A COMMODITY MANAGEMENT PROCESS FOR THE SOUTH AFRICAN NAVY

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by

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DECLARATION

I, Bruce Ronald Carter, hereby declare that the contents of this research project represent my own unaided work, and that the research project has not been previously submitted for academic examination towards any qualification. Furthermore, it represents my own opinions and not necessarily those of the Cape Peninsula University of Technology.

ABSTRACT

Transformation brought many changes to the South African Navy (SAN). The "old way" of provisioning, which involved spending enormous amounts of money on maintaining high stock levels and running supply processes through an overly large staff component, is over. The new Navy will have to survive with fewer funds and a reduced staff. This changed circumstance calls for a more efficient and effective provisioning process.

The current provisioning process handed down from pre-transformation days is outdated and totally obsolete. The result is that Commodity Managers (CMs) do not have an adequate process for the planning, decision-making and control functions of their supply support activities. This absence of an updated, clearly defined provisioning process is causing poor end-user service delivery.

This research project starts with a literature survey (Chapter 2) in which published practices are reviewed to substantiate the need for and importance of a process that includes planning, decision-making and control. This research concentrates on government and military practices and investigates processes that support operational planning and sustainability levels. It also includes the principles of logistics and articles on lessons learnt by other military organisations.

The second step involves interviews with provisioning managers of similar organisations to the SAN (Chapter 3). The result of these interviews identifies new and interesting concepts that may assist in achieving a more effective provisioning system within the SAN.

A statistical investigation (Chapter 4) involving provisioning data provides insight into the bottlenecks and highlights the need for a provisioning-package process-smoothing capability.

Interviews with SAN members (Chapter 5) provides insight into the input interface challenges and identifies the need for a tracking system that gives a real-time indication of requirement progress.

The findings of this research provides recommendations (Chapter 6) at national strategic, military strategic, operational and tactical levels regarding the planning, decision-making and control functions that will lead to the establishment of a valid provisioning process for the Commodity Management subsection of the SAN. This will ensure that a standard process is followed enabling the effective provisioning of SAN end users using fewer funds and with a reduced staff.

FOREWORD BY MANAGER SYSTEM SUPPORT (MSS)

The SA Navy went through a comprehensive transformation of its organisational structures, processes and regulations over the past six years. The transformation became necessary due to political imperatives as well as due to the need to tailor the South African National Defence Force to become more lean and affordable.

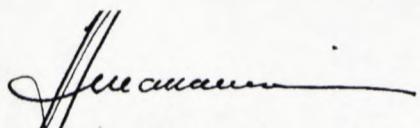
The transformation of the SA Navy also had an effect on the established methods and processes followed during pre-transformation years to support the Fleet with readily available spare parts and material. The old methods and processes have however become largely inappropriate in the post-transformation military environment. This dilemma is also not unique to the SA Navy today....it applies right across the whole public service.

In the "old days" there were sufficient funds available to keep the depots full of all the inventory items that may be required. The provisioning processes were thus rudimentary of nature and were definitely not optimised for cost-effectiveness. These luxurious days are now something of the past: The reduced funds available over the past five years have been inadequate to keep sufficient stocks in the SA Navy depots, with the result that stocks that were piled up dwindled to such an extent that the SA Navy is today forced to procure as and when required, i.e., operating in a reactive mode.

The problem is that the provisioning procedures and processes followed by the SA Navy did not keep up with the changes. The processes that were followed in the past have never been updated or changed and have become totally obsolete. The old processes do not work in an reactive provisioning environment. It is thus correct to state that the SA Navy does not have an appropriate or an efficient provisioning process in place today. It is for this reason that Cdr B. Carter, himself a supply officer in the SA Navy, was requested to investigate different supply-support processes in an attempt to make recommendations regarding the establishment of appropriate and efficient provisioning processes that the SA Navy could consider.

This document, titled "***A Commodity Management Process for the SA Navy***" is the result of the investigation conducted by Cdr Carter. It contains valuable insight and ideas that could be implemented with great success in the SA Navy. It is possible that the other Arms of Service of the SANDF (Air Force and Army) could also benefit from this paper.

It has become important for everybody in South Africa to economise and at the same time improve service delivery. The recommendations made by Cdr Carter will go a long way towards achieving these two seemingly contradicting goals in the SA Navy's supply-support environment.



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MANAGER SYSTEM SUPPORT : SA NAVY

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FREQUENTLY USED ABBREVIATIONS AND ACRONYMS

AIR	Automatic Inventory Replenishment
BPO	Blanket Purchase Order
BSO	Base Supply Organisation
CCM	Cost Centre Manager
CLD	Critical Low Density
CMs	Commodity Managers
COTS	Commercial off the shelf
DFL	Director Fleet Logistics
DMSMS	Diminishing Manufacturing Sources and Material Shortages
DoD	Department of Defence (RSA) / Department of Defense (US)
DODI	Department of Defence Instruction
FOF	Flag Officer Fleet
FSE	Force Structure Element
FSEs	Force Structure Elements
GO	Government Order
GSB-NBS	General Support Base – Naval Base Simon's Town
HDI	Historically Disadvantaged Individual
HNS	Host Nation Support
JIT	Just–in-time
LCC	Life Cycle Costing
LIMS	Logistics Information Management System
LOT	Life of type
LSA	Logistic Support Analysis
MILSPEC	Military specification
MoD	Ministry of Defence (UK)
MRP	Material Requirement Planning
MSS	Manager System Support
NOP	Naval Operations Plan
NPN	Non Pattern Number
NSD	Naval Stores Depot
NSN	National (Nato) Stock Number

OEM	Original Equipment Manufacturer
PA	Provisioning Advice
PAS	Provisioning Administration System
PBS	Product Breakdown Structure
PSO	Peace Support Operations
PWRMR	Pre-positioned War Reserve Material Requirement
RBS	Readiness Based Sparing
RO-RO	Roll on roll off (Ship with ramp. Lets trucks drive on and off.)
SAN	South African Navy
SANDF	South African National Defence Force
SITA	State Information Agency
SMs	System Managers
SMEs	Small and Micro Enterprises
SOP	Standard Operating Procedure
SPSC	Simon's Town Procurement Service Centre
STB	State Tender Board
STOREQ	Stores Requisition
STUFT	Ships Taken up from Trade
TLS	Transportable Logistic Support
US	United States (of America)
UK	United Kingdom

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CHAPTER 1
INTRODUCTION

1.1 Clarification of terms

Commodity: The term refers to items of supply. All items used or needed by the SAN are commodities.

Commodity Managers (CMs): Officers appointed to manage a group of commodities. These groups are divided into product system categories.

Force Structure Elements (FSEs): These are the end-user customers who are ultimately being supplied and sustained by the supply chain.

Procurement: This term within the SAN defines the element of purchasing where requirements are advertised, the tenders received are adjudicated, orders are placed and payments authorised.

Product systems: Refers to classes of ships, specialist items or general items.

Provisioning: This term within the SAN defines the element of purchasing planning, decision-making and control. It is where specifications are drawn, budgets planned, stock level decisions are made and authority to buy the items is given.

Purchasing: A term used in industry to describe a function performed where items are identified, stock levels determined and purchases made.

Supply Support: Refers to the activities carried out by all sections and sub-sections within the SAN supply chain.

1.2 Statement of research problem

The absence of an updated, clearly-defined provisioning process within the Commodity Management subsection of the SAN supply chain is causing poor end-user service delivery.

Expansion: The Commodity Managers (CMs) do not have sufficient planning, decision-making and control tools to enable them to make strategic, operational and tactical decisions.

1.3 Background

Since the transformation of the SAN organisational structure from 2000/2001 to date, the Commodity Management subsection has not formulated a clear process in which to execute newly required functions. This has led to considerable confusion and frustration both internally by Commodity Management staff and externally by staff members of adjacent supply chain components. This is also impacting on end-user Force Structure Elements (FSEs), who are not being adequately supported.

The SAN supply chain process as graphically represented in Figure 1.1 starts with the FSEs who, in the case of the Commodity Management subsection, are ships and maintenance units. These FSEs submit their requirements to the Base Supply Organisation (BSO) of the General Support Base – Naval Base Simon's Town (GSB-NBS), which processes the requirement on the Logistics Information Management System (LIMS), a computerised supply chain data management system. If stock is available, then a direct issue is made from the depots to the BSO for distribution to the FSE requesting the item.

If no stock is available, then the request is registered as a "dues out" and prints a Provisioning Advice (PA) notification at the Commodity Management subsection. This PA is then processed and passed to the Simon's Town Procurement Service Centre (SPSC) in the form of a "procurement package", which usually includes the items requested as well as additional depot stock. The SPSC then advertises the requirement, receives and adjudicates the quotations and awards a Government Order (GO) to the company with the lowest price to the required specification. A delivery date is indicated and the company awarded the GO has until that date to deliver the item/s.

At any time on or before the delivery date specified, the company awarded the GO will deliver the item/s to the indicated depot. The depot receives the item/s, checks for quality and quantity, places them in the store and updates the LIMS system. The "dues out" is then issued against the requested quantity and delivered to the BSO for distribution to the FSE.

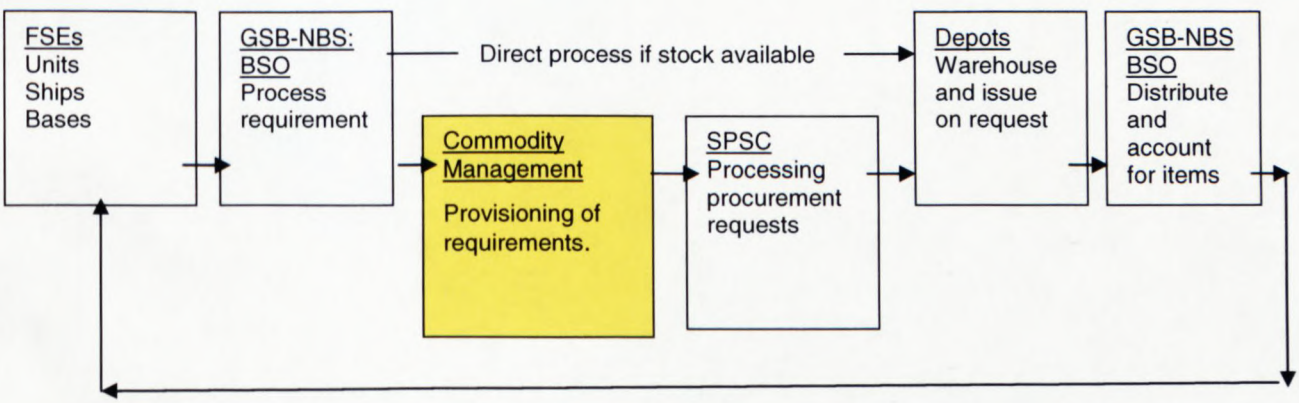


Figure 1.1: SAN supply chain process

From an organisational command and control point of view, the Commodity Management subsection is a component within the System Support Section and each Commodity Manager reports directly to his respective System Manager except for the Commodity Manager System General Commodities, who reports directly to the Manager System Support (MSS). The Commodity Manager System General Items is responsible for the provisioning of all items

common to the other commodity subsections, and for diving, safety and communications spares. The MSS falls under the Director of Fleet Logistics (DFL) who reports to the Flag Officer Fleet (FOF). Figure 1.2 gives a diagrammatic overview of the command and control relationship.

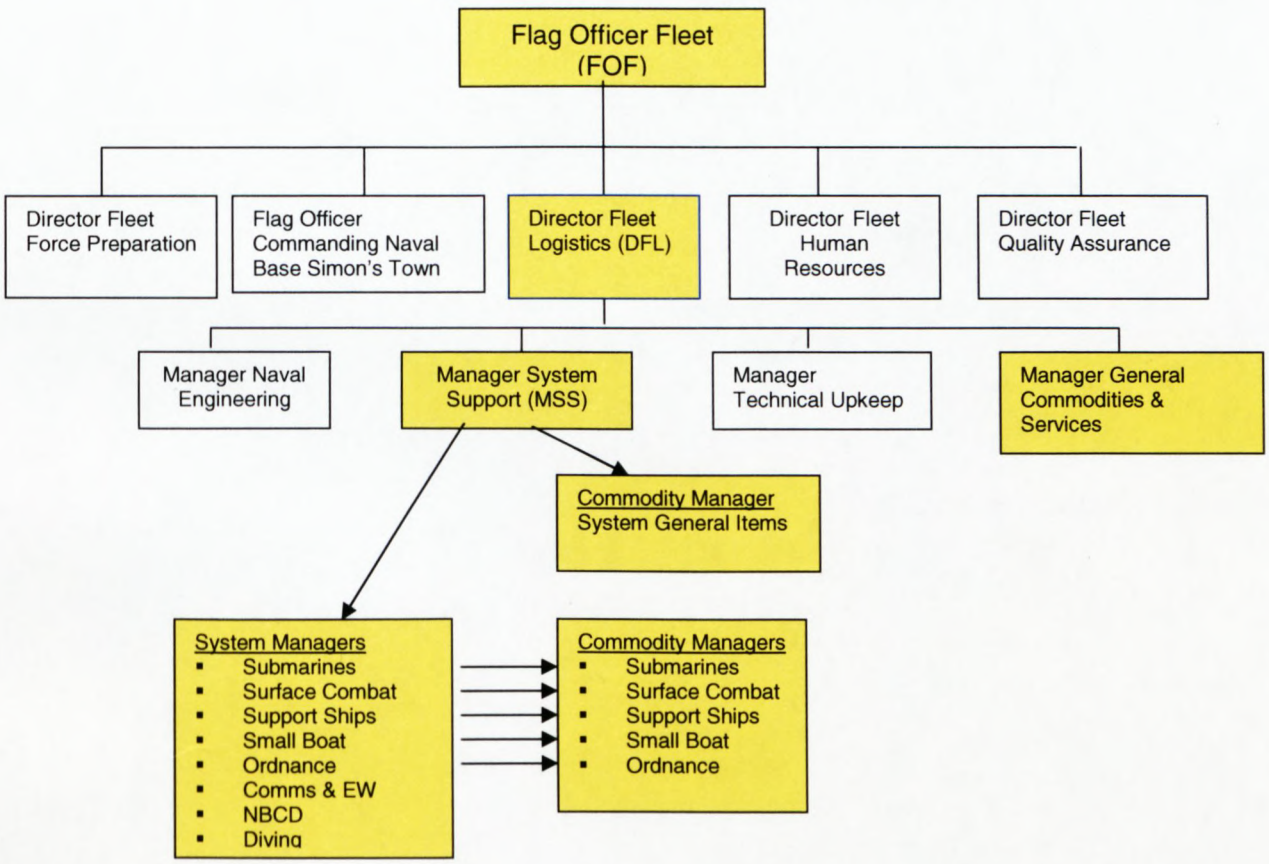


Figure 1.2: Organisational structure

It must be noted that the Manager General Commodities and Services reports directly to DFL. The section conducts provisioning for office supplies and general use items and is included in this research in order to clarify its relationship with the Commodity Management subsection.

The Mission of the System Support Section is to make product systems available to Fleet Commanders through a process of Integrated Logistics Support; it is the sole authority within the SAN for making product systems

(ships and weapon platforms) available to Fleet Commanders. The official definition of ILS, according to Sparius and Bothma (1997:15), is:

> ILS is a management function that provides the initial planning, funding and controls which help to assure that the ultimate end user will receive a system that will not only meet performance requirements, but one that can be expeditiously and economically supported throughout its programmed life cycle. A major ILS objective is to assure the integration of various elements of support.

The various elements of support referred to that contribute to this integrative process are: maintenance planning, provisioning, test and support equipment, transport and handling, personnel (technical) and training, support facilities, technical and support data and computer resources.

