddle carriers and ship to shore cranes in the operational area.

Figure 2.8.2: Mean Time between Failures Straddle Carriers.

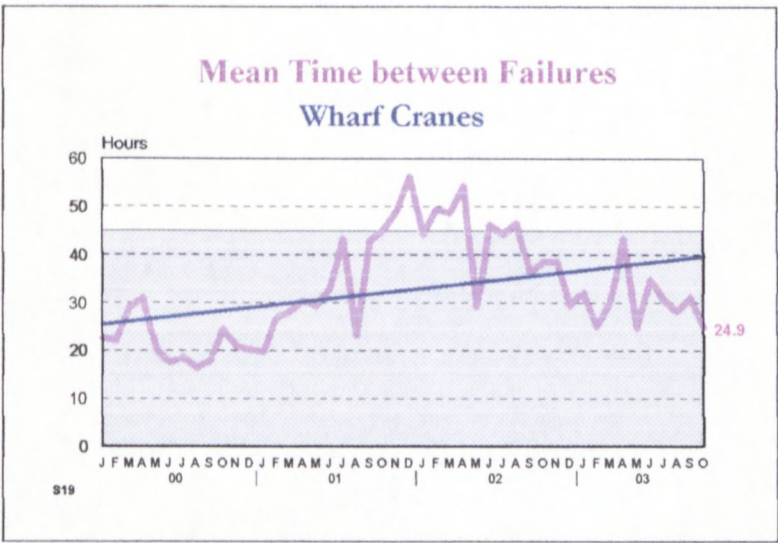
(SAPO. 2003 Key Performance Matrix Indicator, presented at the IAB meeting, November).



- **Mean Time between Failures: (MTBF)** is monitored on straddle carriers and ship to shore cranes in the operational area.

Figure 2.8.3: Mean Time between Failures Shore Cranes.

(SAPO. 2003 Key Performance Matrix Indicator, presented at the IAB meeting, November).



2.9 CONGESTION.

Port Congestion problems are due to the fact that the ports have run out of space and poor terminal flow. Over capacity, is caused by intense competition and market forces. Vessel scheduling is not sensitive to terminal productivity in times of congestion and high berth utilisation leads to delays in obtaining a berth. Low crane productivity and low yard productivity lead to delays in ship turnaround times (<http://www.goole.com/search>, port congestion).

“An increase in yard productivity (by storing more containers in the yard), can easily lead to a decrease in crane productivity or in gate productivity, since the efficiency of storage and retrieval functions in the container yard suffer” (CETS. 1986. Improving Productivity in U.S. Marine Container Terminals 1 5).

Knowledge of container terminal congestion should influence the shipping lines to develop sophisticated scheduling strategies to account for the above possibilities and try to minimise their influence on terminal operations

OT Africa Line (OTAL), the specialist West African shipping line, in response to port congestion in South Africa, restructured its service schedule in a bid to avoid congestion ([http://www.highbeam.com/library/port congestion /](http://www.highbeam.com/library/port%20congestion/) 2003).

Vessels calling to a port need quality of service, reliability, price, hinterland services and good IT systems. If a port promises 50 moves per hour you need it because your whole schedule depends on that. Scheduling of vessels does not consider port congestion at the time of planning ports of call (Anon. 2003 Cargo Systems 30 9 37 November). www.cargosystems.net

The Med center Container Terminal in Gioia Tauro (Southern Italy) faced problems ranging from terminal congestion and equipment shortages, lack of employee training and wild cat strikes. After implementing a number of aggressive steps, including large equipment purchases and productivity incentive programs, the terminal improved its effectiveness, efficiency and employee involvement.

“Best of all, we are gaining back our customer’s confidence,” said a spokesperson of the terminal. **The positive customer comments, increase in container traffic, new services and new customer enquiries are promising signs that the terminal is heading in the right direction”** (APM Terminals. 2003 Gioia Tauro Terminal. QuayWords. 3 16 March).

Improved management and labour relations plus capital investment have cemented Dar es Salaam’s position as east Africa’s most successful container terminal.

The terminal’s design and layout of 16hecters with 550meters of quay with a depth of 11.5meters often experienced congestion due to capacity and infrastructure limitations. The implementation of RTG’s increased container throughput to 230,000 TEU’s a year, with the storage area having 2.200 TEU ground slots. The terminal is now able to stack containers up to five high. This process has increased throughput by 21% and eased congestion (Anon. 2003 Dar es Salaam still dominating east African traffic. Cargo Systems. 30 7 35:36 September).
www.cargosystems.net

The stacking of containers 5 high and people based ideas have improved management techniques and increased productivity from 10 mph to an average of 20 mph (Anon. 2003 Dar es

Salaam still dominating east African traffic. Cargo Systems. 30 7 35:36 September). www.cargosystems.net

The port of Mombassa increased its container throughput by 5% for 2001/2002 from 265 671 TEU's to 305 427, due to the purchase of 11 RTG's able to block stack and parcel size containers as per clients request. The terminal was designed to handle no more than 250 000 TEU's (Anon. 2003 Dar es Salaam still dominating east African traffic. Cargo Systems. 30 7 35:36 September). www.cargosystems.net

2.10 CTCT'S INEFFICIENCY

The Port Congestion Forum established in 2002 were aware of the inherent problems the CTCT had experienced previously and predicted the same constraints and bottlenecks in 2003 due to equipment and capacity limitations in congested periods. The critical success factors identified for the terminal were equipment, infrastructure and people.

There was a broad public consensus that the terminal operations could work better. Consensus could not be reached on how to improve, as industry and market forces influenced terminal efficiency. The terminal was affected by the seasonal influence of deciduous fruit export usually from January to August; thereafter the terminal did not experience prolonged congestion. Delays incurred, were adverse weather conditions and bunching of arrival of vessels over the weekends after having called upstream (Anon. 2002 Port Congestion Forum. Business Bulletin. 4 1:3 July).

The forum continued to meet on a regular basis under the auspices of the Port Liaison Forum at the Chamber of Commerce. This forum, facilitated by the Cape Town Regional

Chamber of Commerce and Industry, highlighted obstacles in efficiency and productivity at CTCT.

“Due to the exponential and unpredicted container growth (post 1994) severe problems in berth and stack capacity had resulted in poor productivity levels. This in turn led to vessels being delayed and even bypassing Cape Town”

(Anon. 2002. Port Congestion Forum. Business Bulletin. 4 1:3 July).

The terminal's position was compromised in the weeks of April to May 2003 when vessels turn around times, increased from 60 hours to 100 hours, causing vessels to queue outside. The call size of vessels increased from 450 to 525. Poor information led to deviation variances from original forecast to actual number of containers handled, straining the already limited capacity availability (CTCT. 2003. Congestion Analysis. May- August 2003).

Container throughput stagnated, increasing the dwell times of containers on hand. In order to alleviate this problem the terminal requested that importers and surrounding container depots gear up for a continuous 24 - hour operation to deliver and remove containers from the terminal. Importers and depots could only take delivery of their containers 16 hours per day as transportation and depot costs increased substantially over nightshifts and week- ends. Public holidays added to the cause, increasing import container dwell times to 7 days on the yard (CTCT 2003. Congestion Analysis. May- August 2003).

The filling up of vessels after calling at the two upstream terminals aggravated the situation by creating restows to accommodate reefer containers. Exporters were capitalising on a good fruit harvest season and overbooking on vessels calling.

The terminal's stack efficiency and integrity control measurement of 70% was compromised due to poor container throughput, causing disruptive and dispersed stacking of containers.

Gross container productivity during this period fell to below 12.9 containers per hour. Operational personnel were not enabled to maintain terminal objectives and became disheartened.

Certain vessels waiting for service decided to bypass the terminal, which created a knock on effect of export container dwell times increasing to 7 days (CTCT 2003. Congestion Analysis. May-August 2003).

2.11 SUMMARY.

CTCT's key performance measurements of vessel turnaround time, port turnaround time, container handling rate, ship container per hour, rail turnaround time, truck turnaround time and terminal berth occupancy were not achieving the target of an international, efficient terminal.

Capacity, layout and design constraints resulted in poor service delivery in congested periods. There was a huge outcry from the industry. The terminal's infrastructure needed Government's intervention.

Chapter 3 clarifies the various initiatives and interventions undertaken by the terminal to improve its service levels to its users. Most of these initiatives were on a short-term basis; equipment and infrastructure were long- term objectives, which needed huge amounts of investment.

CHAPTER 3

RESEARCH METHODOLOGY

The researcher identified that previous historical information identified constraints that impacted on the service delivery of the container terminal. This information provided the bases of assisting the researcher in finalising his findings, recommendations and conclusions. The full research methodology consisted of:

- The Logion Report (3.1).
- National Port Authority Intervention (3.2).
- The Interim Advisory Board (3.3).
- The Technical Task Team (3.4).
- The Port folio of Process Issues (3.5).
- The Gemini Consultancy Report (3.6).
- The Terminal Stakeholder interview (3.7).
- The Sample of Open Ended Questionnaire (3.8).

3.1 THE LOGION REPORT.

Portnet commissioned the Logion Consultant Company in October 1995 to assess “Options to Improve Short Term Quayside Productivity”, to improve terminal efficiency through increased productivity and the ability to accommodate growth. Container terminal capacity, Operations, Planning and Control, Systems, Labour and Rail Operations were the basis of the study.

The executive summary of this report stated:

“Market forces and a world trend of 7% to 8% in container growth would dictate the rate of development at Cape Town and by the end of the century the terminal would reach saturation. This limitation at Cape Town would retard the growth of transshipment cargo and it would not be able to take advantage of becoming a hub port terminal” (Logion Consultancy Report. 1995. Options to Improve Short Term Quayside Productivity. October).

“The overall productivity rates would be generally poor in peak times, as there was a lack of ship to shore cranes servicing the deep-sea berths. The average length of quay per ship to shore crane in major European terminals was one crane per 173 metres of quay, whilst in Cape Town the figure with six operational cranes is one crane per 229 metres” (Logion Consultancy Report. 1995. Options to Improve Short Term Quayside Productivity. October).

A detailed analysis of crane utilisation including the identification of peak demands identified that the terminal needed additional capacity and equipment for duration's of six to eight months during the times of exportation of fruit.

The report identified poor vessel turnaround at Cape Town due to vessels not starting on arrival as unpredictability and stowage problems were being resolved first.

Increasing operational flexibility by implementing a continuous improvement project of a direct straddle carrier operation to and from vessels, needed to be investigated (Logion Consultancy Report. 1995. Options to Improve Short Term Quayside Productivity. October).

Safmarine comments on the report (December 21st 1995) were:

“There is a strong possibility that the container terminal will continue to operate under severe pressure for many years to come and that any additional capacity will be rapidly absorbed. In view of this, Safmarine will support any initiative aimed at expanding container capacity of the terminal, provided that this can be done quickly and cost effectively” (Logion Consultancy Report. 1995. Options to Improve Short Term Quayside Productivity. October).

3.2 NATIONAL PORT AUTHORITY INTERVENTION.

The National Port Authority (NPA) had to implement infrastructure and capacity initiatives. The container terminal stacking area would have to be extended and there would have to be a continuous upgrade of equipment and capital expenditure. Market forces demanded additional reefer capacity and plug in points, placing a further burden on the terminal.

SAPO had identified short-term initiatives to develop stack capacity but these initiatives would not be conducive to efficiency and productivity creating long distance travelling to transfer containers, fragmenting operations.

The long-term objective would be stack capacity expansion in a north-easterly direction, parallel to quay 600-604, increasing storage capacity. An environmental impact assessment (EIA) for the proposed extension had been published for comment.

The final EIA report would be submitted to the authorising body, the Department of Environmental Affairs and Tourism (DEAT), for a decision to proceed with the project (Anon. 2003. NPA Cape Town shows transparency with Milnerton residents. Port Anchor Dispatch. September).