This research focuses on the provisioning aspect as carried out by the Commodity Management subsection of the System Support Section. This is fully described in the following paragraph.

1.4 Main research problem

The problem is that the process used in the past is outdated and no longer relevant. Therefore there is currently no approved updated process for the planning, decision-making and control of the supply support activities carried out by CMs. These activities include: planning by means of budgeting and ensuring availability in industry; decision-making, which involves setting specifications, identifying and the codification of items, determining stock levels, authorising procurement action, and disposing of obsolete and unserviceable (damaged) items; and control, which ensures that the right item is purchased in the right quantity at the right time and delivered to the right place.

This lack of an approved process is affecting the relationship between CMs and the staff of the BSO who are responsible for capturing end-user requirements, distributing items of supply and accounting for these items.

Further to this, CMs are bound within a captive environment as Chief of Acquisitions has delegated the SPSC as the Navy's purchasing agent. Chief of Acquisitions is responsible for all procurement within the South African National Defence Force (SANDF) as laid down by the Department of Defence Instruction (DODI) (South Africa, Department of Defence, 1998:2). This relationship with the SPSC is affected by the output activities of the Commodity Management Subsection.

CMs also have a limited operational sustainment capability, which restricts their ability to support ships that are operationally deployed.

This research investigates and recommends activities towards a proposed provisioning process that will enable adequate planning, decision-making and control functions for the Commodity Management Subsection.

1.5 Objectives of study

The objectives of this research study are to:

- Determine the specific **interface** problem areas regarding input interfaces into the commodity subsection processed by the BSO. This involves repeat requirements via the computer system and new requirements manually sent to the CMs for processing.

- Investigate a **process:**

    - A planning process that allows for effective budgeting and expenditure.

    - A decision-making process that optimises provisioning and stock levels.

- A control process that enables actual result to be compared against the plan and allows for corrective action to be taken.

1.6 Postulated outcome

The outcome of this research provides guidelines for the establishment of a provisioning process for the Commodity Management subsection of the SAN. This process can then be published as a Fleet Order, which will ensure that a standard process is followed enabling effective provisioning to end-user FSEs.

1.7 Research methodology

The research design for the collection of data follows three different investigation methods to achieve the main objectives of the research as listed in Section 1.5:

- ACADEMIC DOCUMENTATION

  Books and publications on supply chain processes were consulted in order to provide the framework for this research. Articles on lessons learnt by other organisations have also been included as they are of benefit in avoiding similar mistakes.

- SIMILAR ORGANISATION INTERVIEWS

  Interviews were conducted with the supply chain managers of organisations that have a similar infrastructure and goals to the SAN. These interviews provide new insights into provisioning processes.

- STATISTICS

  This comprises empirical research obtained from the computer database. This research provides facts on the stock situation through historical data on past demand rates, and identifies problem area and bottlenecks.

- SAN INTERVIEWS

  Interviews with the Manager General Commodities and Services and key personnel of the BSO provide insight into what the input interface challenges are.

1.8 Delineation of study

This research study only covers the provisioning activities of the commodity subsection of the SAN supply chain. This includes input interfaces from the BSO. Interviews were not conducted with SPSC staff as the interface to this process is well documented.

This research only deals with provisioning to ships and does not cover provisioning for universal items to shore establishments.

1.9 Significance of research

This research is important to the SAN, as it will help establish a management process that will enable better provisioning to the Fleet. This will ensure that seagoing vessels, the core business of the SAN, are properly provisioned.

The outcome establishes recommendations regarding planning, decision-making and control functions that will lead to the establishment of a valid provisioning process for the Commodity Management subsection of the SAN. This process can then be published as a Fleet Order, which will ensure that a standard process is followed to enable the effective provisioning of FSEs.

1.10 Framework of document

Chapter 2 provides a literature survey in which published practices are reviewed and used as a benchmark for the proposal of a provisioning system. This includes articles on lessons learnt by other military organisations.

Chapter 3 comprises the results of interviews with provisioning managers of similar organisations to the SAN. These interviews identify new and interesting concepts that may assist in achieving a more effective provisioning system within the SAN.

Chapter 4 contains a statistical investigation of data and provides direction regarding the identification of problem areas and bottlenecks.

Chapter 5 gives the result of interviews conducted within the SAN. These interviews provide insight into the input interface challenges.

Chapter 6 provides a discussion of the findings with recommendations.

CHAPTER 2
LITERATURE REVIEW

2.1 Introduction

The Commodity Management subsection of the SAN Fleet Command was established after a transformational change to the SAN organisational structure in 2000/2001. The purpose of the Commodity Management subsection is to support naval vessels through a process of provisioning. Provisioning, as described in the SAN General Publication 1D (SANGP1D) (2000c:72) entails managing the integration of the Supply Support requirements at System Hierarchy level five (platform systems) to level two (components) for the allocated product systems throughout their programmed life cycle. Appendix A indicates the System Hierarchy levels.

The responsibilities of the CMs as laid down in SANGP1D (South African Navy, 2000c:27-28) are as follows:

- Establishing, maintaining and managing Supply Support Plans based on the supply support requirements and the Logistic Support Analysis (LSA) records for their allocated product system. This entails compiling the annual budget.

- Managing the most cost effective supply support for these product systems. This entails setting specifications, and identifying and codifying the required items. It also involves disposing of items at the end of their life cycle.

- Managing the materiel requirement plans in order to ensure that requirements are satisfied on time.

- Conducting inventory control, and initiating and monitoring procurement action of items for the allocated product systems.

- Exercising control over the scales of issue of inventory items as well as authorisation for materiel issued.

The listed responsibilities can be summarised as planning, decision-making and controlling. Inputs to this provisioning process are received from FSEs (end users) through the BSO, and outputs are to the SPSC who procure the requirements. Supplies are stored at one of the depots, the main one being the Naval Stores Depot (NSD) at Wingfield, from where they are issued to the BSO for distribution to Fleet customers.

At Fleet level there is presently only a Fleet Order "The Application of System Management and System Support within the Fleet Command (Doc FCFOFORDAA0080) dated 28 Feb 00" in which Supply Support is defined as (South African Navy, 2000b:2):

> Supply Support: Includes all spares, repair parts, consumables, special supplies and related inventories needed to support prime equipment. Supply support also covers provisioning documentation, procurement functions, warehousing and distribution material. Considerations include each technical upkeep level and each geographical location where spares and repair parts are distributed and stocked; spares demand rates and inventory levels; the distance between supply points; procurement lead times; and the methods of material distribution.

It must be noted that the procurement function addressed in this order has now been moved to the Secretariat of Defence and the Fleet Order must therefore be amended to indicate this.

The Fleet Order (South African Navy, 2000b:4) briefly mentions CMs:

> Commodity Managers will primarily be responsible for performing an integrating function between the users of equipment, the System Managers and the provisioning and procurement functions within the DFL.

This indicates where CMs fit into the organisation but does not indicate what process the CMs must follow.

A second Fleet Order (South African Navy, 2000a) entitled "Fleet Logistics Division Organisation, Authorities and Chain of Responsibilities (Doc FCFOFORDAA0070) dated 28 Feb 00" mentions the manager re-provisioning, and defines the functions as (2000a:6):

> The manager re-provisioning is responsible to DFL for directing and co-ordinating the activities required for the provision of a procurement service for materials and services, as well as the provision of a general logistics administration service.

This has changed to the General Commodities and Services section and its functions have been amended. This order therefore needs to be revised. Although the functioning of this section is not in the scope of this research, the section is included in research interviews in order to establish the impact this section has on the Commodity Management section. It must also be noted that certain elements of the General Commodity and Services section do impact on ship provisioning, e.g., safety clothing.

The two Fleet Orders currently in circulation do not formalise the process for the execution of the provisioning function. This is preventing CMs from effectively carrying out strategic and operational decisions and is further causing a perception by fleet customers that the CMs are not supporting the fleet. A formalised process is therefore required in which the provisioning activities are clearly defined.

It must also be noted that the function of provisioning, which is part of the supply chain, is not unique to the SAN as it is a logical business application and is performed by many companies and governments throughout the world. There is, however, a shortage regarding the amount of information available on the management of supply chains. Van Weele (2000:xiii) comments in the introduction to his book *Purchasing and Supply Chain Management*, that relatively little academic research has been undertaken in the area of purchasing and supply management, and that most handbooks on purchasing are of American origin and date back to the 1950s.

The importance of a supply chain and a process that enables the execution of supply chain management is paramount to the effective running of an organisation's supply support. Dobler and Burt (1996:13) believe that the development and management of the organisation's supply chain is one of the most interesting and challenging aspects of supply management. They believe that "this chain is the upstream portion of the organisation's *value chain* and is responsible for ensuring that the right materials, services and technology are purchased from the right source, at the right time, in the right quantity".

Van Weele (2000:8) talks about the "value chain" and defines it as "the various steps a good or service goes through from raw material to final consumption". This extends beyond the scope of this research as only the process for the provisioning function of the supply chain within this value chain is researched.

2.2 Drivers for change

A process must be able to satisfy the users as well as the customers. Van Weele (2000:9) states that "companies increasingly are organising their activities around processes, which are relevant for their customers, rather than their functions". Vice-Admiral Sir Jeremy Blackham (2002), the UK Deputy Chief of the Defence Staff stated that the acquisition process must offer "greater value for the customer, greater certainty for the supplier, more effective capability for the frontline". He believes that there needs to be a fresh way of doing things which is compatible with current needs and responsive to the challenges of current circumstances; and that this demands new understanding, new mindsets, new approaches and new tools. It is an interesting observation that the UK military procurement system, like the SAN, requires a new and more effective way of conducting purchasing activities.

With technologies like computers and automated systems being widely and economically available, it is important that these technologies be embraced and used to their full potential. Dobler and Burt (1996:15) state that future processes will be largely automated and that supply management personnel will be concerned with "producing high value added, not paperwork". Chadwick and Rajagopal (1995:28) discuss the supply process under the term procurement, and support the need for a good automated system by stating: "Procurement is not confined to simply shopping around and the management information system necessary to support it must be more comprehensive than the usual print order and record expenditure files." They believe that there must be scope for supplier appraisal and performance measurement, quality assurance and control, project monitoring and management, contract drafting and implementation, as well as inventory control and expediting facilities. "An adequate information system will provide management reports to support decision-making and be a ready mechanism for improved productivity, performance monitoring and comprehensive financial control."

This indicates that automation is the future, and the SAN must be able to include the current computer system into an adequate supply process. This is currently in process, but should the system not prove adequate, then one of the many software companies like "SAP", which specialises in providing information systems and computer-based tools, should be approached.

Another good software tool is the one provided by the Electronics Industry Data Exchange (EIDX). They provide forecast/planning business models and their website www.eidx.org indicates that good forecasting allows order lead times to be set to a minimum, allowing releases against the forecast to be made virtually at zero lead time or "just-in-time". This just-in-time concept is a great cost saver and although designed for a more stable manufacturing process environment, may be of some value in unstable and dynamic environments.

Another change concept presented by EIDX is the Blanket Purchase Order (BPO). This is a long-term commitment to a vendor for material against which short-term releases will be generated to satisfy requirements. This is a trend gaining much popularity in the commercial / industrial sector and many similar commodity industries are moving towards this cost-saving form of centralisation/outsourcing.

Hughes, Ralf and Michels (1998:106) take this a step further and suggest that inventory management for multi-use, low-value items should be provisioned on an Automatic Inventory Replenishment (AIR) system where the supplier holds the stock and is linked into the computer system of the organisation. "The aim is to improve efficiency in the ordering and replenishment process and provide the supplier with more freedom to respond directly to the purchaser's requirements." They also suggest the use of consignment stock and supplier managed inventory.

Change is thus necessary in order to make improvements to the SAN Supply Chain. Chadwick and Rajagopal (1995:5-6) support the need for strategic change and state that the narrow mindset of "We've always done it this way" imposes a limit on an organisation's progress. They believe that "there is a particular need for empowerment change within the supply function, and that this will improve the performance of the whole business".

With change, must come improvement. Hughes *et al.* (1998:111) believe that simplicity pays off across the supply chain and that there is still a need to launch and sustain initiatives that drive out complexity. The redesign of the supply chain process should harmonise (standardise and rationalise), harness the electronic supply chain and challenge low value added work". They support the need for change within the government sector in order to achieve cost reduction, and state: "They have all become aware of accelerating commercial pressures associated with market testing, outsourcing, privatization and similar value-for money initiatives" (Hughes, *et al.*, 1998:116).

Ross (2003) believes that it is important for organisations to integrate their strategies with those of the supply chain systems in which they are entwined when building a process. It is therefore important to look outwards and not just be concerned with internal processes. Ross (2003:2) states "companies have begun to extend the tools of modern enterprise management to their supplier and customer channels in search for additional sources of cost reduction and process improvement".

Although the SAN underwent a transformation process in 2000, the provisioning section merely went from being managed by Replenishment Officers to being managed by CMs. Transformation was nothing more than a name change and a change in the command structure. The method of provisioning, however, has not changed and CMs are doing the same old thing but in a new structure. In order to implement a real customer-based service, process changes are required and these processes must be clearly defined and documented so that they are visible and understood by the end user customers.

2.3 Clarification of differences in supply chain terms

It must also be noted that the terms for purchasing, procurement and supply management have different meanings in the commercial sector than they do in the SAN. It is therefore necessary to elaborate on these differences in order to be able to put them into context. The SAN does not use the term purchasing, but Van Weele (2000:14) notes that "terms like procurement, purchasing, supply and logistics management are used interchangeably". It is therefore not essential that we become too legalistic or dogmatic about these terms. This research does, however, look at the different terms in order to give an understanding of them.

Van Weele (2000:14) describes the term purchasing as "obtaining from external sources all goods, services, capabilities and knowledge which are necessary for the running, maintaining and managing the company's primary and support activities at the most favourable condition".

Dobler and Burt (1996:35) define purchasing as follows: "The purchasing function comprises the essential activities associated with the acquisition of the materials, services and equipment used in the operation of an organisation."

The term "procurement", however, is defined by Van Weele (2000:16) in somewhat broader terms, and "includes all activities required in order to get the product from the supplier to its final destination". His model encompasses the purchasing function, stores, traffic and transportation, incoming inspection, quality control and assurance, and salvage and environmental issues. Dobler and Burt (1996:35-36) also describe procurement as being a wider term: "The procurement process, or concept, encompasses a wider range of supply activities than those included in the purchasing function." They believe that procurement includes a broader view of the traditional buying role, with more buyer participation in related activities. Specific activities usually included in the process are:

- Participation in the development of material and service requirements and their specifications.
- Conduct of materials studies and management of value analysis activities.
- Conduct of more extensive material market studies.
- Conduct of all purchasing function activities.
- Management of supplier quality.
- Purchase of inbound transportation.
- Management of investment recovery activities (salvage of surplus and scrap).

In essence (Dobler and Burt: 1996:36), "procurement tends to be broader and more proactive, with some focus on strategic matters, as compared with the typical implementation of the purchasing concept". The general definition by the above authors is very different from the SAN definition where procurement only involves the administrative process of advertising the requirement, adjudicating the tenders received, printing the order and authorising payment on delivery.

The term Material Requirement Planning (MRP) is defined by Dobler and Burt (1996:497) as a "technique used to determine the quantity and timing requirements of 'dependent demand' materials used in the manufacturing operation". Van Weele (2000) describes the process of MRP at considerable length with the basic idea being that it is a plan that provides an estimate of the volumes that management thinks it can sell. The SAN, however, is not a manufacturing operation and hence the textbook ideas behind the philosophy of MRP may be difficult to implement. The term MRP is, however, used in the SAN to describe the planning process for estimated stocks.