3.3 THE INTERIM ADVISORY BOARD.

The governments stated intention to concession or privatise operations of container terminals by allowing long-term lease agreements that included commitment to invest in upgrading infrastructure and equipment had not reached consensus with its stakeholders.

The shipping industry requested government's intervention to formulate strategies to assist with the immediate problem of congestion.

The Department of Public Enterprise (DPE) and the container industry; the main stakeholders in terms of establishing a crisis congestion committee would have to provide assistance and support in alleviating port congestion within the South African container terminals. The Interim Advisory Board (IAB) was subsequently established (2nd November 2002) namely, S A Port Operations (SAPO), National Ports Authority (NPA), and the Container Liner Operator Forum (CLOF), to intervene in alleviating congestion at DCT then CTCT.

Its primary objectives were defined as being:

- To improve the operational efficiency in the short term.
- To reduce the total turnaround time (TAT) of ships that call at the container terminals.

3.4 THE TECHNICAL TASK TEAM.

A Technical Task Team (TTT) affiliated to the IAB, was established and its primary objectives were to compile a statement of action plans that would not take long, or be too expensive to implement, to assist in the terminal's efficiency. The (TTT) team was appointed for CTCT (5th September 2003)

comprising of four core portfolio champions that would investigate:

- Third party issues creating inefficiency.
- Terminal Equipment issues creating inefficiency.
- People issues creating inefficiency.
- Process and System issues creating inefficiency.

3.5 THE PORTFOLIO OF PROCESS ISSUES.

The portfolio of Process Issues was designated to the researcher within SAPO's domain. Prior to the visitation of the team to Cape Town scheduled for the 11th-12th September 2003 the researcher had to retrieve relevant information to point the way forward. By retrieving historical information the team was able to analyse and link the four-core portfolios to relevant information.

3.6 THE GEMINI CONSULTANCY REPORT.

Gemini Consulting Limited, were commissioned in 1998 to assist the terminals in actioning a detailed action plan to identify inefficiencies, action plans, accountability, responsibility, requirements, implications and completion dates.

The issues raised were generic in relation to the four-core portfolios (third party, equipment, people, and processes) that the TTT had to analyse. Labour relations had deteriorated and there was resistance from terminal stakeholders to adhere to completion dates during this period. The objective to introduce a formal morale measurement process was indicative that labour relations were poor.

Other issues were:

- Improve equipment life cycle management.
- Design pays and reward systems based on competencies, skills and performance.
- Review organisation structure and manning levels.
- Upgrade and improve use of infrastructure.
- Improve process efficiency. Review Standard Operating Procedure (SOP's).
- Establish improved planning practices. Enforce terminal discipline.
- Increase productivity in operations.
- Ensure adequate training.
- Improve financial control.
- Implement an activity-based management costing system.

This background information provided a point of reference and departure point for the established technical task team.

3.7 TERMINAL STAKEHOLDER INTERVIEWS.

The modus operandi of the TTT visitation program to Cape Town was:

- Analyse each core portfolio.
- Prepare a questionnaire aligned to each portfolio.
- One to one interviews with terminal stakeholders.
- Identify solutions to solve problems.
- Compile a consolidated report of each portfolio.

- Report on each portfolio to the container terminal management team.

The visitation program of the researcher allowed for key role players listed below to be interviewed. These interviews would assist in identifying problem areas that created poor service delivery to terminal users. These interviews provided the basis for the researcher to verify the causes of inefficiency by selecting a sample of terminal users to test for cross case analysis, verifying terminal inefficiencies.

Table 3.7.1 Key Role Players Interviewed.

NAME	ESTABLISHMENT	POSITION	RELEVANCE
Mr Yacoob Hartley	South African Port Operations	Acting Container Manager	Ensures Terminal is efficient
Mr Dereck Goetze	South African Port Operations	Planning Manager of the Terminal.	All activities within the terminal are controlled and planned.
Mr William White	South African Port Operations	Waterside Manager	Responsible for the performance and productivity of vessels calling to the terminal
Mr. David Davids	South African Port Operations	Landside Manager	Responsible for all landside activities in the terminal
Mr. Peter Odendall	P&O Ned Lloyd Container Lines	Operations manager	That P&O vessels calling to the terminal receive a reliable service
Terminal Supervision	South African Port Operations	Supervisory role of the terminal	Terminal Objectives are obtainable
Technical Department	South African Port Operations	Equipment Maintenance dept	Functionality of container terminal equipment
Technical Task Team Of The I.A.B	Team affiliated to the Interim Advisory Board of Container Terminals in South Africa	Technical Team Appointed to Audit S.A. terminals	Identify causes and effects of inefficiencies in container terminals.
Mr Billy Cilliers	National Port Authority	Port project manager	Develop capacity for CTCT

3.8 The Sample Questionnaire.

Primary research information obtained from historical information led to open ended questions enabling the researcher to group the terminal inefficiencies. The sample questions were:

Question 1:

Unreliable information impacts heavily on the functionality of the terminal creating inefficiency.

Question 2:

Terminal capacity, design and layout are the most critical success factors to terminal efficiency.

Question 3:

Terminal users influence the level of service the terminal provides.

Question 4:

Terminal equipment reliability is the most critical factor supporting terminal efficiency.

Question 5:

Terminal personnel's skills contribute to efficiency.

Question 6:

The terminal management system and aligned processes support efficiency.

Question 7:

Continuous improvement initiatives will succeed in improving efficiency.

Question 8:

The morale of the operational personnel is at its lowest due to poor work conditions.

After the interview process with key stakeholders the researcher employed cross-case analysis by selecting a sample size of operational personnel at ground level.

Deployed operational personnel were functional on a three shift pattern, allowing for a continuous 24/7 operation. The researcher selected personnel from the respective operational grades from all three shifts. The sample consisted of:

- 6 operators-lifting equipment (OLE's), 2 per shift, operating terminal lifting equipment.
- 6 drivers articulated vehicles (DAV's), 2 per shift, performing internal driving duties transferring containers as planned.
- 6 Cargo Coordinators (CC's), 2 per shift, coordinating container movements within the terminal.
- 6 Operational Supervisors (OS), supervising and ensuring that planned tasks were executed.
- 6 External transporters, transporting containers to and from the terminal.
- 4 Shipping agents, representative of the 4 major stakeholders conducting business with the terminal, providing the terminal with container information via statutory requirements.
- 3 Ship's Planners, planning and coordinating the sequencing works-plan of vessels.
- 3 Space Yard Planners, planning and coordinating the yard capacity.

- 4 Vessel Operators, representative of the 4 major stakeholders conducting business with the terminal, scheduling vessels calling to the terminal.
- 6 Technical personnel servicing and maintaining the equipment fleet.
- 3 Full Time Union Representatives (FTUR's), one from each respective union, namely: SATAWU, UASA and UTATU.

Participants had the choice of agreeing to statements according to the Likert Scale: 1. Strongly Agree. 2. Agree. 3. Strongly disagree. 4. Disagree.

The sample questionnaire concentrated on the critical success factors and processes that needed full integration to ensure terminal functionality. The grouping of these statements offered the researcher the opportunity to allow for participation and involvement in solutions and recommendations to problem areas. The sample was structured on the basis of experts in the field of container operations.

3.9 SUMMARY.

Relevant research drew attention to various constraints that had been hindering progress and improvement within the terminal.

The critical factors such as information, equipment, infrastructure and people were contributing to inefficiency.

The congestion that the terminal had experienced occurred in periods leading up to and during the peak times of the Western Cape's export drive of fruit world- wide when the terminal experienced severe capacity constraints.

Internationally, the performance of this terminal was measured in its peak time, as vessel schedules had to abide by due dates the fruit was planned to reach the markets.

Chapter four relates to the sample questionnaire. It's findings and results of terminal inefficiencies. One must not obscure the fact that a great deal needed to be done so that service levels would be of an acceptable standard. Terminal stakeholders had no choice, but to support and co-operate with the terminal in its efforts to improve efficiency during its congested period.

CHAPTER FOUR

RESULTS AND FINDINGS

4.1 CRITICAL SUCCESS FACTORS.

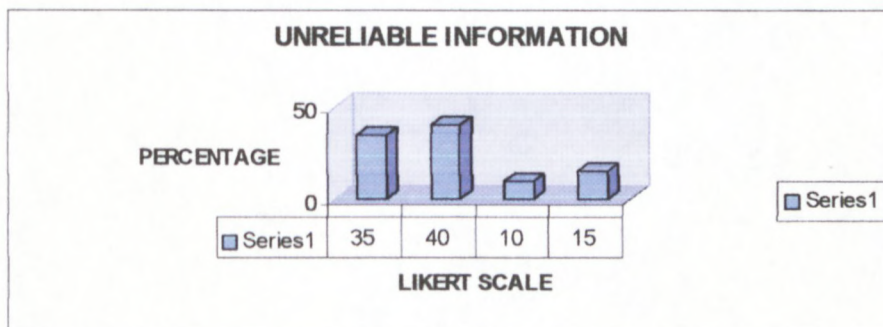
Chapter 2 clarified the integration of a terminal's success factors. Operations, within a container environment required centre stage and supporting functions had to be aligned to its objectives. The sample of experts in the field identified the lack of effective mechanisms unable to sustain and ensure success of core functions. The statements guided the researcher as to the importance of each factor of contribution.

Statement 1:

Unreliable information impacts heavily on the functionality of the terminal creating inefficiency. Explain the reasons why?

Likert Scale	Standard Score.
1. Strongly Agree	35%
2. Agree	40%
3. Strongly Disagree	10%
4. Disagree	15%
Total	100%

Figure 4.1.1: Unreliable Information.

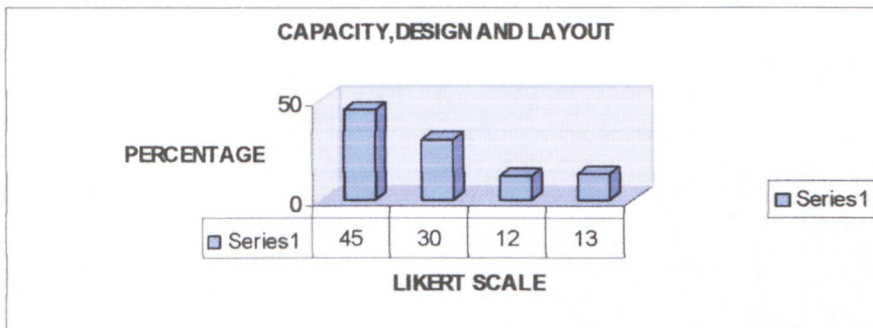


Statement 2:

Terminal capacity, design and layout are the most critical success factors to terminal efficiency. What is the terminal's capability?

Likert Scale	Standard Score.
1. Strongly Agree	45%
2. Agree	30%
3. Strongly Disagree	12%
4. Disagree	13%
Total	100%

Figure 4.1.2: Capacity, Design and Layout.

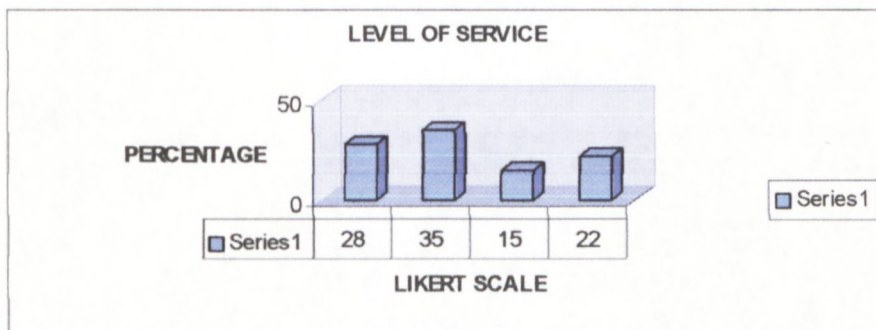


Statement 3:

Terminal users influence the level of service the terminal provides. How do they influence it?

Likert Scale	Standard Score.
1. Strongly Agree	28%
2. Agree	35%
3. Strongly Disagree	15%
4. Disagree	22%
Total	100%

Figure 4.1.3: Service Level.

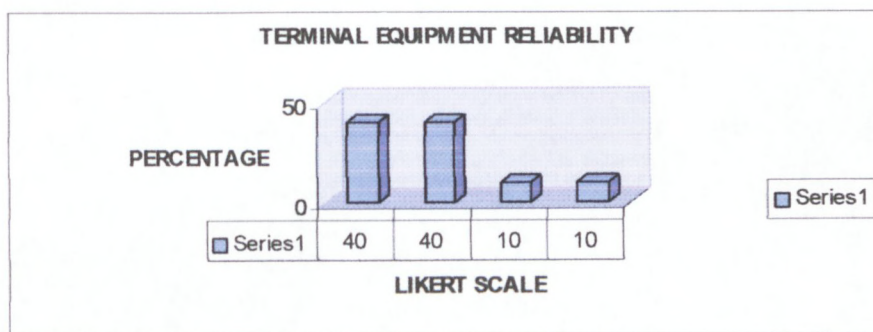


Statement 4:

Terminal equipment reliability is the most critical factor supporting terminal efficiency. How reliable is the equipment?

Likert Scale	Standard Score
1. Strongly Agree	40%
2. Agree	40%
3. Strongly Disagree	10%
4. Disagree	10%
Total	100%

Figure 4.1.4: Terminal Equipment Reliability.

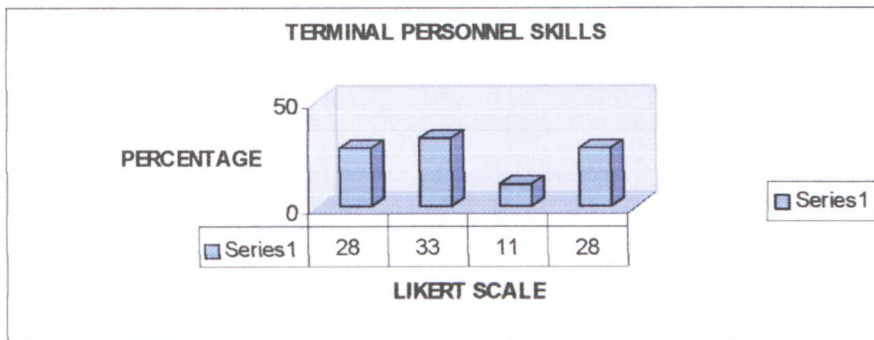


Statement 5:

Terminal personnel's skills contribute to efficiency. What level of skills is needed?

Likert Scale	Standard Score
1. Strongly Agree	28%
2. Agree	33%
3. Strongly Disagree	11%
4. Disagree	28%
Total	100%

Figure 4.1.5: Terminal Personnel Skills.

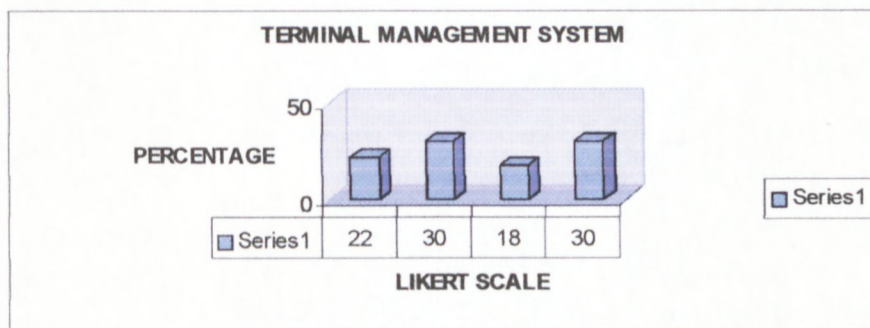


Statement 6:

The terminal management system and aligned processes support efficiency. How effective is the system?

Likert Scale	Standard Score.
1. Strongly Agree	22%
2. Agree	30%
3. Strongly Disagree	18%
4. Disagree	30%
Total	100%

Figure 4.1.6: Terminal Management System.

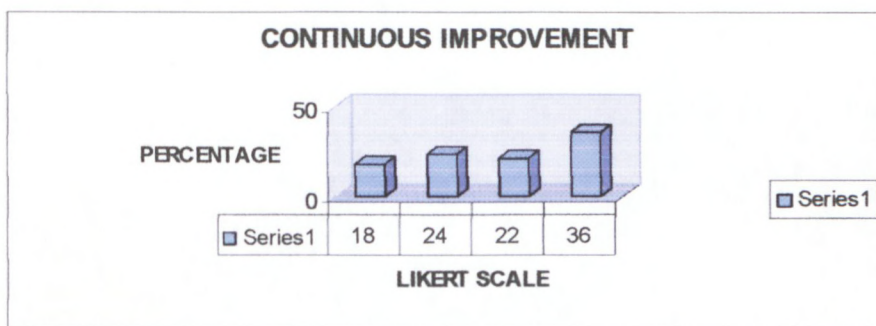


Statement 7:

Continuous improvement initiatives will succeed in improving efficiency. Which improvements will improve efficiency?

Likert Scale	Standard Score
1. Strongly Agree	18%
2. Agree	24%
3. Strongly Disagree	22%
4. Disagree	36%
Total	100%

Figure 4.1.7: Continuous Improvement Initiatives.



Statement 8:

The morale of the operational personnel is at its lowest due to poor work conditions. What is hindering good performance?

Likert Scale	Standard Score
1. Strongly Agree	30%
2. Agree	40%
3. Strongly Disagree	10%
4. Disagree	20%
Total	100%

Figure 4.1.8: Morale of Personnel.

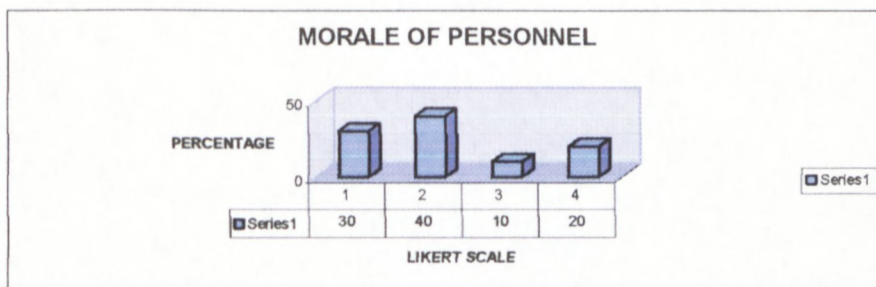


Figure 4.1.9: Pie Chart Segment of Statements.

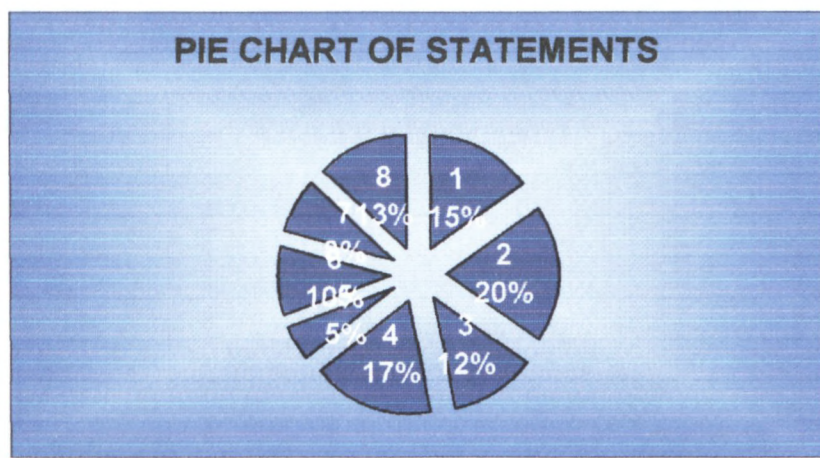
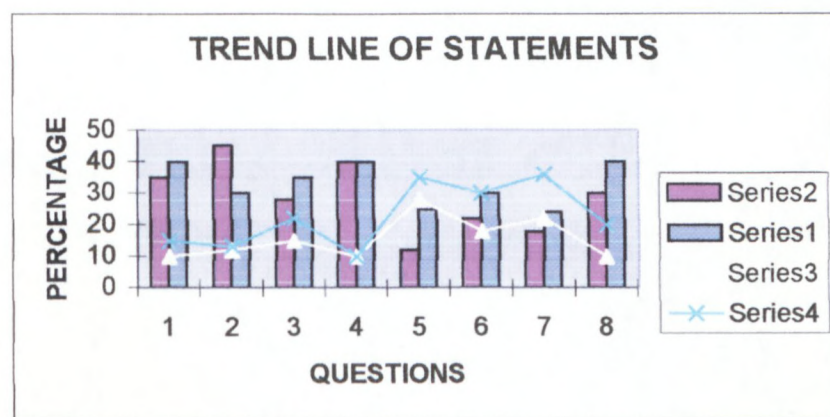


Figure 4.1.10: Trend lines of Statements.



The researcher established that the terminal was dependent on the above critical success factors to ensure its level of efficiency. Each factor had a defined role of integration and a unique relationship in ensuring that the terminal operated at an acceptable level.

The findings are those of the researcher's own observation and comments and not necessarily that of the Technical Task Team

The researcher's statements established that:

- Unreliable, poor information rendered 70% of terminal activities inefficient.
- Capacity, layout and design had to contribute up to 80% of the terminal efficiency at all times, these included periods of congestion.
- The methods of container transportation influenced the required levels of service at Cape Town. Servicing un-containerised vessels resulted in 63% of conditions being unfavourable, affecting vessel turn around.
- The terminal was reliant on equipment and integrity being standardised at 80% ensuring terminal efficiency.
- The integration of the terminal critical success factors and a well trained, equipped workforce would ensure terminal efficiency. The lack of integration resulted in poor distribution skills by 61% to perform at an acceptable level.
- The management system designed to utilise equipment and resources optimally could not fit in the organisational structure and design resulting in poor efficiency by 55%. The system was unable to integrate all the processes and control terminal activities.
- The limitation of capacity, infrastructure and people shortage hampered terminal initiatives and continuous improvements by 56%. Short-term initiatives were terminal driven. The long-term solution needed Government intervention.
- Poor job satisfaction and uncertainty in permanent employment resulted in 70% of operational personnel's morale being very low.

4.1.1 FINDINGS OF TERMINAL INFORMATION

Industry information pre 1994 was centralised and regulated by the then controlling authorities. This changed dramatically in post 1994 as information became the competitive advantage. Disclosure of information to the terminal was poor. Required statutory documentation was incomplete and became unreliable.

The terminal functionality was dependent on an acceptance level of 100% accuracy of reliable information from its users in order to plan and execute its activities to maintain its level of service.

The researcher tested the standard deviation of terminal information by selecting a sample size of ten (10) vessels information out of a population of 60 vessels worked in the peak period of February'03, with an average call size of 570 containers. The vessels selected were the Pegasus, S.A Helderburg, Umfoluzi, City of Stuttgart, Pon Chusan, Saf Memling, Dal East London, Ever Gifted, Saf Tugela and the Orion.

The test transpired from the period the vessel advised the terminal of its call on a seven-day advice, to two days before calling. Measuring the relevant statutory documentation, inaccurate, incomplete and late information was being submitted in respect of forecasted container movements to actual import, export containers handled.

The deviation test was indicative of a 15% variance and the other vessels had an 80% probability of unreliable information that impacted and rendered the terminal inefficient with regard to capacity, yard planning, and resources. The chain reaction of this variance created a loss control of container stack integrity, when allocating space for the consolidation of containers for the respective vessels. The yard space planner would have to allocate additional space for extra containers elsewhere;

therefore dispersed and fragmented yard planning became the order of the day.

In congested periods, when demand for capacity could not meet supply, any deviation did not support the terminal's objective of enabling operations to perform at an acceptable standard. The terminal performance measurements from year 2000 to 2003 were indicative of the same inheritance of inefficiency during a peak period of eight months starting in January of every year till August and improving thereafter.