The necessity for describing these terms is to ensure that there is an understanding between the commercial use of the terms and the SAN use of the terms. This ensures that there is no misunderstanding in the mind of the reader or in the interpretation of the interviews which will be documented in later chapters.

2.4 Government practice

Dobler and Burt (1996:746) believe that purchasing in not-for-profit institutions and governments is similar in many ways to purchasing in industrial organisations. "The fundamental objectives are to identify sources of needed materials and to acquire those items when needed, as economically as possible within accepted standards of quality. The function must be able to

react quickly, effectively and efficiently to requirements and policies and procedures must conform to sound business practice."

Notwithstanding the similarities, purchasing in not-for-profit institutions and governments differs from purchasing in industry in several respects. Most significantly, purchasing in the not-for-profit and governmental sectors, such as the SAN, is a stewardship function, as the SAN spends funds derived from national taxes in support of activities that the Government has decided to provide on behalf of its people. Consequently the supply support function in the SAN has become regulated, defined and controlled by innumerable laws, rules and regulations, and policies into which the Commodity Management subsection must integrate, and for which a process must be defined.

Dobler and Burt (1996:746) acknowledge that "purchasing by governmental organisations tends to be somewhat more regulated by legal requirements and more open to public scrutiny". Government decision-making on purchases should be as transparent as possible in order to satisfy taxpayers that their money is being well spent, but military spending is anything but transparent, owing to the political secrecy regarding security acquisitions. Van Weele (2000:325) gives support to this and states that decision-making in Defence buying is "troublesome and difficult to manage".

A major concern regarding public spending is the tendency to spend more than your allocated budget in order to get more funds allocated the following year. The higher the budget, the more power the government official is deemed to have; and being able to spend the entire budget, even if not exactly to plan, is the sign of a good manager. Any official not wishing to spend his entire budget, or who tries to return funds not required, is looked down upon as being a bad manager. This is nothing new or unique to any particular country and Van Weele (2000:327) comments: "Most countries still seem to struggle on how to control and monitor governmental purchasing expenditure effectively."

2.4.1 The United States corporate military supply chain process

The United States of America Department of Defense (1997) has published a handbook that acts as a guide to the military supply chain process and provides doctrine needed to support this process. The handbook is titled the *Department of Defence Handbook, Acquisition Logistics, MIL-HDBK-502*. Relevant headings are used as a framework to give support to a proposed SAN process. They are:

Mission Frequency and Duration. MIL-HDBK-502 (1997:5-4) states: "From an operations support standpoint, mission frequency and duration define the support resources needed to sustain operations."

This concept should be the basic principle underlying the SAN provisioning process doctrine as the more the ships are used the more maintenance is required and thus more spares will be required to carry out this maintenance.

Anticipated Service Life. MIL-HDBK-502 (1997:5-5) states: "Maintaining a support capability for outdated technology is expensive and limits opportunities to use contractor support because the number of sources that can support the older technology reduce dramatically as it is replaced with new technology."

It must be noted that support to outdated equipment is difficult. Haub (1997:1) supports this by stating: "Diminishing Manufacturing Sources and Material Shortages (DMSMS) have been confronting program managers, logisticians and item managers in the US Department of Defense (DoD) and private industry for more than 20 years." DMSMS is defined as "the loss of, or impending loss of, the last known supplier of an item or raw material".

According to Haub (1997:2), "DMSMS can prevent ships from sailing". This is critical to this research as obsolete parts are mistakenly designed into new systems every day. The reason, according to Haub (1997:2), is that "the

market for the product may be too small to be profitable; for example in 1963 the US government's procurement of integrated circuits accounted for approximately 95% of the market, whereas in 1997 it is less than 2%". If this is having such an impact on the US Military, it is certainly much worse within the SAN where purchasing power is substantially lower.

A proactive approach to this problem is therefore needed and the solutions according to Haub (1997:3) may include:

- Reclamation. "Reclamation or 'cannibalisation' can be a spare parts 'goldmine', especially when the system population is small and will remain in the fleet for just a few more years."

- Redesign. "Equipment redesign is another solution, but involves the biggest effort and hence the highest cost."

- Reverse engineering. "Used on occasion to solve DMSMS problems. This lengthy process is usually undertaken as a last resort, and mostly for mechanical parts."

- Life of type (LOT). "A LOT buy, extended buy, or bridge buy – involves making one last 'big buy' of an item before the manufacturer ceases production."

There is a warning from Haub (1997:4), however, in that "calculating the correct quantity to buy, particularly for an intended service life of 10 or more years, is difficult. The level of use of equipment fluctuates constantly and the number of platforms in service also changes over time". There are also unforeseen problems, and an example quoted by Haub (1997:6) is that "in 1994, Motorola Corporation announced that it would cease production of all military specification (MILSPEC) items. This decision was driven by a shrinking military market and the direction of former Secretary of Defense William Perry

to use performance-based and commercial specifications". This indicates that the DMSMS problem is a very complex one and Haub believes that it has to be managed on a full-time basis by experienced analysts and engineers.

This challenge is taken very seriously by the US military and according to Haub (1997:6): "Lockheed Martin recently received a $69 million contract for out of production parts management for the US Air Force F-22 Raptor. Some F-22 micro-electronics are already obsolescent with the aircraft not even being in production yet."

It therefore seems logical that CMs must have full knowledge of where equipment and its components are in their "technology life" in order that smart decisions are made about supporting the system. A good prediction tool will provide reasonably accurate estimates of production life. According to Haub (1997:7), "there are several good prediction tools on the market, and their subscription fees are relatively low. Stottler Henke Associates being one".

Supportability Risk. MIL-HDBK-502 (1997:5-7) states that system supportability should be assessed under both peacetime and wartime scenarios. "Peacetime support planning is based upon equipment readiness and economic considerations. Repair decisions in this scenario are made to reduce the cost of obtaining replacement products. A wartime scenario should include both surge and sustained rates of operation. Wartime support planning is driven by equipment readiness or operational availability." It is thus important that both peacetime and wartime processes be implemented.

Commercial equipment supportability. MIL-HDBK-502 (1997:6-22) indicates that the US DoD is adopting new business practices and that it is shifting away from development and towards commercial procurement. The reason for this is that off-the-shelf items developed for the commercial market frequently meet US DoD needs. The challenge with this, however, is that the long-term supportability of these items is much more problematic. "Since commercial items will probably be used in harsher environments than those for which they

were developed, kept in service longer than intended by the commercial developer, and required to interface with other systems, the logistical implications of using commercial items need careful scrutiny."

This statement indicates the importance of obtaining a balance between military items and commercial items. A clear doctrine on the use of Commerciall off the shelf (COTS) items is required. The SAN is better suited to COTS items as the organisation does not have the financial power to support purpose designed equipment.

Supply Support Information. MIL-HDBK-502 (1997:7-12) indicates that supply support information is used to determine the initial requirements and the cataloguing of support items that are to be procured through the provisioning process. Relevant information required is the Cage code (manufacturer of item), Reference number, NSN (for military purposes) and the item's name.

It must be noted that inadequate control data is a big cause of bottlenecks. This is a challenge within the SAN as a large part of the inventory data consists of supplier codes and not the manufacturer's code. This makes it difficult to source the items outside of the specific supplier's environment.

2.4.2 United States Marine Corps provisioning

The US Marine Corps (1997) provisioning manual MCO P4400.79F (1997) provides additional insight into the provisioning process:

- Range and quantity of repair parts, special tools and publications. (Paragraph 1000). "Provisioning must include the identification, selection and acquisition of initial support items required for maintenance."

- Logistics support plan. (Paragraph 1003.2). "Provisioning planning will focus on the following: early funding estimates for budgetary planning, validation of maintenance and non-maintenance items and identification of support items."

- Marine Corps provisioning policy: (Paragraph 1004.1). "Types of stock depend on type of weapon system and support concept established by the Marine Corps Research, Development and Acquisition Command Program Manager." This consists of:
  - Garrison operating level (retail stock).
  - Pre-positioned War Reserve Material Requirements (PWRMR).
  - Initial system stock (wholesale stock).
  - Critical Low Density (CLD) allowances. (Support items susceptible to failures).

  This is applicable to the SAN as it indicates that support items must be classified into different categories and that a different process is required for each category.

- Range and quality of support items. (Paragraph 1004.2). "The range and quantity of support items required shall be based on the data developed during the Logistic Support Analysis (LSA) process."

  This is a critical lesson for the SAN as the organisation tends to build its LSA as it supports it.

- Initial stock levels. (Paragraph 1004.3). This is set at 24 months and in the case of uncertainty "a minimum retention level equal to the past 24 months".

- Equipment provisioned. (Paragraph 1004.4). This should consist of high levels of combat-essential equipment and mission support equipment. Commercial equipment and batteries are provisioned, but at lower levels.

2.4.3 United States Navy inventory management

The United States Naval Sea System Command (NAVSEA) is responsible for the naval inventory management system. The organisational structure is described as follows (United States Navy, 1999:1-3): "The Assistant Secretary of the Navy (Shipbuilding and Logistics) is responsible for inventory management." The Chief of Naval Operations (CNO) is responsible for the planning and determining the material support needed by the operating forces of the navy. Naval Supply Systems Command (COMNAVSUP) is responsible to CNO for providing material support to the operating forces of the navy. Inventory Managers are primarily responsible for the management of assigned groups or classes of items of supply. Inventory management includes systematised support decisions, e.g., what line of items to stock, how much of each is needed and where they should be stored.

This system is very similar to the old structure of the SAN before transformation; hence the structure is of little value to this research.

The aim, however, of the Naval Supply System of COMMAVSUP as stated in the manual (United States Navy, 1999:1-2) is to provides inventory management and physical distribution functions for supplies, spares, equipment and end-items necessary to support production, deployment and sustained maintenance of weapon systems and associated materials. This adds two new dimensions in the form of deployment and sustained maintenance which are currently missing in the SAN doctrine and which may be of great value.

Another important aspect regarding NAVSEA that is worth considering is that the Naval Supply System Commanders are responsible for the following additional tasks:

- Research and development.
- Items requiring engineering control decisions.
- Items that are substitutable and interchangeable.
- Items unstable in design.

In the SAN, these tasks are performed by the Naval Engineering Service. The ability to control the progress of these tasks is thus greatly diminished.

2.4.4 Royal Australian Navy readiness based sparing

The Royal Australian Navy runs a logistics support doctrine similar to the SAN, which is called Readiness Based Sparing (RBS). According to Sanders (1992:61), RBS focuses on equipment readiness and the initial project has been used in support of its Seahawk programme. RBS aims at achieving stock level maintenance at each of the depot facilities in the supply and maintenance hierarchy in order to satisfy the target operational availability set for the Seahawk. These stock levels include items at the organisational level, for immediate removal and replacement, items of spares for the repair lines and items at the depot level to minimise the risk of stock-outs.

The RBS focus on "readiness" is an aspect that provides a good focus for the SAN as stocks are determined by the maintenance requirement, which is segregated by level of difficulty and divided into a three-tier hierarchy:

- Organisational level repair (routine maintenance at air stations).
- Intermediate level repair at main workshop at Norwa for higher level repair.
- Depot level repair performed by contractors.

The driving philosophy behind RBS according to Sanders (1992:64) is that "repair is the preferred source of replenishment" because purchasing is more costly and time-consuming. An important aspect of provisioning is that the shorter the turnaround time, the shorter the average logistics delay will become. The challenge, however, is that if there are no spares for these indentured items, the turnaround time for the component will increase and ultimately the readiness of the aircraft is reduced.

The SAN doctrine regarding the level of maintenance and repair is currently not specified. It is clear from the RBS approach that more weight needs to be allocated to the repair process as a means of provisioning as this will ensure a higher level of readiness.

2.5 Planning of purchasing

According to Dobler and Burt (1996:751) planning and scheduling of purchases is no less important in institutions and governments than it is in industrial organisations. "In fact, it may be more critical, because the public's health, safety, and welfare can be immediately and adversely affected by even a short-term disruption of supply."

Dobler and Burt (1996:751) identify a critical shortcoming within all government sections in the following paragraph:

> Historically, institutional and governmental purchasing departments have not been particularly successful in enlisting the assistance of operating departments and personnel in planning and scheduling procurements. As a result, urgent needs often have had to be addressed through emergency, rather than standard, procurement procedures.

It therefore becomes clear that the effect of ineffective planning causes a disruption in the provisioning process and that operational staff should be more involved in the planning process. This will result in more efficient provisioning and therefore a reduction in time-consuming and disruptive emergency purchases.

Dobler and Burt (1996:751) suggest the following strategies commonly used by institutions and governments to plan purchases more effectively:

- Consolidation of requirements.
- Term contracting.
- Delegation of purchasing authority.

They state that by "delegating to operating departments the authority to make small purchases, certain emergency purchases and specialised purchases, governmental purchasing departments provide operating departments with greater flexibility and reduce the costs of the acquisition process".

Within the SAN the Fleet Order "The Application of System Management and System Support within the Fleet Command (South African Navy, 2000b) prescribes Life Cycle Costing (LCC) as the methodology for SAN logistics support.

Chadwick and Rajagopal (1995) describe LCC as "Womb to Tomb" costing, as the true cost of ownership of the items of supply or service includes events which take place before and after the delivery date right through to disposal. Life cycle costing involves:

- Pre-acquisition costs. These include investigation, specification, design, and budget allocation. This is essentially what commodity managers do.
- Acquisition costs. This is the purchase price including delivery, insurance and taxes, installation, commissioning, and training.
- Operating costs consist of: labour, materials, consumables, and energy supply.
- Maintenance costs: consist of specialist labour, specialist tooling, spare and replacement parts, and reduced output with age.
- Downtime costs. These include: lost profits, and extra costs of overtime or sub-contracting charges.
- Disposal costs consist of: safe disposal by resale, including any ongoing liabilities; cost of removal for sale or scrap; and reinstatement of land or buildings for alternative use.

The planning of supply support is dynamic, and according to Blanchard (1998:338) must be "responsive to changes in system operation, deployment, utilization, effectiveness requirements, repair policies, and environment". Supply support planning should include:

- Determination of requirements. Initial requirements for spares, repair parts and consumables stem from the supportability analysis. This supports the maintenance concept in identifying functions and tasks by level, repair policies, individual spares/repair part types and item replacement frequencies.

- Provisioning and acquisition of material. According to Blanchard (1998:339) "a plan is developed as part of the integrated logistic support plan for the provisioning of the appropriate material". He further states (1998:341) that "the provisioning concept will vary somewhat between major high value items and smaller repair parts ... and ... procurement policies may differ for items with different usage rates". This means that fast-moving items may be procured locally near the point of usage such as the intermediate maintenance shop. The planning for slower moving items stocked at the depot, however, may be that they are purchased from a geographically remote supplier as the procurement lead times are not as critical. The ultimate goal is to plan for the provisioning of the correct amount and type of supplies at the lowest total cost.

- Planning for the disposition of material. Repairable spares that are condemned are generally shipped to the depot or the supplier facility for disposal. These items are inspected, disassembled and useable parts salvaged, reclaimed or recycled and, according to Blanchard (1998:341), "the residue will be disposed of in an expedient and economical manner consistent with the environmental and ecological requirements".

2.6 Supply chain decision-making

Decision-making is important in the Government supply chain as the purchasing agency must, according to Dobler and Burt (1996:748), "strike the appropriate balance between quality, total cost, timeliness, control, accountability and politics". When it comes to decision-making for new items, Van Weele (2000:28) acknowledges that this usually involves many disciplines and departments in the organisation and, by having various stakeholders, there will also be various opinions and views on what to purchase. This, he feels, can "make the purchasing decision-making process complex and obscure".