With regard to vessel information, unpredictability existed, as it was not being structured in accordance with the vessel's route of call to S.A ports and its available capacity. The Electronic Data Interchange (EDI) between vessel and terminal did not comply with regard to its intended use of information predictability. Indiscriminate stows affected vessel operations and created a situation of presenting the working of the vessel piecemeal.

Cold chain cargo, regarded as High Valued Cargo (HVC) required strict protocol and Masters of vessels had to abide by laid down regulations. This type of cargo had to be loaded onto the vessel according to allocated stowage positions. These positions had been compromised when the vessel called upstream and this created additional restow moves at the terminal.

The vessels had to comply with their safety standards and structural design; therefore final approval of container stowage's and weight allocations could only be obtained once the vessel berthed delaying the start process on arrival at the terminal. Vessel operators were constantly changing stows creating a loss of control of stack integrity and shifting of containers when sequencing specific positions for containers in order to ballast vessels.

Late changes to scheduled arrivals caused by decisions to bypass certain ports complicated the discharge operation due to the changes of the discharge profile. CTCT were not informed of these changes and this placed further burden on availability of capacity. Vessel operators were playing the ports off against each other.

Cape Town became known for its “Fill-Up / Sort Out” status, creating numerous restows, unfriendly stowage positions and rectifying vessel weight and ballast problems before sailing on to its scheduled destinations.

Local traffic for the terminal amounted to 446137 TEU's for March 2002/03. Additional movements such as direct restows, indirect restows, hatch covers and tranships for the same period amounted to 104721 TEU's which was indicative of 1.23 moves $(104721 \times 100 / 446137)$, 20.5% $(10472 \times 100 / 508977)$ in addition to handling local generated container traffic, it strained capacity.

Figure 4.1.11 Terminal Layout and Stack Areas.

[illegible]

The container growth in containers 1995- 2002 were:

Table 4.1.1 Percentage Growth in Containers 1995 – 2001.

YEAR	1995	1996	1997	1998	1999	2000	2001
CONT'S	263965	265658	255890	254878	265481	279915	345577
PERCENT		0.6	-3.7	-0.4	4.2	5.4	23.5

Table 4.1.2 Percentage Growth in TEU's 1995 – 2001.

YEAR	1995	1996	1997	1998	1999	2000	2001
CONT'S	303046	309591	309289	318190	341060	369812	456976
PERCENT		2.2	-0.1	2.9	7.2	8.4	23.6

Market forces, modern technology, and improved management systems dictated developments. The terminal was able to handle 106577 TEU's (increase of 26 %) more in 2002/03 than it was originally designed for, but the performance and vessel productivity deteriorated as design and layout could not support terminal efficiency, creating poor process flows of container handling. The average container-handling rate was 15.1 mph for this period (CTCT.2003).

The location of import stacks from berth 604 to 501(2-km's) created long distance travelling inhibiting good performance on the discharge operation. Internationally, container terminals with sufficient capacity were able to handle 40-50 containers per hour by dumping the containers directly behind the vessel and sorting them to other stack areas after completing the import leg. This type of operation required that RTG's stack containers 5 high behind the working crane.

CTCT did not have this privilege, as no RTG's were available, therefore capacity initiatives created longer distance travelling to accommodate container throughput. By transferring containers further away from the point of effective efficiency and productivity, waterside operations were prone to down time due

to long distance travelling. The distance containers were being transferred ranged from 1-2 km's. Travel times to these areas were between 5-8 minutes. Waterside, Landside operations were working in the same areas and at times the same rows. This situation created inefficiency in that only one task could be executed while the other stood by.

The fruit season produced 500.000 tons of fruit, shipped in reefer containers (PPECP, 2002).

Table 4.1.3 Growth in Reefer Export Containers 2001-2002

YEAR	6 METRE	12 METRE
2001	18305	20092
2002	20241	23614
PERCENT	9	8.5

The capacity of 950-reefer plug- in points was insufficient during fruit exportation. The terminal needed additional points during peak seasons.

The lack of additional resources for cold chain cargo in the peak season created disruptive stacks when consolidating containers, creating inefficiency. This impacted on the transferring of the container to be shipped onto the vessel. The existing capacity could not cope with the seasonal demand. The acceptance of reefer transhipped containers increased dwell times, stagnating container throughput. Overbooking of these containers by operators resulted in shut out of containers, clogging the terminal. Vessel operators prioritised containers to be shipped on a basis of more important than the others, creating manual planning as the system had already planned containers in sequence as per vessel co-ordinator instructions. Containers shut out became the terminal's responsibility and occupied groundslots that could have been allocated to the next vessel calling.

Insufficient capacity during peak times created poor flows of operational activities in the retrieval of containers after being stacked for shipment or delivery. Yard stacks were topped up continuously and containers were placed on top of those planned for distribution. Dispersed stacks affected landside operations, resulting in containers having to be moved elsewhere, impacting on the stack management system. Truck turn around time increased 30-40 minutes, during peak periods (CTCT 2003).

The access and exits restricted vehicles entering and leaving. Bottlenecks frequently occurred, increasing the vehicle turn around time once registered on the management system. The terminal could not prepare for the exact container volumes to be handled on a daily basis, as terminal users did not provide this information. Up to 40-50 trucking vehicles would arrive at the same time without any notification to the terminal.

Housekeeping of the terminal in order to maintain stack integrity could not be performed due to resources deployed at all flash points.

The management of dwell time of containers on the yard was structured according to the estimated time of arrival (ETA) of vessels, allowing import containers 3 days free storage after being landed and 5 free days for exports. Most export stacks closed at 18h00 on the last day, clashing with peak time traffic in the Cape Town CBD area adding to congestion at the intake control area.

Market forces dictated the arrival of goods which were planned for exportation, usually transpiring on the last day of stack closing, resulting in allocated capacity not utilised for 4 days and on the last day a tremendous influx of export containers caused bottlenecks for the terminal.

Late arrivals of containers, after the stack closed, affected the planning of vessel stowage plan, resulting in indiscriminate stows affecting terminal operations. Imports/Exports being handled on the last day of planned dwell time were exceeding amounts permissible by the management system. The dwell time strategy did not adjust to insufficient capacity during congested periods.

Low tariffs to encourage transship containers to be landed and await the on carrier vessel allowed dwell times averaging 9.5 days (CTCT 2003).

Table 4.1.4 Growth in Tranship Containers.

YEAR	6 METRE	12 METRE
2001	49884	3197
2002	46458	38187
PERCENT	-9	83.7

The above table indicates that 6 metre containers dropped off in 2002 and 12 metre containers increased by 83,7% occupying 2 groundslots of twenty foot equivalent units. The terminal became a storage area encouraging deviant behaviour from its users. These containers created double handling, as they had to be consolidated with other export containers once the stack had been opened for the vessel. The strategy of storing tranships containers in congested periods strained capacity availability.

The berth at quay 601 had a depth of 10 metres and could only accommodate C class vessels, resulting in larger vessels having to wait at anchor until a suitable berth became available. There was only one container terminal at Cape Town, being used as a multi- purpose service provider and not specialising in high service delivery for fully cellular container vessels calling.

4. 1.3 LEVEL OF SERVICE.

The level of service the terminal had to provide was dependent on methods of container transportation. Vessel profile, age, design, structure and trucking / rail transport, equipment in use, statutory requirements and regular routine service impacted on terminal efficiency.

CTCT being on the point of Africa was providing container service for all vessels calling and did not specialise in one direction. Vessels calling were classified according to their structure in order to engage the anticipated berth occupancy (CTCT 2003 MIS Department. September).

Vessels were classified as:

Fully Cellular Vessel: A Class, with a productivity range of 18-20 moves per hour.

Semi-Cellular Vessel: B Class, with a productivity range of 16-18 moves per hour.

Non Cellular Vessel: C Class, with a productivity range of 14-16 moves per hour.

The percentage of these vessels calling at the terminal for March 2002/ March 2003 was:

A class 55.6%

B class 31.5%

C class 11.9%

Class B vessels, had own ships gear to handle containers and requested the use of vessel derrick operation in times of congestion, occupying the berth longer than planned. These types of vessels age profile ranged between 18-23 years. They were chartered to provide a service to ports that had limited

resources and container terminal infrastructure, resulting in CTCT having to unload / load containers in unfriendly gantry positions creating a slow down in the continuous momentum of handling containers at an acceptable rate.

C class vessels, having been modified to accommodate container cargo, encountered ballast problems and weight distribution transpired to ensure that vessels were sea worthy. Containers were being selected for specific stowage positions.

The running average of vessel related problems, from the time on berthing till departure was 20% of total terminal down time for 2002/2003 compared to 16% the previous year, an increase of 4% (CTCT 2003 MIS Department).

The level of service the stevedoring function provided the terminal in maintaining its efficiency was reliant on the availability of vessel gear, such as twistlocks (secure container), lashing bars, side gear, eye hooks and bridge cones. All of this equipment ensured that the containers on deck were secured as a compact unit able to withstand the sea elements, being unlashed when planned for discharge.

The masters of the vessels were responsible for ensuring that containers were secured according to IMO regulations and that of vessel insurers. This type of operation to loosen and secure the gear created downtime and impacted on efficiency. The running average of ship's gear related problems was 19% of total terminal downtime for 2002/2003.

40% of terminal downtime 2002/03 was ship-related issues (CTCT 2003 MIS Department).

Ship repairers, marine services, vessel bunkering, ship chandlers and port health, immigration and custom regulation impacted on the TAT of the vessel.

No service level agreements existed with these stakeholders. They were not aligned to terminal objectives and efficiency.

Container vessels incurred delays of up to 4-6 hours waiting for Marine services to berth, unberth them, due to the port offering different service packages. Limited marine resources could not provide the entire port a service, resulting in no dedication to vessels calling at the container terminal (CTCT 2003 MIS Department).

4.1.4 TERMINAL EQUIPMENT RELIABILITY.

Modern technology and reliable equipment are critical in maintaining good productivity rates in order to enhance container throughput. The fleet size and type of equipment in use had to support operations in achieving the desired result. Design and layout, volumes of containers and container throughput influence the equipment infrastructure.

The current equipment in use at CTCT had aged dramatically (some equipment are over thirty years old) and could not keep pace with world trends in competing against container moves per hour. The fleet size of 6 quayside gantry cranes was insufficient to service the length of the quayside (1150m). The international standard of 1 gantry crane per 100 metres of quayside had proven that container terminals were able to turn vessels around efficiently by allocating 3 / 4 cranes to a vessel, depending on its length and call size. This is not the norm at CTCT and inefficiency existed when cranes moved up and down the quayside in order to provide a service.

The required availability and utilisation of terminal equipment was based on container throughput of 400 000 containers per annum. The high demand for equipment utilisation during peaks created additional workloads and poor maintenance management.

Table 4.1.5 Equipment Availability.

Equipment	Required Availability	Current Availability	Required Utilisation	Current Utilisation
Cranes	96%	96%	80%	70%
Straddle Carrier	96%	70%	80%	40%
Haulers	90%	80%	80%	30%

Two Demag cranes at CTCT were unable to service A / B class vessels with containers loaded 5 high on deck, as their specifications were designed to handle containers 3 high during the seventies, resulting in the next suitable crane, when available having to assist in handling these containers. Equipment with reliable reputations commissioned at the terminal could not adjust to harsh conditions and were prone to malfunctioning.

The maintenance of terminal equipment, systems-driven, was not integrated with operations and huge divides existed. Equipment performance statistics varied between the two departments.

The SAP system, designed to monitor and track equipment downtime did not calculate the time before repair, to time of repair, resulting in inaccurate recording of equipment downtime. Technical supervisors were burdened with administrative tasks involving routine data capturing of information for the SAP system. No proper hand over of equipment failure, to time of repair, existed between operations and the technical department.

The maintenance program strategy identified short and long term technical trends, but could not sustain the reliability of equipment required to function consistency for long periods of time due to the depreciation of equipment. The requirement of ensuring that all 6 cranes were available during peak periods resulted in long term routine maintenance not transpiring.

Routine daily tasking of testing cranes before starting operations did not transpire and technical personnel were called out

unnecessarily as crane operators induced certain breakdowns due to bad attitudes towards equipment.

The procurement process was too long and complex. Only one single department existed for the whole port, resulting in a lack of understanding of the problem and no dedication to the terminal. The company policy of empowering black economic businesses (by allowing higher priority over other companies) delayed the process. Some BEE service suppliers lacked adequate administrative infrastructure to be able to process quotations efficiently; delaying the procurement process, causing further delays to equipment repair. The standard and quality of work from outsourced contractors was questionable creating quality checks before acceptance.

The workshop infrastructure and skills base had not kept pace with increased operational needs. Trade hands had qualified in one specific qualification; there was no multi-skilling of artisans for electro/ mechanical tasks. Remuneration levels precluded the employment of highly skilled artisans.

Manning levels of the workshop had identified a shortfall in engineering and the age profile was very high. The filling of vacancies was a long process due to differences within the equity committee.

No continuous or updated training transpired due to personnel shortages.

4.1.5 TERMINAL SKILLS

People skills are critical in the efficiency of terminal objectives; therefore the training strategy needs to be aligned to the desired results of terminal objectives. This includes management, supervisors and labour.

Internationally, functional training involving loyalty and dedication to one piece of equipment resulted in accepting responsibility and ownership, creating experts in the field.

CTCT had three operational pillars of people skills, namely: Cargo co-ordinator (CC), Operator Lifting Equipment (OLE) and Driver Articulated Vehicle (DAV) that function as a team to ensure terminal efficiency. Within the OLE pillar the strategy of multi-skills had been adopted to increase the skills base and operators operated different fleet equipment, daily. This strategy had not created experts in the field, resulting in poor loyalty and dedication to one piece of equipment. The terminal did not ensure that the best operator be utilised productively. Inconsistency existed on productivity measurements of containers per man-hour.

The age profile of the OLE's was averaged at 40-50 years, resulting in comfort zones for old hands unable to perform.

The capacity, design and layout constraint in peak times impacted on operational personnel efficiency when handling containers. These constraints resulted in poor performance due the difficulties in retrieving containers. These conditions were not conducive in assessing the skills gap and required training needed to ensure good performance.

It was the terminal's responsibility to ensure that it became the enabler and create the conditions that lead to good performance. This was possible when volumes and container throughput

dropped in the months of late August to early December. The average productivity for this period was 18.1 moves per hour (CTCT 2003 MIS department).

Classification of vessels calling at CTCT posed different challenges to the operators. In order to maintain a guaranteed service of 18 mph, cellular vessels had to perform over and above 25 mph consistently to accommodate the shortfall of non-cellular vessels. Only certain operators could perform at this level.

The requirement of 18 mph in all conditions was not specified in the training of OLE personnel. The training lacked simulated cases and live experiences to ensure adjustment to the different challenges of vessel working.

The skills level of the technical workshop was not at the level operations would like it to have been, causing operator frustration when experiencing equipment downtime.

System-driven activities instructed machine and operator to execute the task at hand. Manual processes were dropped off resulting that all activities had to be system-driven and manual instructions were ignored. There were no clear guidelines for employee conduct.

The shortfall in manning levels according to organisational design and structure created the situation for twelve hour shift working on 24 / 7 basis. Operations personnel were exceeding their normal hours of working and burn out resulted, impacting on safety regulation procedures. Risk Management issues increased substantially.

The terminal developed a culture of entitlement, creating a lack of discipline and respect for leadership and the supervisor role. Terminal policy, rules and regulations were transgressed frequently.

The delegation of authority from Head Office was not clear creating a long chain of command. Terminal management were uncertain of role clarification and responsibility. Terminal privatisation resulted in poor transparency, affecting morale.

Operational management skills were lacking and there was a lack of hands-on operational problem solving. Some managers were not suited for this role. There was inconsistency in implementing policies, creating a lack of professionalism and poor business ethics, impairing effective communication.

Due to task execution being presented piecemeal the planning thereof was abdicated to operations whereas it was the duty of managers to ensure that proper planning prevented poor performance.

The role of the supervisors was dual-purposed in that it monitored activities according to rules and regulations and solved problems hands-on. Teams allocated for task execution were not constant, hampering team building and motivation. Personal relationships were difficult to maintain due to the workforce culture of entitlement. Frequently instructions were ignored. Terminal activities were presented piecemeal and no guidelines existed as to the desired result required. Poor performance was difficult to identify and became reactive.

The deterioration of the workforce's wellness due to issues such as alcohol and substance abuse, sickness, social and domestic problems added a new dimension to the supervisory role, requiring new skills to cope with these circumstances. The number of discipline cases increased and culprits challenged the

discipline system. Absenteeism had increased to 8% (CTCT 2003), resulting in poor deployment resources in terminal task execution.

Buschak et al (1996:28) states that:

“Organisations and environmental factors associated with absenteeism included poor employee morale, personnel conflicts, unsatisfactory compensation and benefits programs, unrealistic job expectations, inadequate training, and unsafe or stressful workplace conditions.”

4.1.6 TERMINAL MANAGEMENT SYSTEM.

The Cosmos management system aided terminal activities by ensuring that all movements are systems-driven, supporting the effective utilisation of equipment and resources. Due to a unique organisational design and structure to handle containers at various control areas, the system could not be aligned and integrated into all terminal functions, resulting in a poor organisational fit. This system was designed to achieve maximum operational efficiency by implementing direct straddle carrier operations and not a chassis trailer system as used in Cape Town.

The system could not interface the handling of cold chain cargo due to its complexity of providing a power source in order to monitor temperatures. These containers were handled on a manual basis and thereafter updated into the system.

The lack of space and capacity during congested periods forced the system to allow multiple task execution in one container area, resulting in downtime in waterside activities where

productivity performance was being measured in assisting vessel turn around.

System parameters were set according to capacity; layout and design, programmed to handle containers on the basis of sorting containers as per the requirement of size (6/ 12 metre lengths), weight (classified as light, medium, and heavy), and port of destination for the respective vessel calling. This sort requirement was transgressed frequently in times of congestion, creating poor stack integrity.

The system was designed on the maximum efficiency of yard space at 70% allowing operations to maintain housekeeping, stack integrity and move containers internally. Transgressing this constraint rendered the system ineffective and a loss of control of yard planning. Yard planners manually planned the yard in congested periods, as demand for capacity could not meet the volumes of containers (CTCT 2003 MIS Department).

The capturing of poor and unreliable information rendered the system ineffective as its functionality was based on a 100% accuracy level.

Operational personnel, able to manipulate system instructions were breaching protocol resulting in system downtime.

The skills gap identified that computer skills needed improving. The training centre had not been established to enhance and improve system skills

The volume of containers in congested periods strained the system's memory control, resulting in slow, reactive responses. The Electronic Data Interchange (EDI) could not be globally linked to other terminals with the same system to exchange information and determine vessel predictability.

The data conversion needed to be properly prepared as security firewalls could be breached.

The management system had sole rights endorsed on the contract at the time of implementation and the complete package was not purchased. Any problems and improvements needed permission from owners overseas resulting in long response times. SAPO could not improve on software or programmes without consent.

The information technology (IT) department was controlled by NPA and not under the terminal directive, resulting in manning levels not structured according to system design and maintenance. The system was designed on a 24/ 7 basis and needed support service on this basis, with prompt response to system downtime.

4.1.7 CONTINUOUS IMPROVEMENTS.

Increasing demands on the terminal's facilities had meant that major capital investments in infrastructure expansion as well as equipment reengineering and refurbishment needed approval by the controlling body, Transnet.

The container terminal faced numerous challenges of facilitating service and process improvements by working with stakeholders, employees, customers and suppliers to develop people based solutions for all of its users.

The terminal had to provide an efficient service for the Western Cape region. Service level agreements (SLA) with critical stakeholders were still in its premature stage. These agreements needed to be designed and enforced in ways that distribute entitlements and obligations fairly and efficiently in order for SAPO to perform efficiently. The lack of terminal infrastructure

and equipment was a constraint that hampered its efficiency and access to international trade.

The project management competency was under the general manager's directive and not the terminal. Initiatives directed at improving business turnaround failed due to poor implementation and target dates being exceeded. Projects that needed finalisation to ensure terminal improvements were:

- Improvement of vessel related problems.
- NPA capital investment in equipment and infrastructure.
- Human Resources investment in human potential and proper training.
- Job security and quality employment at the workplace.
- Reliable and accurate information from terminal users.
- Government's intent on privatising operations.
- Improving labour relationships.
- Management's role and clarification ensuring business sustainability.
- Stevedoring functions aligned to terminal objectives.
- Container dwell time strategy in congested periods.

The external challenges that influenced CTCT were the growing volume of containers on a global basis (from 4% to 8% per annum). The current layout configuration to accommodate bigger vessels as well as the impact of technological advances in engineering had resulted in the business constantly not being able to provide an effective service to its users.

Continuous improvement had not focused on training and development for the effective use of technology.

A lifestyle management program had to address all round wellness in the workplace, dealing with issues that affect employee performance, from serious illness to alcoholism and drug addiction.

4.1.8 MORALE OF PERSONNEL

The key to any successful operation is the motivation of labour to participate and encourage contribution to improvements in methods, equipment and working conditions. The proper mix of individual responsibility, job satisfaction, information availability, clearly defined employment conditions, proper training, and safety procedures leads to proper motivation and increased productivity.

The lack of ensuring that the above factors were present at Cape Town resulted in the workforce not being able to achieve the desired results, creating low morale. Terminal users were blaming the workforces' inability to perform at an acceptable level and did not consider that the critical success factors needed full integration to ensure terminal efficiency.

The performance based incentive scheme did not consider Cape Town's constraints during congested periods. The workforce was able to perform at an acceptable level given the proper conditions when volumes became manageable.

Key union issues needed immediate intervention and commitment. Outstanding issues were:

- Poor performance management due to capacity, layout and design

- Lack of job security due to terminal being privatised.
- Mistrust of management, no transparency.
- Insufficient manpower according to organisational structure. Equity plan had not been signed off for 4 years.
- No succession, career path planning for operational personnel, resulting in poor promotional prospects.
- Management's lack of consistency in implementing policy. No inclusion and involvement in decision making resulted in poor labour relations. Management had no flexibility in terms of handling the workforce.
- Racial bias firmly embedded.
- Lack of training due to work overloaded. Manning levels did not allow for training, sickness and absenteeism. The workforce could not adjust to the growing demand of modern technology quickly.
- Lack of transportation for shift working personnel on 24 / 7 bases.

The ethics of the workforce was unprofessional and company values were being ignored, due to the perception that the terminal was not caring and was to be sold off.

The uncertainty of direction from head office resulted in poor information sharing, impairing effective communication.

The open door policy allowed for unions to challenge business decisions, ignoring and vetoing line manager's decisions.

4.2 SUMMARY.

The researcher's modus operandi and that of the Technical Task Team of analysing the four core portfolios, preparing a questionnaire to interview terminal stakeholders and to compile a consolidated report on the findings and possible solutions to solve problems verified that inefficiencies at Cape Town existed. The TTT audit report is protected by SAPO.

The critical success factors of the terminal could not be fully integrated to ensure efficiency during congested periods due to the inability of the current layout configuration to accommodate bigger vessels and improve on technological advances in engineering. The terminal needed capital investment urgently.

Continuous improvements during congested periods needed stakeholders, employees, customers and suppliers people based solutions. The terminal needed to focus on performance excellence by ensuring that the workforce was well trained and knowledgeable.

Chapter 5 relates to the researcher's recommendations in solving identified problem areas. The reclaiming of certain work disciplines, easy to implement, would result in quick-win solutions. A project management approach had to be employed for implementation.