2.6.1 Inventory decisions

As it is the CMs' responsibility to stock the depots in anticipation of the end user's requirements, this will be given a fair amount of priority. The trend of the past was spending an enormous amount of money on stocking the depots in order to ensure demands were satisfied. Budget restrictions from 1999 caused "stock" to become a dirty word and stock levels were run down to an absolute minimum. This, however, led to frequent "dues out" (no stock available), which affected the operational capabilities of the SAN. Dobler and Burt (1996:517) state that "in many circumstances, however, inventories do have some redeeming values - they are not all bad. The trick is to obtain the best of both worlds at a reasonable cost. Generally speaking, inventories make possible smooth and efficient operation of a manufacturing, organisation by *decoupling individual segments* of the total operation".

From this statement it becomes apparent that a balance must be achieved between too much stock and not enough stock, thus ensuring that SAN operations are not compromised owing to no stock being available when required.

Supply support, according to Blanchard (1998:62), includes the "spare parts and associated inventories necessary for the accomplishment of unscheduled and scheduled maintenance actions". The type of spare part to be provisioned must be determined at each maintenance level (by manufacturing part number) as well as the quantity of items to be purchased and stocked. It is also necessary to know how often and in what quantity various items should be ordered. Demand rate is therefore determined by:

- Replacements occurring as a result of corrective and preventative maintenance actions.
- Spares to compensate for repairable items in process of undergoing maintenance.
- Parts to compensate for the procurement lead times.
- Spares to compensate for the condemnation or disposal of repair items.

Further to this, Blanchard (1998:72) believes that inventory decisions are based on the following factors:

- Operating level – quantity of material required to support normal system operations in the interval between orders and the arrival of successive shipments of material.
- Safety stock – Additional stock to compensate for unexpected demands, repair times, pipeline, procurement lead times and unforeseen delays.
- Reorder cycle – interval of time between successive orders.
- Procurement lead time – Time from date of order to receipt of shipment of the inventory.
- Pipeline – the distance between the supplier and consumer, measured in days of supply.
- Order point – Point in time when orders are initiated for additional quantities of spares / repair parts.

When it comes to decisions regarding which brand of main equipment to purchase, the deciding factor is often determined by the purchase price of the equipment. Chadwick and Rajagopal (1995:75), however, believe that "from

nuclear power stations to humble photocopiers, owners have discovered that no procurement decision should be taken on purchase price alone". From their statement, one realises that the total LCC must be considered right from purchase to sustainability to disposal of the equipment.

The Minister of State for the British Armed Forces, Adam Ingram (2002:58) supports this by stating that it must be plain that affordability is not simply about buying equipment with the lowest up-front cost, but that we must focus on the true cost of the equipment which includes the cost of, for example, logistics support, training and maintenance support over the equipment's whole in-service life. "Whole-life costing gives the Ministry of Defence understanding of the full cost of owning and supporting equipment to inform our decision-making process."

2.6.2 Sourcing decisions

Sourcing is the activity of finding a supplier that will satisfy one's requirements. Buyers need to source suppliers that will provide the right product at the required quality, within the time stipulated.

In some organisations, the emphasis is on reducing the number of suppliers and entering into long-term agreements. The thrust, however, in most governments and certainly within the SAN is to reach out to as many suppliers as practicable. Dobler and Burt (1996:752) state that:

> Reaching out to potential suppliers is important to many institutions and most governments. Their policies may include, for example, such goals as "to foster effective broad-based competition within the free enterprise system" and to "assure that small and disadvantaged businesses are solicited on each procurement for which such businesses may be suited". Some institutions and governments publish newsletters which list their bidding opportunities, while others are beginning to use electronic bulletin boards.

As specifications drive the provisioning and procurement process within the SAN, it is necessary to include a caution on the military's tendency to over-specify military items. This is the age-old problem of asking for a Mercedes when a Volkswagen would do the job. Funds can be easily misspent within the military as a large number of transactions are processed annually and the technical description of the item does not always indicate what it actually is. A screw could therefore be a three-cent screw you buy in the hardware store or it could be a R650 000 screw that propels a submarine through the water. This problem was experienced by the United States Navy in 1985. Jackson (1985) in his article aptly titled "The $436 hammer: a laughing matter?" describes how the US Navy Supply Corps ended up paying $436 for a simple hammer. The warning he sounds against this occurring in other high specification-driven organisations cannot be over-emphasised.

2.6.3 Outsourcing

Outsourcing is when specialist suppliers are used to perform activities within the supply chain. The result can be a faster reaction to needs or lower costs with higher value added. Johnson (1997:13) states that "around the world, companies of all shapes and sizes and all types of industries are coming to terms with new ways of doing business of which outsourcing is an ever-increasing part". Van Weele (2000:10) states that outsourcing is "becoming more and more a strategic issue in many industries". Any future process should therefore consider some form of outsourcing as a solution to a more effective supply chain.

Johnson (1997) states several tactical reasons for outsourcing. Two of his reasons, which can contribute value to the SAN, are:

- Reduces operating costs. Others may have the structures to perform the job more effectively.

- Makes capital funds available. It reduces the need to invest capital funds in non-core business functions. This makes capital funds more available for core areas.

Outsourcing should therefore be considered as an enhancement option for the Commodity Management subsection, as there are certain functions that could be better performed by outside contractors.

Outsourcing must, however, be carefully considered. Johnson (1997:2-4) warns: "Make sure that whoever you are dealing with in the outsourcing business understands clearly your definitions otherwise major confusion can arise." He further warns that one should "never sign an outsourcing agreement without considering carefully the longer term implications – too many have, to their regret".

The current South African policy of affirmative action has led to many government officials taking retrenchment or early retirement packages, which has led to some deficiencies being experienced (as with all changes) within the SAN environment. One of the ways in which these problem areas have been solved is by outsourcing to former employees. Sayers (1997:4), however, warns against outsourcing to former employees and feels that "self-interest can be a powerful incentive. Handled well, it can help everyone. Handled badly, it can lead to dubious practices, if not corruption".

This trend towards outsourcing to former employees can be beneficial to the SAN. In the light of Sayers's warning, however, it should be carefully monitored.

2.7 Purchasing control

The control of the supply chain process is one of the most important factors in the provisioning process. Van Weele (2000:104) states:

> Purchasing management must see to it that both results and activities that have been planned are realized within the available financial resources. To this end the actual performance, obtained through purchasing activities, must be periodically checked against the purchasing plan.

Chadwick and Rajagopal (1995:220) support Van Weele's statement and state that "whether the organisation adopts a centralised or decentralised policy for purchasing, there should be some agreed rules to ensure that the process is under control". They further state that a high-level management document should exist providing answers to the following questions:

- Where does authority for purchasing actions lie?
- Is there a properly managed, up-to-date, list of authorised signatories for purchase requisitions and purchase orders?
- Are fully approved and agreed procedures in place for all activities governing purchasing transactions?
- Is a formal procedure in place for maintenance of the supplier database, both for existing and new suppliers?
- Are all suppliers measured for their performance in meeting purchase order requirements and is due account taken of their rating before new or repeat business is placed with them?

Chadwick and Rajagopal (1995:221) state that "control only comes after knowledge, understanding, and acceptance of correctly aligned plans. The central core of procurement must be able to collect and disseminate the information required by the people involved in the day-to-day dealings with suppliers to ensure that they themselves can control the process along the lines that they have fully bought into".

It is evident that some form of control is required in order to ensure that the process is operating effectively and efficiently. A check sheet against the

questions posed by Chadwick and Rajagopal will ensure a measure of control, but is rather limited. The control aspect is therefore an area that was investigated in much greater depth in the chapters to follow.

2.8 Logistic support and operational sustainability

The purpose of logistics support according to British Maritime Doctrine (United Kingdom, Ministry of Defence, 1999:146) is to ensure the provision, sustainability and recovery of forces at the required level for the duration of operations. This adds the dimension of sustainability which requires investigation, as CMs will be required to interface with the operational planning staff in order to supply vessels that may be deployed great distances from the RSA for long periods. Logistics support is further defined in this publication to include medical and repair facilities, movement of personnel and the transport of fuel, lubricants ordnance, spare parts, food and other provisions. The British Maritime Doctrine (United Kingdom, Ministry of Defence, 1999:147) further notes "logistics support is fundamentally a joint activity in which resources and facilities must be pooled to the utmost extent between services". The Commodity Management subsection must therefore appreciate that it is part of a larger organisational process, and that the functioning of the section must be in line with and capable of working in conjunction with the joint operational level of the SANDF. The principles of joint logistics must therefore be understood in order for CMs to function effectively in this environment.

2.8.1 Principles of operational logistics

The United States military lists 14 principles of operational logistics which form an essential part of any supply support system. It is important that CMs are able to comply with the requirements of these principles. Huston (1979:12) lists them as follows:

- First with the Most: "The primary purpose of logistics is to facilitate the delivery of adequate potential or actual firepower or shock to the critical places at the critical times ... "

  CMs must therefore be able to supply the required items in adequate quantities in order to support operations involving the SAN.

- Equivalence: "Strategy, tactics and logistics are different aspects of the same thing. If completely separated they become meaningless."

- Material Precedence: "Material mobilization should precede manpower mobilisation." Planning ensures the proper sequencing of requirements.

- Economy: "Logistics resources are almost always limited and it is necessary to concentrate them in the best way to achieve the primary mission." Military managers must identify items that are critical to keeping their systems operational.

- Dispersion: "Within reasonable bounds storage and other logistics activities should be dispersed and multiple lines of communication should be used." This is important as it will limit the loss or disruption of supplies if a depot in the line of communication is disrupted or destroyed. Adequate stocks must be available for the supply of more than one operational supply base.

- Flexibility: "... [Be] prepared to support any number of different plans." Military managers must be flexible in that they must be able to adapt to changing circumstances.

- Feasibility: Logistics support and plans "are subject to capabilities of the national economy".

This is an important consideration for a small force like the SANDF, as military expenditure is limited and the cost of achieving a high availability rate is beyond the available budget. CMs must be reasonable in their supply calculations and accept that 100% availability is too costly to achieve.

- Civilian Responsibility: "... [The] chief reliance for the production of military goods remains on private industry."

  The implication of this to CMs is that the relationship with the state Armament Corporation (Armscor) is essential to effective sustainability as most of the components and spares are from foreign sources and Armscor is the sole agent within the RSA responsible for securing the strategic availability of imported parts.

- Continuity: The essence of this principle is that systems should be put in place during peacetime so that "no fundamental change is necessary to meet an emergency".

  This is an important aspect for CMs to consider, as the current system is so overloaded with control functions that it could not easily adapt to an emergency situation. Emergency procedures must be conceptualised and requested from higher authority.

- Timing: "Timing must be relative to the objective." The essence of this is that the objective must be clearly identified and communicated to those responsible for achieving it.

  The application of this to CMs is that adequate notice must be given of future requirements owing to the long lead times of the currently restrictive and controlled process.

- Unity of Command: The essence of this principle is that a single authority should be responsible for logistics.

  This is currently an area for enormous development and improvement within the SANDF as CMs are responsible for keeping the depots full, but do not have the mandate or means to convey supplies to the theatre of operations. The movement of supplies to the theatre of operations is a joint operations responsibility, and once supplies are released to them no visibility on storage locations and stock usage levels are visible. Anticipation of demands on industry therefore cannot be secured, and budget allocations cannot be planned for.

- Forward Impetus: In essence a "continuous replenishment from the rear". Ties in with unity of command.

- Information: "Accurate, up-to-date information is vital to effective logistics planning and to supply distribution."

  CMs have effective control over this at unit level, but not at operational level. The implication is that demands during an emergency will create a "dues out" if depot stock is insufficient, and lead times for replacement will depend on industrial production lead times and transportation lead times.

- Relativity: "Preparedness can never be absolute, only relative to time and place of possible conflict and to potential enemies." It is thus essential that critical spares be identified and stock-piled before the requirement becomes critical. This must be done in balance with the principle of feasibility.

According to British Maritime Doctrine (United Kingdom, Ministry of Defence, 1999:150), the principles of joint logistics guide military planners and logistic officers in working towards a common objective. These principles of joint logistics are similar to the principles of the US military but are aimed at a higher order objective as they involve working with other arms of service. They are listed in the British Maritime Doctrine (United Kingdom, Ministry of Defence, 1999:150-152) as:

- Foresight: This is the aspect of logistics planning. This involves planning to have the right supplies in the right place at the right time. This involves collaborating with other arms, for example, the air force, to ensure that supplies are delivered in an optimal manner.

- Economy: "Logistics resources will usually be in short supply and sufficiency should be the objective of the logistician. It is possible to over-plan as well as under-plan logistics requirements." In the case of over-planning, it can consume resources that could have been better devoted to combat forces.

- Flexibility: "A logistics plan must be flexible and capable of responding to inevitable changes in the operational plan." Along with this, the logistics system that executes the plan must be able to adapt to the rapidly changing requirements.

- Simplicity: "Any unnecessary complicated aspect of operational planning will be prone to disruption." A simple plan is also more likely to be accepted, correctly interpreted and executed.

- Co-operation: It is essential that there is "co-operation between services, nations and commands" in the control of logistics.

These principles must be considered by CMs when functioning in a joint operational environment. Commodity planning must be able to integrate with joint operations.

2.8.2 Sustained reach

The importance of sustained reach in terms of the British Maritime Doctrine (United Kingdom, Ministry of Defence,1999:154) is that good forward support ability gives forces the capability of carrying out sustained operations that are great distances from their home bases. An example is the British support to forces in the Falklands War.

From a CM's point of view this could involve support in sustaining maritime or coastal Peace Support Operations under a United Nations or African Union mandate. CMs must be aware of the methods by which sustained reach is achieved.

According to the British Maritime Doctrine (United Kingdom, Ministry of Defence, 1999:154) sustained reach is achieved by:

- Replenishment By Fleet Support Vessels. The Royal Fleet Auxiliary in the case of the Royal Navy.

  This option can, however, be expensive and is only feasible in the case of larger maritime nations. The RSA only has one vessel capable of contributing to this task, the *SAS Drakensberg*. However, no vessel can remain at sea indefinitely and the vessel will have to be taken out of service at regular intervals for upkeep and maintenance.

- Ships Taken Up From Trade (STUFT). This option of chartering a civilian vessel provides a useful alternative, and it is far less costly to charter a ship for a limited period than to run a ship continuously.

  There are, however, a few disadvantages in that ships' operators and crew are unlikely to take their vessels into a combat environment. This option works best for strategic sea lift where equipment and supplies are put ashore in a Host Nation port. Supplies are then moved into the theatre of operation.

- Host Nation Support (HNS). This is a strategic partnership arranged at political level for the sustained support of forces operating far from home bases. The British Maritime Doctrine (United Kingdom, Ministry of Defence, 1999:153) describes this as an important concept as it aids in supplementing afloat support by providing forward support. HNS may be "no more than a sheltered anchorage for support or repair vessels" or may be expanded to providing substantial forward logistics support.

In the maritime environment the capability of conveying strategic equipment and forward base spares over great distances by sea is known as "sea lift". This capability is used for moving forces and not for the sustained replenishment of supplies. Ships used may be Fleet Support Vessels or STUFT.

The New Zealand Defence Force (New Zealand. Ministry of Defence, 2000:77-83), in an analysis of its sealift capabilities, conducted an exercise to determine the most economical application of this strategic requirement. In conclusion, they decided to modify their current vessel, the *Charles Upham*, as STUFT charter proved to have uncertain availability, and the annual operating cost, although estimated as being low, was uncertain. The operational risk proved too high for the degree of certainty expected. Chartering would therefore be

used only in conjunction with other nation operations where Lead Nation (US or British) capabilities would be used. The other aspect that this investigation highlighted is that RO-RO ships (ships with ramps that allow containerised cargo to be driven on and off) were the most useful for military operations. Container ships offered a slower and less flexible capability.

The implication of this to the Commodity Management subsection is that containerisation with a purpose-built transport system is the option of the future. The Commodity Management subsection should therefore be looking into replacing the current depot bulk storage system with a more flexible pre-packed containerised system that allows for easy relocation. The advantage of this would be that the BSO, with its accounting infrastructure, would deploy a depot sub-entity, thus giving real-time issue updates into the main accounting system. This will enable CMs to monitor the actual use of commodities via the issue system, and facilitate long-term replacement planning.

Future deployments of the SA Navy in support of SANDF Peace Support Operations are ideally suited to this form of fleet provisioning as the charter of STUFT (container or RO-RO) for the delivery of containers to Host Nation ports is cost effective and entails little danger or risk to the ship operators and crew.

The tracking of and accounting for items issued from the containerised mini-depot can be successfully achieved through modern technology. Bonner (1983:15) suggested the use of bar coding for military logistics applications over 20 years ago. The SAN is yet to get this coding system up and running even though it has been commercially used in South African supermarkets for many years now. This, of course, is not to say that the tracking of supplies has worked smoothly for other nations. Hoey (2004:1) in quoting a report by Sir John Bourn, head of the National Parliament on Operation TELIC United Kingdom Military Operations in Iraq, indicated that "the means of tracking supplies in theatre were largely ineffective, manpower intensive and swamped

by the sheer volume of supplies". In summary, key items never got to the people who needed them, which led to a loss of confidence in the supply chain. He also states that while supply personnel were searching for these items duplicate orders were urgently placed, which placed a further burden on the overtaxed supply system. This led to recommendations by the National Audit Office which are summarised by Hoey (2004:1) as:

- "MoD...develop procedures to identify the levels of stock or industrial surge arrangements to support approved levels of readiness."

- "Improve management of logistics to reduce risks, in particular by introducing a means of tracking the distribution of material once it has arrived in theatre."

- "MoD is encouraged to review its process by implementing lessons learnt to ensure that lessons are implemented as quickly as possible."

From the above statements it can be seen that the tracking of spares and equipment is essential, especially when dealing with a huge volume of supplies. This gives weight to a pre-packed mini-depot system that is totally portable and capable of being deployed immediately.

2.9 Lessons learnt by other forces

Hoey (2004:1) quotes Bourn as stating: "The MoD is encouraged to review its process by implementing lessons learnt ..." It is crucial to this research that lessons learnt from other military deployments are included as a final section to this chapter as they may contribute to the CMs avoiding the same challenges.

General Magruder of the US Army had a very distinguished military career and retired as Commanding General, US Forces Korea and Eighth US Army. The problems he experienced with the logistics system prompted him to write a book dedicated to his observation of recurring logistic problems. Lessons learnt applicable to this research are indicated by Magruder (1991:121-122) as follows:

- "Local wartime procurement in a overseas theatre of operations saves time and transportation, conserves the resources of the United States, helps keep the local economy operating ... Local peacetime procurement in overseas areas stimulates the local economy, helps establish quality control in the industry of underdeveloped nations and teaches our own procurement personnel how to contract with foreign industry."

  This is certainly a good point that Magruder makes, as time and cost are two critical factors that once lost can never be recovered. The concept of peacetime development with Host Nations is one that can be confidently implemented within Africa, as according to Sturman (2004:4) the African Union's "New Partnership for Africa's Development" (NEPAD) is part of the greater African vision for reducing poverty and encouraging a GDP of 7 per cent throughout the region.

- "Since smaller logistics troop requirements allow more combat troops in the field, continuous efforts must be made reduce logistics troop requirements ... among the many methods that should be considered are: simplified distribution by broader use of containers with standard content ..."

  The concept of pre-fitted containers would work well, especially within the SAN, as the combat support ship *SAS Drakensberg* has a

limited, but sufficient, capability of transporting standard containers to any port around the globe. Should the vessel be unavailable owing to maintenance, commercial vessels could be contracted to deliver the containers to the operational port support bases.

2.9.1 British Gulf War lessons

The British learnt many valuable logistics lessons during the first Gulf War, which directly impact on this research. According to Thornton (1995:121), containerisation is so important that the commercial world cannot operate without it. He states: "The British Army, however, have been slow to recognise this and were stuck with inadequate equipment to lift and move the containers when outside the port area." Thornton's lesson for CMs is that when embracing the concept of containerisation, suitable lifting and transporting equipment must also be considered.

Another important aspect covered by Thornton (1995:123) concerns spares availability. He states: "Initially the spares held were sufficient to meet the majority of demands; however some spares were always in short supply and even obtaining them from the UK became difficult." An example of note that Thornton expands on is that of the Land Rover 90 and 110 series which is considered the workhorse of the Army. As these vehicles were new, there was an assumption that they would not require many spares. With driving conditions in the Gulf taking a heavy toll on the vehicles, they required frequent servicing and repair. Soon shortages of spares became critical. The local Land Rover agent was called in to supply the spares and it was then that they discovered that the domestic market in Saudi Arabia only used petrol Land Rovers, and that the availability of diesel engine spares for the Army Land Rovers would be extremely difficult. The lesson from this is that one has to be very careful in ascertaining which category of spares can be obtained locally and which spares need to be provisioned for before deployment.

The re-supply of stores, especially those that have to be provided from the home-base depots, is a critical consideration towards effective operational theatre provisioning. Thornton (1995:126-128) makes several observations on this aspect:

- Timing: Adequate time is needed to get the supplies into the theatre of operations. Failure to do this by slower more cost-effective means may result in an expensive duplication at a later stage. Thornton (1995:126) states: "The realisation that our stores would take too long to arrive by sea prompted concentrated re-supply by air." This was not only costly, but led to double the amount of supplies arriving in the theatre which caused a huge bottle-neck in identifying and distributing the spares.

- Tracking: It is essential the supplies can be effectively tracked into the theatre. One of the main problems of the Gulf War was the enormous expense of stores being misplaced and unidentified for days on end. Coupled with this is the requirement for a good tracking system that enables stores to be accurately located, and the second is a system of classification that determines the priority of the stores.

- Reversal system: Very often too much of one item is provisioned and has to be returned to the main depot in order to prevent an unnecessary build-up in the forward depot. The process of returning stores is often very paperwork intensive and causes a bottleneck. Thornton (1995:128) believes that this "logjam" can be overcome by simply returning the stores without paperwork.

  This will be difficult to accept within the SA Navy owing to a culture of strict control and inherent distrust in the personal ethics of personnel. However, this may be adaptable to a system where stores can be returned against the handwritten cancellation of the

depot issue voucher. This will ensure that stores do not get pilfered and at the same time prevent the time-consuming process of having to bring the item on charge at the unit and then printing a return voucher to the depot. This current process takes about 10 to 15 minutes per item.

2.10 Conclusion

This chapter examined the provisioning function of the supply chain process and presented sufficient supporting literature to substantiate the need for and the importance of a supply chain process. It became apparent that the process should include a planning process, a decision-making process involving inventory decisions, sourcing and outsourcing, as well as a control process.

These processes must also be in line with those of the operational planning and sustainability levels and adhere to the principles of operational logistics. Finally, lessons learnt by other military logistics organisations provide valuable input into formulating a commodity management process.

The following chapters continue this line of thought by obtaining empirical information from credible sources.

CHAPTER 3
SIMILAR ORGANISATION INVESTIGATION

3.1 Introduction

Interviews were conducted with the supply chain managers of organisations that have a similar infrastructure to that of the SAN. The aim of the personal interviews was to learn more about how industry managed their provisioning processes, and to identify new concepts that may be used to improve the effectiveness of the SAN provisioning system.

3.2 P&O Nedlloyd

The shipping industry is very similar to the SA Navy in that it operates vessels at sea and cannot afford to have vessels non operational. An interview with Paul van Rensburg, the terminal manager for P&O Nedlloyd on 8 October 2003, highlighted a few critical areas of their operating procedures and provided insight into possible improvement that can be made by the SA Navy. This entire paragraph under P&O Nedlloyd is the result of information provided at the interview. According to Van Rensburg (2003), the average daily running cost of a cargo ship is $ 15 000, increasing to $ 30 000 per day for the large 80 000 ton container ships. The large container ships carry around 7 500 containers and the new ships being built will increase this to 8 500. The ships remain close to fully loaded along each leg of their trade routes, thus should a vessel break down then the running costs become a loss for every day of non-operation. This is further compounded by tight schedules and quayside booking penalties, as well as penalties for late delivery to certain clients.

P&O Nedlloyd operates its fleet on the standard procedure of preventative maintenance. This means that maintenance schedules are in place to conduct

routine inspections and the replacement of items that are susceptible to wear and tear. Stock kits and specialised tools will be carried onboard for this purpose and items used from the kits will be replaced on a routine purchase order request. If the task is too complex for the ship's crew, then the task is outsourced to professionals who will execute the maintenance task. This may be done while alongside, at anchor or even while at sea, i.e., the specialist is flown onboard by helicopter and then lifted off again when the task is complete. For more complex tasks the ship has planned maintenance periods in which it is taken out of operation for a period just long enough to execute the more complex maintenance tasks. Such tasks are usually carried out in a dry dock.

3.2.1 Support philosophy

The support philosophy of the shipping industry, according to Van Rensburg (2003), is based on the following concepts:

- When a ship is purchased or leased, or "taken on" as it is referred to in the shipping industry, the manufacturer provides full schematics of all equipment onboard.

- Schematics are then used to compile maintenance manuals. The maintenance manuals are compiled by the Original Equipment Manufacturer (OEM) in consultation with the shipyard building the ship.

- Manuals indicate what preventative maintenance tasks have to be performed, as well as repair tasks for corrective action. Each component listed in the manual has a unique part number.

- All items of possible supply are therefore allocated a part number. This part number is what is used when ordering the item. It must be noted

that only OEM parts are used. Pirate and "grey" parts are not used at all, even if they are offered at a cheaper price.

- A list of onboard spares is recommended by the OEMs and submitted to the ship owner where the fleet technical superintendent scrutinises the list. This spares list consists of spares that may be required to repair the ship by the onboard crew. Once certified by the fleet maintenance division (FMD) that the repair task is possible by the ships crew, the item is then included as an onboard spare. The FMD also regulates who may serve as the ship's engineer, based on the person's experience of the particular engine type of the vessel and their knowledge of the engine and equipment.

- A full range of spares is kept onboard, but it must be noted that due to the cost of a huge investment in spares, only spares that contribute to the running and safety of the vessel are kept.

- If an onboard spare is used, it is replenished by means of a purchase order. The purchase order is completed by the ship's staff and forwarded to the P&O Nedlloyd head office. The head office has a procurement department that handles the sourcing of the items required, the placing of orders and payment.

- The delivery of the item will be arranged through the local OEM agent, who will be responsible for clearing the item through customs and delivering to the vessel when alongside.

The average turn around time for routine spares requirements is seven days. This is the time taken from the requirement's being lodged by the ship staff to the time the item is delivered. For critical items it is a matter of hours, provided the manufacturer has the part available somewhere in the world. To achieve this, a member of staff is always on 24-hour standby and is empowered to

make a decision on the critical nature of the requirement as well as how to best satisfy the requirement. No committees are involved, and once a decision or "call", as it is known in the industry, is made, both colleagues and management support it.

3.2.2 Critical replenishment

According to Van Rensburg (2003), critical replenishment takes place when a spare is not kept onboard, but is urgently required. The ship forwards the purchase order request to P&O Nedlloyd head office, stating the part number indicated in the onboard manual. The head office technical team verifies the requirement and authorises the procurement thereof. The sourcing of the item will be as wide as possible (global) and may even involve its being obtained from the competition or other middlemen if not available at the manufacturer. It must be noted that manufacturers keep stock based on the number of particular engine models running worldwide. It therefore makes sense when ordering a new ship to standardise on a popular make of engine, as this guarantees a ready availability of spare part stocks in the future.

The item required is then air freighted to the next port where the vessel is to dock. The local operations office of P&O Nedlloyd is informed of the incoming item along with any special transport or lifting requirements. The local operations office will collect the item from the airport and deliver it to the vessel. The items are normally custom-cleared prior to arrival. Special transport and lifting requirements will be hired, e.g., flat bed truck, cranes, forklifts, etc. The current delivery time from the airport to the dock is 45 minutes. If the ship is at anchor then additional special transport and lifting equipment may be required, e.g., launch, helicopter etc.

If the ship's staff cannot carry out the repair on their own, then a technical specialist from the manufacturing supplier will be arranged to assist with the

task. It is the norm to ensure that technical assistance is obtained from the OEM. If, however, the task is small or of a non-high tech nature, then use is made of local service agents.

For certain urgent requirements, the local operations offices have the authority to procure items and services up to the value of RM1. The sourcing of the physical item will be done through ship service agents who obtain the quotations. The local operations office will then order and pay for the items or service and reclaim the money from P&O Nedlloyd Head Office. These are usually small or critical items. Specialised spares are, however, ordered through the Head Office.

3.2.3 Stock philosophy

According to Van Rensburg (2003), limited stocks of consumable items like oil, grease, detergents, etc., are kept ashore by the local operations office. This is to ensure the ready supply of common quick turnaround time items that are usually in great demand.

3.2.4 Disposal philosophy

Low-value mechanical items, which are regarded as consumable, are simply thrown away when they break. Non-consumable items that have value, e.g., a generator or propeller that cannot be fixed immediately will be replaced with a working item. The replaced item, if repairable, will be offered for sale if a ship can be found that needs the item. If there is no global requirement for the item, it will be sold as scrap. It must be noted that with over 460 different type of vessel in operation it is impossible to keep stocks for all eventualities, as too much capital will be tied up. If sold, the item will then be removed from the Asset Register and recorded in the Asset Disposal Register. Head Office gives

the instruction to dispose of stock items. There is also a team of auditors that verifies the 320 operations offices worldwide.

3.2.5 Interaction with other organisations

The South African office of P&O Nedlloyd is also contracted from time to time to support visiting foreign navies. When these foreign navy vessels visit South Africa and a spare is needed, the local operations office will procure the requirements as approved by the ship's captain and claim the costs from the Government agency of that navy.

3.3 The City of Cape Town

The provisioning sections of municipal offices are similar to those of central government departments, but have a greater degree of internal flexibility. This flexibility allows them to manage slightly differently from those of central government and may therefore provide a different approach to provisioning. An interview conducted with Danni Steyn, the Material Manager for the City of Cape Town on 22 October 2003, provided an interesting variation to the way provisioning is handled within the SAN.

The City of Cape Town is in much the same situation as the SAN provisioning section in that it has recently undergone major transformation changes. These changes however, involved the amalgamation of seven administrations into one large administration. As a result of this amalgamation, the new administration has had to incorporate different modes of operation, philosophy and accounting systems into one standard procedure. One of the challenges their provisioning section faced was the issue of huge amounts of stocks duplicated at the various depots, which as a result of the amalgamations, now had to be scaled down. The other stock-related challenge was that each item, within each different administration, had a different stock code for their

accounting systems. This duplication at the numerous depots amounted to huge quantities of stocks being held, as well as the confusion of those same items having different stock code numbers, thus making the task of rationalisation very time-consuming and difficult.

According to Steyn (2003), the first step in setting up the new administration was to standardise on one stores accounting system. The system chosen was SAP R3. SAP is an online (real time information) computerised accounting system. The system works on the principle of minimum and maximum stock levels in relation to the usage of the stock item, e.g., a high usage will equate to either keeping higher stock levels or stocking up more often. The standardisation of one accounting system also led to the new administration being able to standardise on one coding system for stock items. All stock items are now coded using SAP sequential numbering.