CHAPTR FIVE

RECOMMENDATIONS

5.1 INTRODUCTION.

One of the greatest challenges facing SAPO is satisfying ever increasing customer demands for efficient service. It has a national socio-economic obligation to optimise terminal performance. Operational efficiency is the foundation in the organisation in attracting capital to invest in key infrastructure. Terminal disciplines to co-ordinate activities have the greatest impact on its business.

The bottle neck areas inhibiting good performance raised in this document, required practical recommendation and implementation. Just as the Medcenter Container Terminal in Gioia Tauro faced problems of congestion, equipment shortages, lack of training and poor performance, aggressive steps had to be implemented to gain back customer confidence. Employee involvement and people based solutions improved efficiency.

By means of project management the problem areas needed to be assessed and prioritised according to short-long term actions, easy to implement reaping best benefits.

It was recommended that Project Management be implemented on the basis of:

- Project scope.
- Project Plan.
- Project Ownership.
- Project Charter and identified milestone areas.
- Communication Plan and deliverables.

5.2 ORGANISATIONAL STRUTURE AND DESIGN.

To regain proper management control of Operations the terminal had to facilitate the process of compliance control to the operations plan. The Terminal had to become the enabler ensuring that the day to day running of the terminal activities were conducive to good performance. The implementation process had to incorporate the deliverables, reporting structure, compliance procedure, for all clients and terminal users. Service level agreements needed finalisation.

5.2.1 Accurate Information.

SAPO must enforce stability of information by implementing disciplines on information such as vessel scheduling, estimated time of arrival and statutory documentation. Terminal users must adhere to standardised procedures in assisting information predictability and reliability. The logistics discipline must be driven on a zero tolerance approach. The following is recommended:

- Ensure stability of accurate information in regard to monthly scheduled vessels due to call at the terminal, to be updated on a weekly basis. If vessel is on time then guarantee a berth, if not stands-by in un-booked queue. The timeous arrival and departure of vessels must be co-ordinated with SAPO's guaranteed performance of 18 mph. No deviation on ETA must be allowed.
- Predictability and reliability of the flow of information from the lines must enforce the total logistics integration approach, be ensuring good stowage plans,

good EDI interfaces between the terminal and customer, effective operational efficiency.

- Enhance the terminal logistics behaviour by focusing on organisational processes creating inefficiency. A single document process for all customers would streamline information. Develop the template to guide this process. Investigate the critical information needed to ensure full integration of systems, equipment and resources.
- Review the process of presenting the works plan piecemeal. The Planning and Control Department must install the 5 P's of planning (Proper Planning Prevents Poor Performance). Compliance control once vessel is planned must not allow changes in works-plan.
- Container lists of forecast containers movements must be presented 14 days before vessel calling with an accuracy level of 50% at 10days, 80% accuracy at 7 days, and 100% accuracy at 4 days no changes accepted.

5.2.2 Manning Level Structure.

- Review the current operational manning levels and fill vacancies appropriate to anticipated container volumes and growth.
- Review current operational shift-patterns and recommend optimal hours of work in compliance with legislation of the BCEA.
- Process re-engineering is key to the optimisation of operational processes so that that the terminal can provide a service to its customers that is cost effective and efficient.

5.2.3 Human Resources.

Human capital management revolves around the management of SAPO's core competencies enabling it to pursue its corporate strategy. The relationship with labour is very volatile due to privatising. Improving labour relations and increasing flexibility would enable the terminal to consistently maintain good performance. The following is recommended:

- Review communication plan, ensure transparency, and be open with decision making.
- Build trust between management and unions allow for participation in privatising terminal.
- Review work ethics. Encourage customer focus, reward performance, display a caring company image, and install company values by setting the example.
- Review Wellness Program of workforce; implement procedures to manage the risks in regards to absence, alcohol and substance abuse.
- Review functional training for Operations; identify skills gap, fast track skills base to meet technology challenges.
- Define supervision role. Identify skills gap, fast track training to assist in the implementation of the wellness program.
- Create unity in management team, install teamwork, and maintain consistency in policy implementation.
- Review perception of racial bias and drudgery.
- Review voluntary overtime policy.

- Develop a strategy that will define the basics of career path, succession planning for strategic positions, to create promotional opportunities.
- Review the inconsistent application of the disciplinary process. Ensure that the terminal does not become a welfare organisation.
- Implement an incentive performance scheme conducive to the terminal objectives. Ensure that labour participate in reaching consensus on common objectives.

5.3 CAPACITY, OPERATIONAL STRATEGIES.

Based on the projected growth forecasts, it is of paramount importance that an expansion plan identifies the reclamation of land on the Milnerton seaboard side. Incorporated in this plan is the need for flexibility by assessing versatile equipment. The port of Dar es Salaam benefited from its recent investment of RTG's increasing throughput by 21% by parcel sizing each customer's containers 5 high, this is one option that must be explored.

5.3.1 Capacity.

- Review the option to dredge berth 601 to a depth of 13metre's and transfer the 2 low Demag cranes to this berth.
- Create reefer capacity by providing sufficient plug points to cope with seasonal demand. Identify secondary primary zones close to the terminal that can assist the terminal during peak times.
- Capital investment in 2 additional Gantry Cranes ensuring 2 cranes for each berth.

- Investigate the option of RTG's operations able to stack containers in parcel sizes as per customer profitability. The current terminal design allows for this type of operation. Containers can be stacked 5 high behind the working vessel and transferred to other areas after completing the vessel.
- Reclamation of land is a long-term process, stacking containers 4 / 5 high is a short-term solution. View this option as short-term planning to increase capacity and improve container throughput.

5.3.2 Operational Strategies.

Inefficient work processes, operational procedures, inadequate skills levels and inefficient equipment maintenance have conspired to poor terminal performance. These limitations have restricted the terminal in its ability to sustain its service level. Improving operational conditions will enhance efficiency. The following is recommended:

- Minimise operational down time: review which types of vessels must be serviced. Large cellular vessels are able to transport most of the containers intended for the Western Cape.
- Increase the number of cranes servicing each vessel on berth. Multiple crane operations on larger vessels with huge call sizes will improve on vessel turn around.
- Remove process bottlenecks at access / exits through process re engineering. The current design allows for 16 trucking transporters into the designated loading area at 501. Engage the industry as to the permissible containers that can be accepted.

- Improve on berth and stack utilisation. Ensure that the 70% capacity constraint within the management system is not transgressed. By implementing effective housekeeping processes, the consolidation of stacks and stack integrity will support terminal activities. Calculate how many containers are permissible per day, week, and month. The exchange of generated traffic must be on a 50 /50 basis. The terminal has to play the role of the disciplinarian.
- Implement a short shipment penalty for customers clogging the terminal. Ensure all containers are planned and taken.
- Review the transshipment strategy in congested periods. Dwell times must be adjusted accordingly in assisting the terminal to exchange containers on a fair basis. The terminal must not become a storage area.
- Engage SLA's with stakeholders providing a service within the terminal that impact on its efficiency, such as, stevedore functions, ship repairers, chandlers, vessel bunkering and marine services. These service providers need to be informed of their role in supporting terminal efficiency.
- Review the procedures of transgressions that impact on vessel performance such as late arrival of containers, after stack has closed.
- Stagger stack closing hours to ensure container arrivals do not clash with CBD peak hour traffic periods.
- Review the process of allowing priority requests from vessel operator to work out of sequence. Do not allow for change of stowage positions once vessel has been

planned and approved for task execution. Enforce this rule and apply it consistently.

- Implement a window berthing system for vessels calling in order to assist the terminal when bunching of vessels occurs over weekends. The current process of “First Come, First Serve” does restrict the terminal during congested periods when container throughput becomes stagnate. Vessels able to assist in the exchange of container traffic to assist in alleviating capacity constraints must be considered first. The Terminal needs to consider back-stow operations by identifying vessel with large call size’s with a large amount of import / export containers at a specific bay. Containers can be discharged and back- stowed alleviating capacity constraints and improving on dwell times of containers.
- Implement a dwell time strategy in times of congestion. The terminal must communicate its status and capacity constraint during these periods to its customers. This strategy must ensure that the industry gears up for the fluid flow of container throughput in an efficient manner. The terminal needs to outsource contractors to assist in removing containers that are in over-stay at the terminal.

5.4 EQUIPMENT RELIABILITY.

The terminal's business is driven on intensive equipment infrastructure, focusing on reliability and maximum utilisation. The required equipment availability is based on capacity and container throughput per annum. Capital expenditure is critical in ensuring business sustainability.

The following is recommended:

- Equipment compliance. Determine the fleet size needed; ensure that sufficient capacity and versatility are available. Investigate the option of purchasing RTG's to enhance equipment availability.
- Procurement procedure must be supportive of equipment maintenance. Outsource long- term refurbishment to BEE's equipped to provide a quality service.
- Equipment ownership. The Engineering Department must enforce the rules of ownership and responsibility. Loyalty to one piece of equipment must be investigated. The department must identify the skills gap of the operators and assist in the skill level required in supporting asset management care.
- Equipment maintenance. Define maintenance principles that ensure desired standard and quality, ensuring operational functionality.
- Equipment reliability. The SAP system must be supportive of equipment maintenance. Improve on parts availability, by contracting highly improved supplier management companies.
- Manning level Requirements. Propose optimal Engineering manning levels. Acquire additional

millwrights to boost maintenance capabilities. Solve differences with equity committee.

- Training. Review the training requirements and skills gap, develop the workforce. Provide in-service training with specialised services outsourced.
- Malfunction of equipment. Review terms and conditions of equipment not suited to terminal conditions. Ensure adherence of equipment.
- Reduce damages due to negligence by ensuring operations take responsibility of their actions.
- Implement a database of equipment history for short / long term trends. Improve on technical planning capability to incorporate preventive downtimes.

5.5 TERMINAL MANAGEMENT SYSTEM.

The terminal has invested heavily in the Cosmos management system in order to be able to maximise on work efficiencies. The insufficient leverage of its IT infrastructure has not realised the true potential of its capability. The re-engineering of works processes must ensure that the system is aligned to fit and support operational efficiency.

The following is recommended:

- Review the process of electronic data transmission and information exchange.
- Review the capability of the system to ensure sufficient leverage for the terminal by offering an overall improved service for terminal customers.

- Identify skills gap, provide training to increase skills base to ensure sustainability.
- Implement the proper IT organisational structure to support the terminal.
- Create a database of the history of symptoms creating inefficiency and downtime. Improve on existing inefficiencies within the system.
- Identify the causes of poor unreliable information and enforce system requirements. Implement a quality check process.
- Engage the system owners and review the contractual rights. Formalise a Cosmos workgroup comprised of well trained users who will drive the development of and utilisation of the system.

5.6 CONTINUOUS IMPROVEMENT.

The terminal needs to improve on its conditions of service by involving its stakeholders in obtaining people based ideas and solutions. After having researched one of the terminal's problem areas, the researcher recommends that the terminal consider the following proposal.

10 years ago a solution was required to overcome a major congestion problem at the West Swanson Dock in Melbourne. The terminal operator and its customers developed a series of business rules to encourage a more logical work pattern for transport companies collecting and delivering containers at the terminal. The principal rule applied was that both the terminal and its customers must benefit.

The business application applied was that all-terminal users had to be registered at the terminal before any business could be conducted. Every company had to declare its modus operandi of how business was to be conducted at the terminal. All assets where subsequently registered via a database at the terminal. The researcher identified that this business principal is not applied at SA terminals.

A vehicle booking system (VBS) was implemented where-by bookings were made 2 days in advance and transport companies were categorised according to their level of service at the terminal. The heaviest users had first priority of time slots and paid a sizeable annual fee for this privilege. Medium users paid a smaller fee, where as light users paid no annual fee.

Any truck arriving late was refused entry through the pre-booking entrance and had to join the stand-by lane. Vehicles not calling at all were fined.

There was reluctance and resistance from smaller transport companies but once they saw the benefits of not having to stand in queues for hours at the terminal, acceptance was easier. In addition to long queues, the terminal and nearby streets where not clogged, resulting in improved container flows. The terminal operator was able to plan equipment and resources more productively.