The current structure of the City of Cape Town logistic division as provided by Steyn (2003) is as follows:

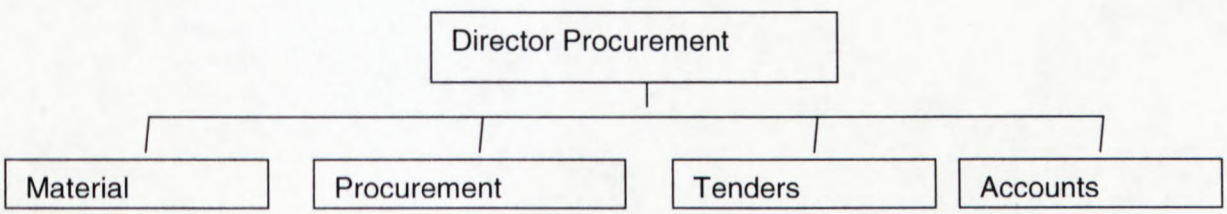


Figure 3.1: City of Cape Town logistics organisational structure

Responsibilities:

- The Material Manager is responsible for material planning and the stores function.
- The Procurement Manager is responsible for sourcing and buying items.
- The Tenders Manager is responsible for obtaining and administering service contracts.
- The Accounts Manager for payments.

The long-term goal, according to Steyn (2003), is to consolidate all four sections under one roof to ensure complete control and functioning of the process. Currently the accounts section is still separate.

3.3.1 Provisioning procedure

The currently adopted standard provisioning procedure for the City of Cape Town, according to Steyn (2003), is to carry out a manual Material Requirement Plan (MRP) run every week. This run is based on minimum and maximum stock levels in relation to the weekly usage. The storekeeper in charge of each store (known as a "plant") initiates the run. There are currently 95 plants within the new administration, but long-term plans are to reduce this to five large plants with 15 to 20 smaller satellite plants. It must be noted that the SAP MRP system can be set to automatically indicate a replenishment requirement when the indicators drop to the system calculated reorder point, but the City of Cape Town has chosen to run the system manually, as this allows greater human input. This human input is necessary for them as it allows for winter and summer peaks to be evaluated. When set on automatic, the MRP tends to normalise the peaks by calculating an annual average. An annual average stockholding can be problematic as too much stock is available during off-peak periods, and too little stock is on hand during maximum peak requirement periods.

The result of the MRP run is the generation of a "planned order", which is simply a list of all stock items that have reached minimum stock levels. The storekeeper in charge of the plant selects which items he/she wishes to replenish and decides what quantities of stock to order. The storekeeper then generates a purchase requisition, which is sent to the procurement section. The procurement section sources the items and places the order. The requested delivery date is determined by the just-in-time (JIT) principle, where new stocks are expected to arrive before current levels are depleted.

It must be noted that in a service environment like that of the City of Cape Town, where repairs to damaged utilities cannot be planned for, it is very difficult to determine accurate stock levels. It is therefore difficult to apply an accurate MRP system, as the parameters are not as stable and predictable as those of a manufacturing environment.

For project reserves, lists of stores required for specific projects are reserved in stock until required. If there is no stock available, then a "buy out" is registered against the person in the cost centre requiring the items.

One of the challenges to the administration's provisioning system is the hoarding of buffer stocks by storekeepers and users. Storekeepers tend to hoard buffer stocks, as they lack confidence in the provisioning system. This is particularly noticeable during peak seasons. The advantage of the SAP system is that it is able to execute what is known as an ABC analysis within seconds. Using this as a management tool, better forecasts and trends can be established which in turn lead to a lower necessity for buffer stocks.

3.3.2 Stock philosophy

According to Steyn (2003), the average stock turnover cycle is currently two months, but it is the intention of the administration to reduce this to one month. The exception to this will be strategic stock items, i.e. low turnover items that are critical to the operation of the administration. These strategic items have long lead times, but are needed urgently when required.

Stores items required for stock are delivered from suppliers against an order, and are delivered directly at source, i.e., to the plant that requires the item. Different delivery addresses, indicated on the order, will indicate the delivery of the same item to different stores.

The plant receives the items online (on the computer accounting system), whereby the new stock levels are immediately updated and are available for issuing. In the past this was done manually, but being online has a great advantage in that it is easier to control and manage the stocks. One of the challenges of the amalgamation was to get all the plants online. Currently only five of the 95 plants still have to be brought independently online. Batch capturing at other plants currently caters for these stores as an interim measure.

3.3.3 Payments

According to Steyn (2003), when goods are delivered, an online Goods Received Note (GRN) is generated by the store receiving the item. The items are then immediately reflected on the system. The paperwork is then sent to the accounts section where payment is authorised and made based on a three-way match, i.e., Online GRN, Supplier Invoice (which is usually sent directly to and captured by the payment section), and the supplier's monthly statement. If the information on all three documents corresponds, then payment is made.

Should an invoice be delivered with the items at the store, then the GRN number will be recorded on the invoice and it will be sent to the accounts section.

It must also be noted that price difference tolerances are built into the system, and if the price is within this tolerance, then the payment will be made. If the price difference is greater than the tolerance, the transaction will be referred back to the buyer who will investigate it and correct the amount. The price tolerance level is confidential, and was therefore not provided by Steyn; it is,

however, estimated that it is a low percentage with a specified maximum total value.

3.3.4 Issues against cost centres

According to Steyn (2003), stock items required by users are drawn from the store against a "Reservation" form. There are no restrictions regarding what users can draw from the store, or what quantities they may request, but all items issued are registered against a cost centre. A cost centre is a section with a budget responsibility, and all stores issued are reflected against the cost centre requiring them. Cost centres are subdivided into:

Jobs: A job card is necessary to reserve the items. This allows job costing against the daily operational budget.

Works Order: This is for large jobs that require capital funds.

WBS: This is for planned maintenance requiring service funds for outside contactors.

The Cost Centre Manger (CCM) is responsible for whatever is ordered and used. If the manager exceeds his/her budget, then he/she is held responsible. In order to assist in controlling costs, SAP enables managers to draw daily reports on issue expenditure. The cost centre works on the basis that at the beginning of each year the CCM gets an allocated budget, which is divided into different commodity groups. For example:

Cost centre A:	
Stationery	R 2 000
Furniture	R10 000
Spares	R45 000
Etc.	
Total budget	R100 000

Every time an item is supplied to this centre, the cost is deducted from the total allocated. The manager is responsible for keeping within the budget.

It must be noted that the City's total stores value is reflected as a negative figure, e.g., R15 billion, and every deduction from a cost centre is added (+) to the City value. This negative value is only for accounting purposes, as in reality the stock is an asset with positive value.

All assets with a value greater than R750.00 are registered on the SAP asset system and identified with a barcode. The depreciation process forms part of the total budget year-end reporting system. Newly acquired assets are registered during the procurement process (this only applies to permanent assets and not consumables). Assets with a value of less than R750.00 are controlled by the cost centre asset owner, on a manual asset register. All assets registered on the SAP asset control system are bar coded and verified on a yearly basis. Assets remain the responsibility of the asset owner. Regular checks and asset movement control in respect of register updating also reside with the asset owner.

3.3.5 Provisioning for new items not held in stock

According to Steyn (2003), if a required item is not held as a stock item, then a direct buyout is initiated. The user requiring the item completes a prescribed form (Appendix B), ensuring that the description of the item required and the specification is clearly stated. The usage per month and plant where required must also be indicated. This form is sent to codification, where they investigate for similar items within the entire inventory (item may be held at another plant). If already in the system, the item is activated for that plant. If not, the item is registered, allocated a unique code number, and linked to the plant requesting it. The cost centre manager must approve all such requests. This is done

online when the manager logs on. All requests are either approved or rejected by the Materials Manager to ensure CCMs do not request "nice to have" items.

It must also be noted that a CCM can authorise a direct purchase. This means that the item is not codified on the stock master file. The direct purchase requisition to buy the item goes directly to the procurement section. An example of this type of item is spares for machinery that are required for repairs. In this case it is not worth codifying the item as it is part of the main equipment and is seldom required.

3.3.6 Petty cash

According to Steyn (2003), petty cash is mainly used for emergency repairs in cases where there is an out-of-stock situation or where the emergency repair is required on site and is not in the close proximity of a store. Petty cash is limited to R500.00 per case. The process is controlled by the procurement section and is based on the replenishment of funds against proof of purchase.

3.3.7 Emergency orders

According to Steyn (2003), the procurement process also caters for the creation of a purchase order for spares and equipment used after the completion of emergency repairs. The process for "major emergency spending" starts with telephonic authorisation between the Procurement Manager, user and supplier. The purchase order is then automatically faxed to the suppliers via the SAP system or manual fax, or hand delivered if the supplier is not linked to SAP.

3.3.8 Procurement

According to Steyn (2003), buyers in the procurement section can authorise orders up to R12 000. The Procurement Manager must approve larger amounts. The procurement section is divided into specialist commodity groups, e.g., electrical, stationery, mechanical, etc. This ensures that the right people are appointed as buyers and that over time they gain specialist knowledge of their commodity group.

3.3.9 Disposal

According to Steyn (2003), all broken and redundant items for disposal are submitted to the Council for disposal authority. If items are specialised and may still be of value, they are advertised on tender. General "written off" items and scrap are sent for auction. Items with no turnover are investigated for alternative use by an all-bulletin electronic enquiry to other departments. The items are also checked for strategic value, and finally certified by the user section that originally requested the items that the item is no longer required. Once these three steps have been followed, the items are tabled at the Council for disposal. The Council is the delegated authority for authorising the writing-off of redundant assets. The City manager is responsible for this function.

3.4 Conclusion

This chapter provides valuable insight into organisations that are similar to the SAN. This insight provides a different perspective regarding supply support procedures and alternatives to the proposed provisioning process.

The following chapter pertains to interviews with the input and supporting sections within the provisioning process of the SAN.

CHAPTER 4
STATISTICAL INVESTIGATION

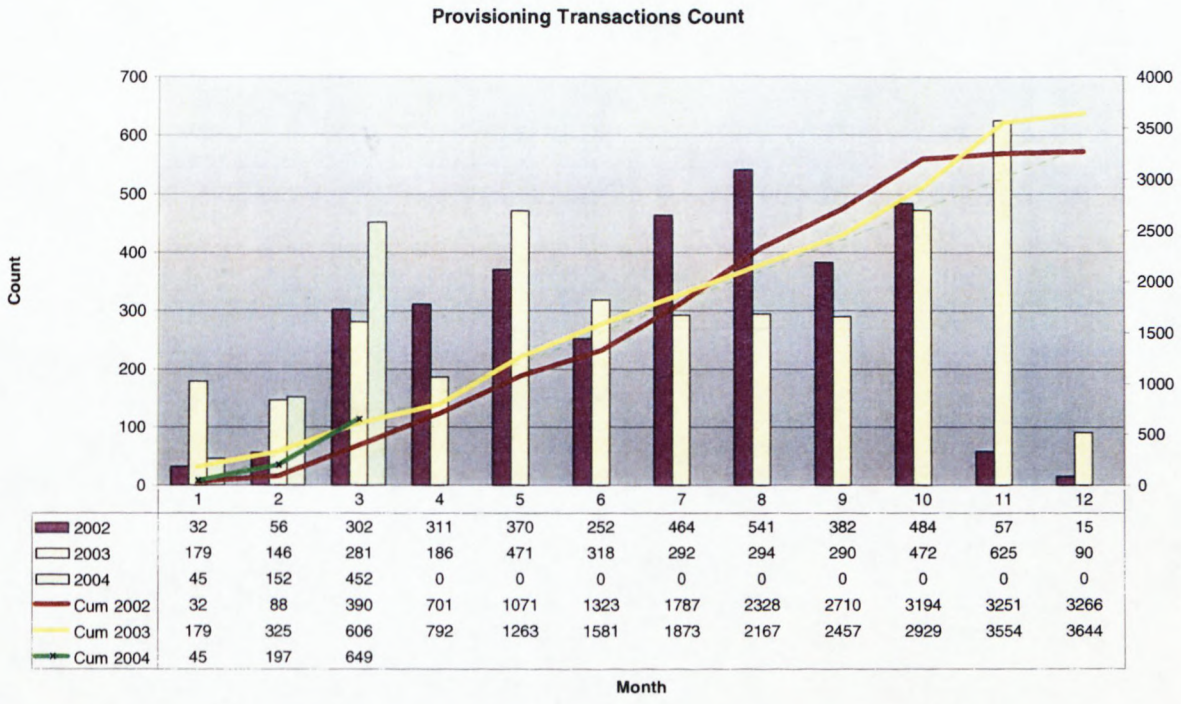
4.1 Introduction

This statistical research provides an analysis of historical information regarding provisioning transaction counts and value, as well as transactions per value and commodity category. This information was obtained from Commander J. Huisamen, a missile-patrol-boat engineer who joined the commodity section in 2001. Being an engineer and someone who is keenly interested in computer systems, he took on the role as database champion and has over the last two years developed an automated system that assists with compiling the reams of paperwork required by the procurement section. Information stored as a result of the daily transactions was of great benefit to this research as the information helped focus on the critical areas. These critical areas need to be addressed in the development of a provisioning process.

4.2 Provisioning transaction count

The provisioning transaction count (Figure 4.1) indicates the amount of transactions processed every month as well as the cumulative transactions for the year. Monthly transactions are indicated on the left-hand y-axis. It can be noted that December 2002 was as low as 15 transactions for the month while November 2003 peaked to 625 transactions. This huge fluctuation makes it difficult to plan procurement packages as the Simon's Town Procurement Service Centre (SPSC) cannot cope with more than 20 packages per day, which amounts to around 400 packages per month. There was thus a holding over of packages in November 2003, while other months such as January, February and April were rather unproductive, owing to the low number of

transactions processed. The ideal would be to achieve smoothing of the monthly transactions.



	1	2	3	4	5	6	7	8	9	10	11	12
2002	32	56	302	311	370	252	464	541	382	484	57	15
2003	179	146	281	186	471	318	292	294	290	472	625	90
2004	45	152	452	0	0	0	0	0	0	0	0	0
Cum 2002	32	88	390	701	1071	1323	1787	2328	2710	3194	3251	3266
Cum 2003	179	325	606	792	1263	1581	1873	2167	2457	2929	3554	3644
Cum 2004	45	197	649									

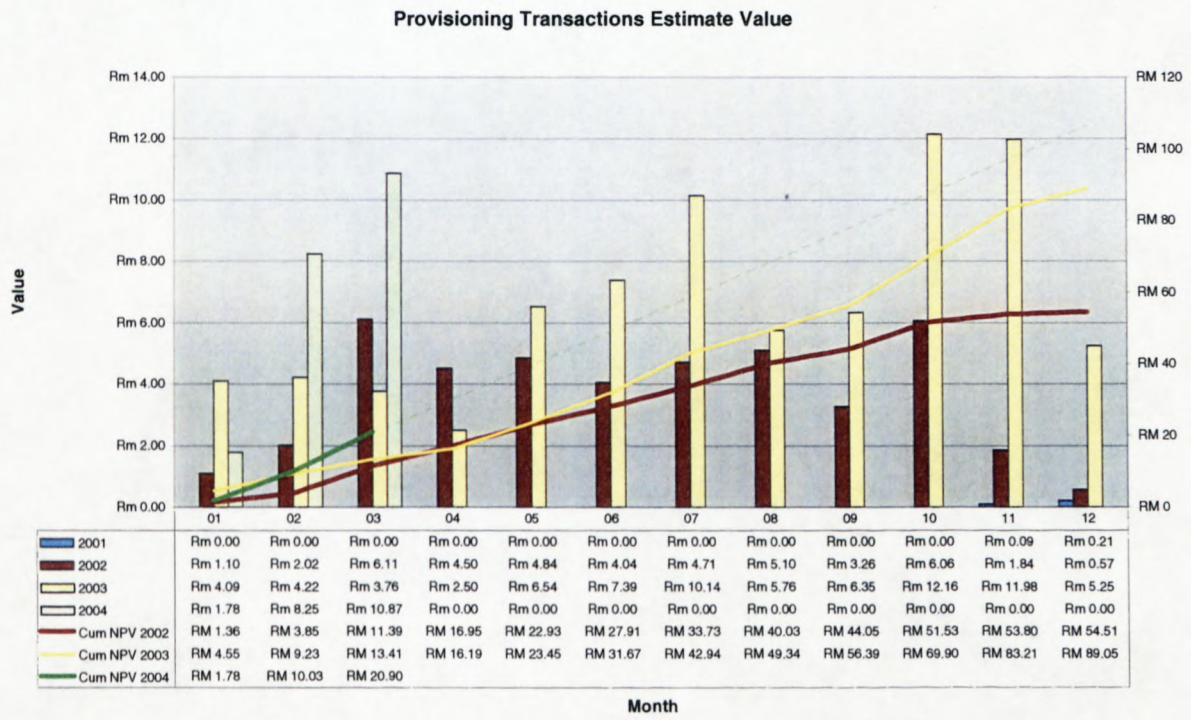
Figure 4.1: Provisioning transaction count

[Source: Huisamen, 2004]

The unevenness of monthly transactions indicates a system that is not optimally balanced. This leads to months where staff members are totally overloaded with packages, and others where very little work is being carried out. The sharp increase in transactions between February and March each year could possibly be explained by the fact that the 1st April is the beginning of the financial year. Packages tend to pile up at the end of the previous financial year due to funds being exhausted. It is proposed that with better planning, these spikes can be normalised to create a better flow of packages and expenditure of funds. This will eliminate the stress placed on staff during spike months.