Hi-tech transponders (already being used in SA) installed into trucks were checked and scanned as trucks approached the entrance gate and an electronic notice board directed them to the appropriate area of the terminal.

5.6.1 Implementation and Application.

The CTCT must implement a planning support office and apply the business principal of registering all terminal users conducting business with it. The modus operandi and assets register of each company must data captured for terminal use only.

The terminal must engage the transport companies to inform it within 48hours of their planned scheduled container movements entering and leaving the terminal.

House keeping at night must prepare and move the containers planned for delivery to a designated area. The purchase and use of RTG's would enhance this operation by parcel sizing containers 5 high according to the level of use of the transporting company. Designated entrance lanes should direct the vehicle to the respective loading area. The parcel size must be loaded according to the best-suited container for the machine and no other movements or special requests must be entertained.

Communication via the internet would enhance and create the opportunity for E-Commerce business sustainability.

5.7 SUMMARY.

The roll out of the terminal audit and recommendations from the TTT identified that the terminal would have to have a unified approach of all terminal stakeholders to solve port congestion. The terminal business manager was the initiator, project champion and final responsibility line to ensure that performance improvements recommended were road-mapped for implementation.

Feedback to the IAB was scheduled fortnightly. Periodic reports had to track milestones and terminal performance. The TTT team would audit the terminal 6 months after project implementation to verify performance improvements.

Project management was the order of the day. By reverting back to the basics of standardised procedures the terminal would regain back certain disciplines, which would improve on efficiency and service delivery. Total participation of terminal stakeholders in project management was crucial in implementation phases. Joint-problem solving with effective communication would reap benefits for all concerned. It was the terminal's responsibility to communicate new developments and business processes to its stakeholders continuously, to regain back customer confidence.

The Port Steering Crisis Committee, chaired by the Minister of Public Enterprises, Jeff Radebe, would be updated as to the condition and status of container terminals. He would report to government as to the level of intervention required to solve port congestion.

Chapter six identifies the reasons why government needed to respond to the shipping industry's outcry on port congestion.

CHAPTER SIX

CONCLUSION

6.1 INTRODUCTION.

Approximately 95 Ports handle international cargo, of which 50 handle containers. Africa, with its impressive coastline with 39 out of 54 countries having direct access to sea, handles 5% of total container trade at its ports (8 million TEU's out of 260 million TEU's world-wide).

It has the highest transportation costs world-wide.

Approximately 17% of product value is transportation costs, compared to 8-9% globally. Ports contribute 10% of costs and inland transportation adding by far the most.

Under investment and lack of capacity is a serious problem, resulting in congestion and surcharges, usually passed on to the consumer. Predictions are that by the year 2010 the east West African trade will be handling 6 million TEU's extra. The African continent requires \$1.6 billion investment to create capacity, equipment and infrastructure.

6.1.1 Need for Change.

The South African economy is developing steadily, generating demand for more freight transportation. The Government's Integrated Economic Action Plan has highlighted the pivotal role transport plays in contributing to the country's economic wealth. The fundamental function of an effective transport system is to stimulate the national economy by transporting freight at a minimum cost. It is therefore critical that an integrated transport system across all modes is essential to improving competitiveness to a level that will enable SA to compete on a global basis.

Logistic costs represent 14.7% (R180bn) of GDP. Transport costs alone amount to 75% of the total logistics costs. The SA consumer spends more on transport costs than generally expected, and much more than it should. SA needs to reduce its logistics cost by one- third to sustain competitiveness in the global economy.

6.1.2 Transport Model.

The normal macroeconomic model is to transport long-distance freight on rail, with feeder and distribution services provided by road. Structural investment myopia caused an unhealthy situation in SA, with three-quarters of long-haul tonnage transported by road, which is more expensive to the economy and depletes its road infrastructure.

The commercial ports (under Transnet) are integrated and crucial nodal points in the transport system and hamper efficiencies and access to international trade in their current form.

Poor operating performance and poor quality of operational returns was caused by, inefficiency in service provision adding costs to the business and customers' bottom line.

Investment backlogs resulted in aged assets and infrastructure. This situation added to the provision of a more expensive service as increased maintenance and repairs were costly. Poor planning, of infrastructure and equipment resulting in capacity constraints.

In his State of the Nation address in May 2003, President Thabo Mbeki defined Government's preferred role for Transnet in the SA economy as:

"The public sector discharges its responsibility to our people as a critical player in the process of the growth,

reconstruction and development of our country by reducing the cost of doing business in our country.”

The specific requirements to Transnet were:

- Contribute to reducing the cost of doing business in our country.
- Contribute to sustainable economic development.

Transnet had to contribute to the transport model by ensuring sustainable economic development of SA by providing the best connected and efficient transport network run by world-class rail, pipeline and port operations.

6.2 PORT LABOUR RELATIONS.

The tragic consequences of the 9/11 disaster resulted in major airlines facing bankruptcy. Transnet’s national asset, SAA, having undergone a major structural refit was faced with having to offset national capital reserves to its investors, resulting in limited funds being available for port infrastructure investment. The congestion at DCT (SA’s busiest port) from 2001 onwards had frustrated the country’s export drive and government were under pressure to speed up the involvement of the private sector. As a result of this, the department of Public Enterprises assigned a team of international experts on port operations to advise on the plan to concession the ports to the private sector. Minister Jeff Radebe, announced on the 19th of March 2003, container terminals would be concessioned.

Labour’s opposition to concession terminals spurred government on to reveal the full extent of the problems facing SA’s ports. The investment backlog of more than R12bn to reorganise the

terminals, could not be the burden of government alone and needed private sector investment.

Indications by the minister that government had a mandate from labour to proceed where incorrect and labour geared up for a national strike at the ports. In a move to avert the strike, government requested an urgent meeting with labour to diffuse the strike and agree on the composition of a Ports Restructuring Committee which would report back to the minister in finding a working model for the ports.

Although some agreements existed between labour and government on the role the private sector could have in port operations, a number of issues remained unresolved. These included job security, training, medical and social care, work benefits and remuneration. Of the nine potential international applicants tendering for the concession, at least two had links to shipping lines, which would create unfair competition. Labour believed strongly that government had to draw upon the knowledge and experience of the workforce in designing and choosing between restructuring options, as the workforce was a source of highly significant knowledge about ways in which operations and systems could be reformed to improve efficiency.

The rethink on concession resulted in the selling of Transnets' 30% shareholding of MTN, and privatising forestry assets, enabling investment to improve and upgrade terminal equipment for the year 2005/06.

6.3 CONCLUSION.

The researcher summarised the following:

6.3.1 Terminal Relationship.

This critical competency for Cape Town is underscored due to labour's high volatility of concessioning and the uncertainty of job security. Repairing the relationship is critical.

6.3.2 Information Technology.

The upgrading of the management information system would increase its capability in providing an improved service.

6.3.3 Process re-engineering.

Updating operational processes would streamline operations able to provide a better service.

6.3.4 Asset Management.

The required maintenance, asset replacement of equipment, would enhance efficiency and maximise utilisation.

6.3.5 Operations.

The integration of critical success factors of information, capacity, layout and design and the required skills would improve service levels.

6.3.6 Continuous Improvements.

People based initiatives, project managed, reaching set target dates would assist in improving service delivery.

6.4 LOGISTIC CONTROL

The Terminal's project implementation team grouped and prioritised problem areas by means of enabling blocks. These enabling blocks were defined according to the principle of total logistics control.

Within the enabling block Operational Infrastructure, recent capital expenditure resulted in the construction of 950 additional reefer plug-in points. The terminal currently has the largest reefer area in Africa with over 2000 points available, able to support the exportation of fruit in containers.

The enabling block Cosmos Functionality, is constantly being upgraded to provide an efficient service to terminal customers. The system has the capability of being able to electronically invoice clients as soon as task execution is complete. The IT infrastructure the system required had been implemented.

The enabling block Operational Strategies, resulted in the fixing of standardised procedures and terminal disciplines. By enforcing the required statutory document requirements and quality checks on information predictability and reliability, terminal information improved.

The enabling block Operational Manning Levels, Shift Patterns and Procedures, identified the required manning levels needed to support the organisational structure. The terminal promoted personnel.

The implementation of an incentive scheme resulted in improved performance and improved turn around of vessels.

By reviewing the dwell time strategy in times of congestion, partnerships with private contractors have been formulated and the terminal is steadily improving on its dwell time of containers.

Continuous improvements are ongoing and the terminal is regaining back its customer confidence.

The terminal needs investment to upgrade its infrastructure and equipment.

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ANNEXURE

A

Government and labour committee to discuss the concessioning of operations

Port reform tension defused

SAMANTHA ENSLIN

Durban — Labour and the government have a settlement in sight that has averted a port reform and restructuring strike. The settlement, which will provide a framework for the restructuring of the port, is the result of a series of talks between the two sides.

Jeff Radebe, the minister of public enterprises and acting minister of transport, yesterday reiterated the government's policy and plans for restructuring the South African ports.

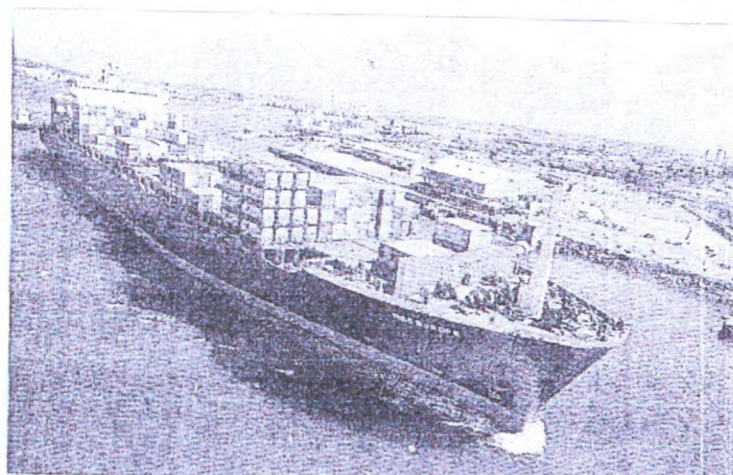
But labour said the minister had agreed that the terms of reference for the committee could not preclude consideration of options other than concessioning as the instrument of restructuring.

Despite the talks, a picket at the Durban port will go ahead today. A march planned for later this week is still under discussion.

Today's picket is not expected to disrupt port operations as only workers who are not on duty will participate.

The meeting yesterday, which took place under the auspices of the National Framework Agreement and covered the government's plan for port reform. It followed national talks last week and port-level negotiations from labour that until now there had been no consultation with the unions on the port reform.

The government appointed



HOLD-UP A ship at the Durban terminal has to wait three or four days, on average, before it can berth.

restructuring to be done to achieve it on the best way to concession the Durban container terminal and other port operations.

In a statement the department said: "The port reform process is aimed at improving the performance of the ports system, and to raise productivity, promote black ownership

empowerment, and mobilize private sector investment."

"The bulk of capacity of the Durban container terminal, which is the first port operation to be concessioned for competition, has been in the spotlight since 1994."

Concession has had a knock on effect at the Cape Town port

and has disrupted imports and exports.

But labour has argued that private sector concessioning is not the only way to improve efficiency.

Among the issues the SA Transport and Allied Workers' Union wants addressed is an examination of "where all the

institutions at local ports lie, including in the private sector, it also wants an analysis of investment needs and job security."

Labour and the government will meet today to agree on the concessioning, programme and terms of reference of the committee, which will report back to the minister in a week.

SHIPS QUEUE UP FOR CAPE TOWN

Durban — The situation at the Cape Town container terminal has deteriorated in the past few hours, with the morning dock shift by ending to berth 10 ships to 15 from 10 to 15.

But the Durban container terminal remains a model, with the average expected delay over the next seven days at 12 hours. Port officials rejected a concession.

Despite an improvement in Durban, the Durban SA Transport and the ISPSA Container plan to increase a 10% surcharge per 20-foot equivalent unit on all import and export containers moving through South African ports. This charge will be used to fund the port's expansion.