4.3 Provisioning transaction estimate value

The provisioning transaction estimate value graph (Figure 4.2) indicates the estimated rand value of provisioning packages sent to the SPSC. This is not a totally accurate account of expenditure as the cost of the final order may be higher or in some cases lower than the estimate. This is caused by inflation of prices, or in the case of lower prices, cost reduction due to bulk orders or the decreasing costs of certain high technology items now being mass produced. The SPSC, however, does not currently update the system, hence estimate values apply.



	01	02	03	04	05	06	07	08	09	10	11	12
2001	Rm 0.00	Rm 0.00	Rm 0.00	Rm 0.00	Rm 0.00	Rm 0.00	Rm 0.00	Rm 0.00	Rm 0.00	Rm 0.00	Rm 0.09	Rm 0.21
2002	Rm 1.10	Rm 2.02	Rm 6.11	Rm 4.50	Rm 4.84	Rm 4.04	Rm 4.71	Rm 5.10	Rm 3.26	Rm 6.06	Rm 1.84	Rm 0.57
2003	Rm 4.09	Rm 4.22	Rm 3.76	Rm 2.50	Rm 6.54	Rm 7.39	Rm 10.14	Rm 5.76	Rm 6.35	Rm 12.16	Rm 11.98	Rm 5.25
2004	Rm 1.78	Rm 8.25	Rm 10.87	Rm 0.00	Rm 0.00	Rm 0.00	Rm 0.00	Rm 0.00	Rm 0.00	Rm 0.00	Rm 0.00	Rm 0.00
Cum NPV 2002	RM 1.36	RM 3.85	RM 11.39	RM 16.95	RM 22.93	RM 27.91	RM 33.73	RM 40.03	RM 44.05	RM 51.53	RM 53.80	RM 54.51
Cum NPV 2003	RM 4.55	RM 9.23	RM 13.41	RM 16.19	RM 23.45	RM 31.67	RM 42.94	RM 49.34	RM 56.39	RM 69.90	RM 83.21	RM 89.05
Cum NPV 2004	RM 1.78	RM 10.03	RM 20.90									

Figure 4.2: Provisioning transaction estimate value

[Source: Huisamen, 2004]

The significance of this graph is that there is a difference between the previous transaction count graph (Figure 4.1) and the transaction estimate value graph. This value graph indicates that in 2003, spikes occurred in July, October and November. This is a marked difference between 2002, which did not indicate

any marked spikes. Comparing this with 2004, where the spikes are in February and March, it shows that this is a very unpredictable environment and that the trend is shifting from late spending to early spending, as the February, March expenditure comprises pre-committed funds for the April 2004 financial year.

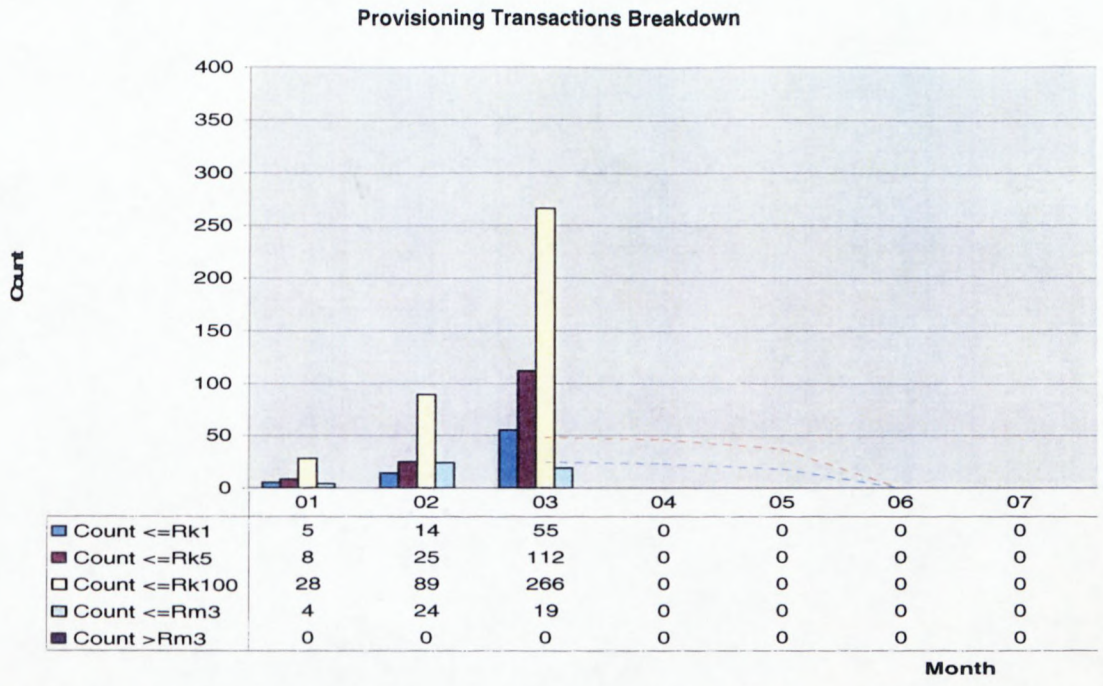
The cumulative value lines indicate that annual costs are rising. This is an indication that annual budgets must adjust to this increase. It also makes it important to obtain control over expenditure, as greater amounts of taxpayers' funds must now be accounted for.

4.4 Provisioning transactions breakdown

The provisioning transaction graph (Figure 4.3) indicates that most of the provisioning packages fall under the category ranging between R16 000 and R100 000. There is also a marked increase in the count between February and March which will make it necessary in future to allocate priorities to the provisioning packages in order to concentrate management effort on the more important or costly transactions. This indicates that the R5 000 to R100 000 category of packages should be the main area of focus.

The other significance of this graph is that if the trend of provisioning packages increases further, it will have a very real impact on the SPSC, as they can only handle around 20 packages per day. Should the quantity of packages increase further, it will cause a bottleneck of packages at the SPSC. Bottlenecks are a major risk to the smooth functioning of the provisioning section as should packages not be processed on time, then orders will not be received on time. Not having orders delivered within the estimated lead times will lead to a stock-out situation at the main depot. This stock-out will impact on end-user clients and may prevent ships going to sea, which will diminish the deployment capability of the navy. It is therefore imperative that this situation be monitored

and that the SPSC is warned of any transaction increases in order that they can plan for in increase in their handling capacity.



	01	02	03	04	05	06	07
Count <=Rk1	5	14	55	0	0	0	0
Count <=Rk5	8	25	112	0	0	0	0
Count <=Rk100	28	89	266	0	0	0	0
Count <=Rm3	4	24	19	0	0	0	0
Count >Rm3	0	0	0	0	0	0	0

Figure 4.3: Provisioning transactions breakdown

[Source: Huisamen, 2004]

4.5 System-specific commodities

The system-specific graph (Figure 4.4) indicates the provisioning package transactions handled by each section within the System Support Section. Of the five sections, the System General Section is the one of main concern as there were two months of no movement followed by a spike of R4.8m in the month of March. Spiking is typical of a new financial year opening, but this one is of particular concern, as a spike this large places an enormous burden on the SPSC, which has a limited capacity in its ability to process the packages.

The Small Boat Section (SBS) indicates a spike in January but appears to now be smoothing out. The Surface Combat Ships (SCS) indicates a very low commitment, which could lead to a spike at a later stage. The Combat Support

Section (CSS) indicates the steady rate of package processing that should be worked towards as this allows for better planning and control.

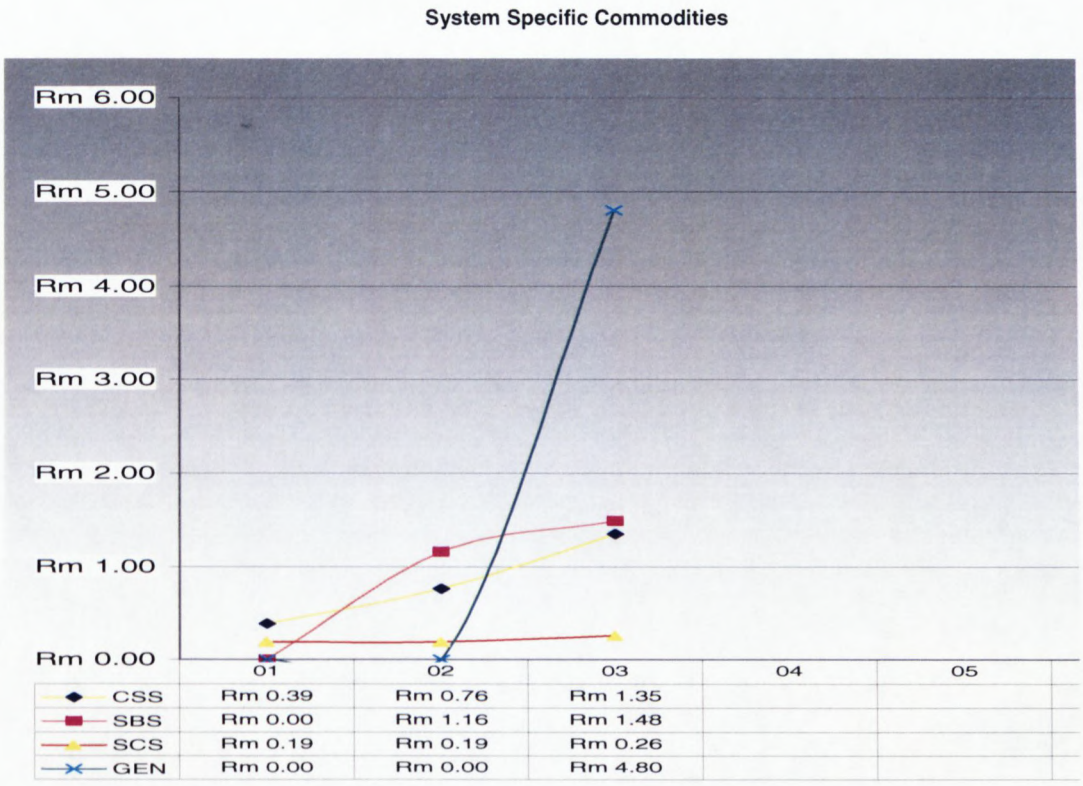


Figure 4.4: System-specific commodities

[Source: Huisamen, 2004]

4.6 Conclusion

In conclusion, in the evaluation of statistical graphs provided by Huisamen (2004), it becomes apparent that a form of provisioning package process smoothing is required. This will prevent spikes that place an overload on the SPSC, and which, as a result, lead to stock not being available when required. The graphs also indicate where the bulk of the packages are regarding package value. This knowledge will facilitate better identification of management areas for planning and control.

CHAPTER 5
SA NAVY INTERVIEWS

5.1 Director Fleet Logistics: General Commodities and Services

The transformation of the SAN in 2000 brought about many changes, one of them being the closing down of the Naval Log Base and the separation of provisioning and procurement. The provisioning functions were rationalised under the Director Fleet Logistics. Provisioning should have then further separated into System Support Provisioning whose purpose is to support product systems, i.e., ship platform equipment, and Reprovisioning, whose purpose was to support all naval facilities (shore bases and ships) with general type commodities and supply support administration. This Reprovisioning section was estimated to be small with very few commodities. With transformation, however, all provisioning was incorporated into the System Support Section, which at the time was the main focus of effort and the only section staffed and functioning. In an interview with Captain N. Otto (2004), the recently appointed General Commodities and Services Manager (a section that he is still in the process of establishing), he stated that as these general commodity functions were identified as being different from system support functions, they had to be removed from the System Support Section and established in a separate structure. This was the rationale for the recently created General Commodities and Services Section.

5.1.1 Strategic analysis

According to Otto (2004), the General Commodities and Service functions do not form part of system management and therefore should not form part of the System Support structure. The logical separation of functions will result in the System Support section being able to better concentrate on the purpose for which it was established, while General Commodities and Services will be

conducted to cater for SAN Force Structure Elements (FSEs), which are the Bases and Units.

The implication of this change, according to Otto, is that both structures will be in a position to execute core functions independently, thereby providing a more efficient service to the Fleet and ultimately contributing to ensure the supply of combat-ready ships.

The risks identified by Otto in his strategic analysis regarding not separating System Support from General Commodities are:

- The current provisioning structure of System Support does not have the capacity to execute the General Commodities and Services effectively, thereby negatively impacting its own core business.
- System Support currently does not keep to its core business and is thereby deviating from the philosophy of System Management.
- The management and control of the General Commodities and Services functions are not effective, which leads to unauthorised and incorrect execution of these functions.
- The Fleet provisioning process is currently not being conducted effectively and provisioning functions are falling behind, thus impacting on other logistic processes within the supply chain.

5.1.2 Process analysis

According to Otto (2004), a process analysis was carried out with the main activity being to "Provide General Commodities and Provisioning Services to the Fleet". This activity had the following sub-processes:

- Provide Contract Services.
- Provide a Logistic Administration and Provisioning Service.
- Execute an Inventory Control Service.

5.1.3 Functional analysis

The functions of these proposed sections were derived from the process analysis, and give a clear indication of the responsibilities coupled with each activity. The recommended structure for the General Commodities and Services section, according to Otto, is:

- Section General Commodities and Services.
    - Purpose: To provide provisioning services and general commodities to the fleet.
    - Functions:
        - The management and co-ordination of contract services.
        - The management and co-ordination of logistic administration and provisioning services.
        - The management and co-ordination of inventory control services.
        - The management of effective interaction with level two (Navy Office), level three FOF and level four FSEs.
- Subsection Contract Services.
    - Purpose: To provide pre-procurement and post-procurement contract services.
- Subsection Logistics Administration and Provisioning.
    - Purpose: To provide a logistic administration service and provisioning service for general commodities and clothing.
- Subsection Inventory Control.
    - To provide a disposal and technical investigation service as well as material process control.

5.1.4 Organisational analysis

According to Otto (2004), the originally approved Reprovisioning structure does not have the capacity to cope with all the provisioning functions derived

from the process analysis. It is therefore important that the section be established along the basis of the functional analysis. The additional following information also contributed towards determining the organisational structure for the General Commodities and Services Section.