The Durban SA Transport will also charge 10% on all imports and exports, which, introduced, a 4% surcharge on all imports and exports will charge from June 7.

Both concession and the surcharge would remain in place until the average delay is reduced to 10 hours in each South African port, or averaged over a two-month period, with a delay to below 10 hours.

They represent the major shipping lines meeting again between South Africa and the US for Europe.

Derek Radebe, the chairman of the Durban SA Transport, said: "The Durban SA Transport will not concede the Durban container terminal to address competition. But he said that even if a terminal operated at maximum efficiency it always needed additional capacity." — Samantia Enslin

National

Govt moves to avert strike over ports

MARTINA LUTSOLO

On an apparent move to avert a strike by organised labour over the restructuring of South Africa's ports, the government has requested an urgent meeting with the South African Transport and Allied Workers Union (SATAU) to discuss concessioning.

Last week thousands of SATAU members staged demonstrations in a

bid to force the government into meaningful consultation with unions on restructuring harbours.

In terms of the Labour Relations Act restructuring proposals should be tabled in accordance with the National Framework Agreement (NFA), which requires all large state-owned bodies to be fully participatory in formulating a policy. But SATAU says the government did not consult on the port reform, which

was limited to the concessioning of port operations.

Today Radebe, chief director in the Ministry of Public Enterprises, this week confirmed that the government has proposed a meeting for May 22 with the transport sector to discuss issues that include port reform. He said SATAU's concerns were genuine, but it was up to them to make their views known to the NFA. "We don't see the need

for strike action while discussions on port restructuring are still unfolding. It will be very premature for SATAU to go on a strike at this stage."

While SATAU welcomed the meeting, it said the issue was whether the government was prepared to discuss options other than concessioning. "The outcome depends on the finality of discussing all options," said Jane Bence, SATAU's policy research officer.

Bence said the government must still not come to the table under the National Economic Development and Labour Council agreement, where there is a parallel dispute about the port policy as a whole.

SATAU said it would accept a concessioning action as a last resort to fight the government's restructuring process.

Continuing to discuss, Page 22

News in brief

• The African National Congress (ANC) government agreement has paved the political career of two ANC National Council of Freedom (NCOF) members. The reorganisation of the NCOF was to be completed following the recent election period. In Grahamstown, the ANC agreed to nominate, respectively, the NCOF, Piet Marais and Fickie Marais, who are now out of the NCOF.

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APPENDICE

B

#	ITEM	ISSUES
1	MT STACK.	• When discharging 3-4 cranes to the area insufficient resources (Equipment & Staff) • Distance factor from vessel to stack. • Vehicle congestion and lack of traffic control. • No supervisory role, lack of supervision.
2	CAPACITY.	• Volumes at times exceed design and layout. • Congestion creates manual planning unable to keep containers together. • Impacts on terminal planning and space availability. • Reefer stack capacity constraint during fruit season.
3	Reefer Stack.	• Capacity constraint creates disruptive stacks and manual planning. • Pile weights for vessel creates shifting of containers. • Seasonal demand, needs additional resources. • Modern technology to assist reefer monitoring. • Tranship reefers restricts capacity throughput, creates longer dwell times. • Shared labour resources for reefers and O/H 's
4.	Information.	• Unreliable forecast • Impacts on terminal planning. • Quality of information poor/creates poor quality of work • Changes work plan continuously • 11:30 Berthing Plan Meeting ineffective due to poor information. • Unable to plan a 3 crane operation due to information not in on time.
5.	Voluntary Overtime.	• Impacts on terminal planning • Abundance of overtime increases absenteeism. • Waterside preferenced. • Increase shift changes. • Contravenes the BCEA.
6.	Supervision.	• Lack of respect for supervisor and decision-making. • More hands-on approach. • Enforcement role in shift change. • Actively involved in policy procedure.
7.	Shift changes.	• Terminal equipment mechanized, have the means to leave the operational area. • Hot seat change over linked to incentive, not norm. • Available transport for shift change is not used. • Supervisors not mechanized to identify personnel leaving work area.
8	Shift patterns.	• Public transport effects morning shift, effects shift change. • Voluntary 12 hrs is creating burnout resulting to an increase in claims. • Manning levels do not accommodate for leave, training; sickness; AWOL and union meetings. • 12hr working is the order of the day.

9.	Equipment Breakdown.	• Life expectancy of HHT & Radio batteries on quayside is shortened due to 24/7 scenario. • HHT's affecting efficiency. • Current measurement for equipment downtime is cumbersome. • Total downtime of crane availability not measured. • LEO's not pre-tasking equipment. • Choice of spreader (ram\ brome), one more robust
10.	Worksheets.	• CC's rely on worksheets. • Creating complacency. • Affecting accurate P-check.
11.	Breaktimes.	• Current relieve system-affecting efficiency. • Unable to systemize breaks for all staff, affects last hour of shift. • 12 hour working during weekdays creating 2 breaks.
12.	Overheights.	• Shared labour resources. • Availability of labour. • Equipment availability. • Over heights not within specification.
13.	Twist locks T/L Boxes.	• Unplanned movements. • Placed anywhere on ship, creating delays. • Insufficient twist lock / defective twist locks. • Inexperienced handling of twist locks.
14.	Communication.	• Lack of stevedore communication. • Moving cranes on and of vessels. • Access to telephones in cases of emergencies. • Operational involvement when vessel operator changes work plan.
15	TRANSHIPS.	• Requires a lot of house keeping, creates double handling. • Tariff encourages tranships, creating longer dwell times. • At times affects capacity. • Encourages deviant behaviour. • Down to one crane operation when 2 cranes stack tranships in same area, same row (ex vessel).
16	MODAL SPLIT (landside waterside).	• Waterside, landside working in same area. • 2 cranes working in same area, same row. • Due to design and layout, unable to plan imports\exports behind vessel.
17	SKILLS.	• Skills gap per individual, per grade. • Loyalty to one piece of equipment, swapping out. • Some not suited for equipment.
18	BLUE STORE.	• Distance factor. • Planning according to operator request. • Not integrated with cosmos. • Equipment breakdown. • Unreliable information.
19	SAFETY.	• Terminal users have easy access to terminal. • Issuing of permits not screened. • Driving through operational area. • Not abiding by rules and regulations.

<u>Item</u>	<u>Issue</u>
Stevedores.	• Change of shift. The stevedore shift change is not co-ordinated with the shift change of the SAPO labour and one labour force waits for the other to get on station. • Communication. Communication between the stevedore labour on the ship and the SAPO labour on the quay is limited resulting in a general lack of co-operation. • Vessel completion and removal of the stevedore labour to the next working vessel is delayed by the perception that the ship has to be worked by the hereditary stevedore. • Abuse of illegal substances in the work place by stevedore labour resulting in labour being taken off the ship. • Safety practices not always followed and safety gear not worn. Some Masters insist on having the labour taken off the ship. • Hatchman not always available or he gives incorrect direction.
Ship repairers.	• Work being carried out in spaces intended for cargo operations. • Congestion on the quay side.
Bunkers.	• Bunkering services interfere with cargo operations. • Bunkering service supply company refuses to move or remove bunker lines or is slow to respond.
Chandlers.	• Congestion on the quayside.
Statutory requirements.	• Port Health. • Immigration. • Random customs actions.

<u>Item</u>	<u>Issue</u>
Late arrival containers.	• Requests are not always made in writing. • Road late arrivals are controlled. • Rail late arrival is being agreed for “marketing” reasons and/or terminal convenience rather than operational efficiency reasons. Sometimes trains arrive and are discharged when the vessel has almost completed and vessel waits for the containers. • Later Cut off being applied after the stack close results in no control being exercised over the number of containers that enter the stack late. • Recovery of late arrival charges is flawed when later cut off is agreed. • Late arrivals affect stack and planning resulting in indiscriminate stows affecting terminal operation at following terminals.
Stack closing.	• All stacks close at 1800. • Stack closing clashes with peak traffic time in Cape Town CBD adding to congestion at the gate. A check is located on a major traffic route to Cape Town’s West Coast suburbs.
Statutory documentation	• Inaccurate, incomplete and late information/documentation being submitted in respect of mainly following information: 1. Import forecasts. 2. Export forecasts. • Import Container lists inaccurate, incomplete and late. • Inaccurate eta information. • COD applications submitted after the 72 hour deadline.
Overbooking.	• Overbooking by container operators results in shut out containers clogging the terminal. • Whether amending documents (amending the containers to another vessel) are passed in good time or not has the same impact on the terminal. • Resources have to be dedicated to separating selected containers. • Prioritising of “must go” cntrs vs those of a lesser importance • SAPO planner has to unplan and replan the vessel manually. • Container operator has to produce amending orders effectively duplicating the workload. • Amending orders (Carrier and Merchant) are usually late increasing the likelihood of further errors.

<u>Item</u>	<u>Issue</u>
Priority discharge requests.	• Certain industries and firms work on the JIT process and frequently face stock shortages resulting in requests for priority discharge of their “hot” containers. • This necessitates out of sequence moves and a change in the planned operation of the vessel negatively affecting the discharge operation where normally the high productivity work rates are being achieved.
Marine.	• Delays due to NPA Marine berthing and unberthing services. • NPA do not always accede to requests from the terminal to bring in one or another vessel when the terminal is ready for that vessel.
Uncons, DG and OOG.	• Delays incurred whilst documentation is finalised eg pre-clearances are required for uncons, OOG to be pre-advised. • Incorrect or no IMO labelling on DG containers • IMO labelling on non hazardous containers.
Change of Destination (COD requests).	• COD requests are submitted and approved out of the agreed time limits.
Stow Aways.	• On some vessels the Master insists on conducting a stowaway search prior to departure.
Stow positions.	• Ships cranes obstructing the gantry, mainly at 601 and 604. • Panamax gantries are required to boom up when moving to different bays. • Sometimes the ship’s crane is required to restow the container to make it accessible to the gantry. • Ships with containers stowed 5 high on deck similarly cannot be worked at 601 and 604.
Exception handling.	• Deadlines and procedures are established to provide for an efficient logistics chain however, to accommodate “important” customers and “special requests” for various reasons, exceptions are made • Requests for exception handling have become so common as to have become the rule.
Peak handling.	• Insufficient infrastructure to cope with peak periods. • Insufficient staff (gangs) to man all of the equipment all of the time for protracted periods.

<u>Item</u>	<u>Issue</u>
Transhipment.	• No seamless moves between terminals. • Process unwieldy. • On carriers are overbooked. • Heavy containers are returned to port of transhipment as they cannot be worked at port of discharge usually by the ships came.
Ship sequence planning.	• Bayplans of poor quality vis quality of print. • Integrity of information is poor in some cases (usually from West Africa). •
Stack layout.	• Stack layout precludes the option of discharge/backload operation and the vessel is required to do a full discharge before being able to be loaded. • Location of the import stack such a long distance (1,4Kkms from 604) inhibits the discharge operation where productivity gains are usually made. • Insufficient stacking area to cope with peak periods.
Ship's schedules.	• Late changes to scheduled arrivals caused by decisions to skip ports complicates the discharge operation due to the changes to the discharge profile. These changes are not always reflected on the profile due to time constraints.
Ship's operation.	• Vessel operators make changes to the stow after the stack has closed. • Deadlines not being met On stack closes: 1. SAPO to hand unplanned list to the vessel operator (VO) 2. VO submit load plan to SAPO 3. SAPO return proforma loaded condition of the ship on departure to VO 4. VO submits to Master 5. Master to approve 6. If any changes are required the process is repeated 7. Time lapse delays vessel. • Contradictory information. • Stow plans are submitted piecemeal.

	<u>Item</u>	<u>Issue</u>
	Reefers.	• Insufficient plug points to cope with peak season flows. • Intake management has been adopted to cope. • Results in operation having to accommodate availability of containers for load. • Specific type Integral reefer units such as Controlled atmosphere containers require specific stow. These containers are not specific separately necessitating changes to the plan.