- Approximately 375 000 NSNs exist on the mainframe.
- 140 031 NSNs have ledgers and are distributed as follows:
    - Unique to ships (System Support): 30 396 – 21.71%.
    - Common between ships (System Support): 23 044 – 16.46%.
    - General Commodities: 60 104 – 61.84%.
- Thus 61.84% of all active ledgers are the responsibility of the General commodities and services section. This section will have to maintain the ledgers and associated files and will have to budget for the provisioning of these items.
- The NSNs without ledgers must be investigated, cleared if not required, and archived. The subsections Inventory Control and Logistic Administration will be responsible to execute these functions.

5.1.5 Conclusion: General Commodities and Services

It is apparent from the interview with Otto (2004), that there is a need to expand this section to the right size in accordance with the outputs expected. It is also of critical importance to the System Support Section that this section be right- sized and that the responsibility for general commodities and services be totally removed from the system support environment. This is necessary, as the smaller specialised System Support Section is not designed to handle this additional workload, which is detracting from its core business philosophy of System Management.

5.2 Provisioning input interviews

Personal interviews were conducted with key personnel at the GSB-NBS Base Supply Organisation (BSO). These interviews give insight into what the provisioning input interface problems are. In a brief introductory interview with Commander D. Phyfer (2004), the Officer in Charge of the BSO, he indicated that the biggest challenge facing his staff was the numerous time-consuming enquiries regarding local purchase and dues-out requirements (these will be expanded on in the interviews with his staff). This takes up an enormous amount of time and severely affects the efficiency of his organisation. Phyfer suggested that a transparent tracking system, available to all staff and end users would go a long way in improving the effectiveness of the entire SAN sustainment process. Such a system is currently available in the commodity section and is referred to as the Provisioning Administration System (PAS). This system was extended to the SPSC environment in 2003. Phyfer believes that the extension of PAS to the BSO and approved end users will not only increase effectiveness but will also enable real-time enquiries by end users, thus alleviating the frustration of not knowing where their request is and how it is progressing.

5.2.1 BSO provisioning procedures

The next interview was conducted with Chief Petty Officer S. Cupido (2004), the Supervisor in charge of the BSO provisioning section. This section receives the stores requests from the end users and processes the requirements. If the end user requests an item that has a Nato Stock Number (NSN), and that particular item is held in stock and stock is available, then the process is very simple and quick. End users are subject to a standard three to five day lead-time for system specific items which can be reduced to one day if the requirement is urgent.

The problems, according to Cupido, usually manifest when the end user does not know the NSN of the item required, there is no stock in the depot for the item required, or it is an item that has never been codified or used in the SAN. The solution to the first challenge of the end user not knowing the NSN is the easiest to overcome, and the BSO has set up a help section and trained its staff to screen the system for NSNs. This requires little interface with the CMs except when a complex description has been used and the BSO staff are not sure as to exactly what the item is that they are looking for. This scenario requires the assistance of system-specific staff, as they are familiar with the items. The challenge is that there is no formal procedure in place to provide this assistance and different system sections hold different attitudes towards providing this assistance. Cupido believes that there should be some form of a Standard Operating Procedure (SOP) to accommodate this requirement.

The second challenge is that of there being no stock available in the depot when the demand is placed. This, in Cupido's opinion, poses the biggest risk to the integrity of the supply element of the SAN as the indicator "dues out" registered against a demand usually means months of waiting. This scenario poses the biggest risk to system sustainment and at present end users and BSO staff are not familiar with procedures to satisfy this challenge. The fact that every item used within a system cannot possibly be held in stock because of financial constraints and the sheer volume of storage space that it will occupy is also not fully understood by end users, and the lack of a promulgated procedure to address this specific challenge is causing a great deal of friction between the end user and BSO staff. This friction is then transferred to the commodity management staff who are held to blame for not carrying out proper planning and provisioning against the required item. This challenge becomes particularly tense when a ship is at sea and sends a stores requisition (STOREQ) signal to the BSO for the urgent delivery of an item. The lack of a formal process to deal with out-of-stock system-specific items often leads to longer delays than are necessary as the process is reinvented each time this occurs. Different CMs also insist on different approaches to solving

the challenge; this causes a great deal of confusion and frustration among the BSO staff. In Cupido's opinion there should be a SOP for this scenario, and better relations between his staff and the commodity management staff in solving this issue. The promulgation of a SOP with as few steps as possible will go a long way to improving relations between the two sections, and will enable end users' insight into the process which will assist in helping them to provide the right motivation to start the process.

The third scenario discussed by Cupido was that of requests for items that are currently not provided for by the provisioning process. This is currently known as the Non Pattern Number (NPN) system. A typical example of this type of item is where an engine is purchased for a particular vessel and the standard "breakable" components are provisioned for within the system, but where a component such as the oil pump pressure gauge, an item that may never require replacing, is not included in the product breakdown structure (PBS). The challenge with this scenario is that when the item needs replacing, for example, if damaged while changing the pump onto which it is attached, the entire system becomes operationally defective and unusable until a replacement is provided. In an ideal world, critical items that could lead to the downgrading of an operational system are provisioned for, but budget constraints and storage capacity often lead to many such items having to be excluded from the PBS.

It is this third scenario that poses the greatest threat to operational availability of systems and the one that in Cupido's opinion needs a SOP as a matter of great urgency. This SOP needs to be disseminated to the lowest and widest possible level in order to provide everyone involved with insight into the process.

The challenge with this NPN process at present is that should one of the requirements not be fully satisfied during a specific step within the process, then the entire request may have to be sent right back to the beginning of the

process to start afresh. This is an enormous waste of time and effort. A SOP will provide end users with a checklist of requirements and insight into what is critical to making this process work.

The last issue addressed by Cupido was that of a general distrust by end users of the depot system regarding patternised non-stocked items. This process involves end users budgeting for certain non-stocked items, for example, vacuum cleaners, and then placing their demand quoting the budget serie code. The item is then purchased for the end user and issued to them. This is in theory how the system should work. The reality, however, is that at the beginning of the financial year the funds for vacuum cleaners are pooled and a bulk order is placed and delivered into the depot. It is at this stage that other end user units that did not budget for such requirements are allegedly assisted by BSO and commodity management staff to receive issues that should not have been theirs. As the depot has no way of allocating an issue directly to an end user, owing to all unit codes having been rationalised under the BSO code during transformation, this loophole allows unscrupulous end users to reap the benefit of someone else's good planning. Cupido feels that some form of control, possibly at commodity provisioning level where the purchase request is generated, should be implemented.

5.2.2 BSO local procurement

The interview with Petty Officer B. Arendse (2004), the supervisor in charge of the BSO local procurement section, provided further insight into the provisioning inputs to the commodity section. The local procurement section of the BSO is responsible for all purchases up to the value of R 5 000. These purchases are known as State Tender Board (STB) Paragraph 3.1 purchases, and the reason for these purchases being at BSO level and not at DoD procurement level is to try speed the system up and not burden the SPSC with these smaller value purchases.

The advantage of the BSO handling these purchases at unit level is that there is better interface with the end users requiring the items, and when low value demands are indicated as being non-stocked, the process to convert the demand to a local purchase is relatively easy and flexible. The challenge however with this process being at unit level is that very often the ordering description does not comply with industry descriptions. This leads to a lot of wasted effort as quotations are sent out and no response is received from industry. When investigated, it is found that the ordering description is not understood by industry. Rectification of this takes time and effort as the item must now be technically investigated by a commodity technical investigator and then codified. The duration of this process often undermines the "quick to satisfy" concept for which it was designed.

According to Arendse, one of the disadvantages of this system is that small quantities of repetitive items are being processed throughout the year. This leads to higher prices being paid for the items as bulk buys cannot be capitalised on. The other concern is that many orders for the same item are being processed throughout the year, leading to a huge increase in workload. The transaction rate within the first two months of the financial year was 1 200 and is projected to end up at 7 200 transactions per annum.

The other concern by Arendse is that staff members are constantly being moved and rotated. This is causing great stress, as new members are constantly being trained, only to be moved within a few months. Arendse believes that the solution is to encourage supply personnel to specialise as procurement clerks. This will alleviate the requirement for constant on-the-job training, and will enable the clerks to become specialists in the field of procurement, thus reducing mistakes due to a lack of experience.

5.2.3 BSO petty cash

The interview with Petty Officer B. Arendse (2004) also included the petty cash subsection, which is attached to his section. Petty cash is used for purchases under R500. The petty cash system allows end users to buy urgently needed items that are temporarily out of stock. This is a simple concept which constitutes a very involved and time-consuming process. This process has recently been formalised by the BSO, but has not as yet been processed into a standing order.

The danger with this process, according to Arendse, is that items purchased with petty cash are not recorded on the provisioning system. The system therefore does not include these purchases in the re-order calculation. The concern at BSO level is that if the system reflects lower usage during the year, then the provisioning at commodity level will be reduced and the demands on petty cash will increase. If this cycle perpetuates itself, it will cause an even greater demand on the petty cash system.

5.2.4 Conclusion: BSO input

The above interviews give a clear indication as to what the input interface problems to the System Support Section are. They highlight the need for a tracking system that gives a real-time indication of requirement progress and the need for better communication between the System Support Section and the BSO.

CHAPTER 6
FINDINGS AND RECOMMENDATIONS

6.1 Overview

Transformation brought many changes to the SAN. The "old way" of provisioning which involved spending enormous amounts of money on maintaining high stock levels and running supply processes through an overly large staff component, is over. The new Navy will have to survive on less funds and a reduced staff. This changed circumstance calls for more efficient and effective processes and work methods.

The current processes handed down from pre-transformation days are outdated and totally obsolete. The result is that there are currently no adequate processes for the planning, decision-making and control functions for the supply support activities carried out by CMs.

The findings of the research into academic processes as well as activities carried out by similar organisations to the SAN are recorded in this chapter as recommendations.

The recommendations resulting from this research will be divided into four levels:

- National strategic level: These are recommendations that have a long term impact and affect the national framework. These recommendations can only be approved at Ministerial level.

- Military strategic level: These are recommendations that impact the SAN capability interface with other Arms of Service. These recommendations can only be approved at Department of Defence level.

- Operational level: These recommendations affect the entire SAN and can only be approved at Navy Office level.

- Tactical level: These recommendations only affect the Fleet Logistics supply support infrastructure and can be approved by the Director of Fleet Logistics for implementation.

The above levels will be further sub-divided into the functional categories of planning, decision-making and control. It must be noted, however, that as the Commodity Management subsection operates within the principles of Integrated Logistic Support, it is possible that more than one function applies to any specific recommendation.

6.2 National strategic level recommendations

6.2.1 The Automatic Inventory Replenishment (AIR) system

This system involves the supplier holding all stocks and being linked into the computer system of the organisation to be serviced. This system presents an effective opportunity regarding supply support for CMs as it involves the supplier being responsible for the supply of stock at a fixed price over the contracted period. This form of contract is a long-term commitment and will involve a fair amount of effort in setting up. However, once the contract is in place, the replenishment of stock is simple. Approval for this system will have to be obtained at Ministerial level as it will involve a deviation from standard procurement practices as laid down by the National Treasury.

This system will reduce time spent on sourcing items and compiling procurement packages, which will in turn reduce the staff requirement. It will also reduce the need for large internal stock levels which will free up funds for more effective usage and prevent funds being tied up in stock. It will further reduce large "write off" costs should the items become obsolete. This system impacts on decision-making and control functions.

The implication of this system is that a computerised network will have to be implemented that is compatible with chosen suppliers. This means that a commercial package such as SAP will have to be used. This system holds enormous advantages in cost saving and staff optimisation.

6.2.2 Pre-positioned War Reserve Material Requirements (PWRMR)

PWRMR involves the building up of war reserves and the pre-positioning of these materials close to the theatre of operations. This involves an enormous initial outlay of funds as stocks are reserved for the exclusive purpose of pre-positioned war reserves. As this is a costly process, funds will have to be allocated by the National Treasury who must give the approval for expenditure. It will also involve in-theatre administration, which requires personnel and infrastructure. This, however, could be performed by military members of the area Embassy office.

This philosophy is recommended as a planning function for long, lead-time, system-specific items that form part of the onboard spares allocation. This will ensure availability of spares within a pre-designated theatre should the SAN be deployed to that region. This philosophy should be considered seriously as the SAN may in future be involved throughout Africa with the African Union standby force in Peace Support Operations (PSO).

6.2.3 Cost centre accounting

The City of Cape Town currently uses a cost centre accounting approach in the running of its sections. This involves holding cost centre managers responsible and accountable for all costs incurred by their section, as well as the effective allocation of the funds to the right requirements. This approach is very different to central Government accounting where managers must budget three years in advance for specific requirements and must then expend the funds against a central accounting process. Currently managers have enormous processes to overcome should they require budgeted funds for alternative needs. These processes are very time consuming and labour intensive. The other labour-intensive activity involved with central control is that allowances have to be constantly monitored and then amended when deviations are required. The cost centre approach gives managers greater freedom with fewer administrative processes but still holds them accountable. It is recommended that the National Treasury be approached to implement the cost centre accounting approach to all sections within the SANDF. Cost centre accounting impacts on decision-making and control function.

6.2.4 Petty cash purchasing cards for CMs

Currently CMs do not have authority to purchase depot stock items with petty cash. Should an item within the petty cash limit be urgently required, the end users must obtain the necessary authority and then physically carry out the purchase themselves. This practice leaves a great deal to be desired as end users do not have the technical data that the CMs have, and often do not have the time to run around sourcing the items required. This often leads to animosity between end users and commodity staff as the end user feels that it is the CMs job to supply the item. This problem can be easily resolved by providing CMs with a credit card that will be used to make the smaller urgent purchases when required.

Such a system will also provide a huge saving in the purchasing of depot stock for cheap items like nuts and washers that often cost less than the cost of processing the Government Order.

It must also be noted that this system will ensure that items purchased by petty cash are brought to charge on the depot system, thus enabling annual statistics to be kept. The value of this is, that over time, bulk purchase opportunities can be identified, thus enabling bigger buys with a greater cost saving.

This card system can be controlled against a weekly reconciliation. The use of such a system will greatly enhance the planning, decision-making and control functions.

6.3 Military strategic level recommendations

6.3.1 Containerised logistic support for operational sustainment

The purpose of logistic support is to ensure the provision, sustainment and recovery of forces at the required service level for the duration of operations. It is therefore logical that as a service within the SANDF, the SAN be ready and capable of providing support to national military operations. It is thus important that the SAN adhere to the principles of logistics. One of the ways of adhering to the principles of adequate supply, dispersion, flexibility and feasibility is to have items stored in a containerised depot that is portable and capable of being easily transported to the area of operation.

Containerised stores allow for enormous flexibility and service delivery as they are portable and can just as easily be operated from onboard a naval vessel, a chartered STUFT, or ashore in a Host Nation country. Currently within the SAN certain critical items are stored in portable containers known as Transportable

Logistic Support, but these items are not linked to the depot accounting system and issues against it are not calculated within the main depot accounting system thus turnover data is not calculated within the reorder point. This means that the items within this store are not being effectively utilised.

It is recommended that a standardised portable logistic system be implemented that is linked to the depot accounting system. This sub store facility will ensure that funds are not tied up in dead stock and that turnover on these sub stores is captured and calculated within the main depot accounting system. This system will impact on planning, decision making and control functions.

6.3.2 Unity of command – Single logistic authority

CMs currently operate in an environment that is isolated from the rest of the SANDF. CMs are responsible for keeping the depots stocked, but do not have the mandate or means to convey supplies into the theatre of operations. This movement of supplies into the theatre of operations is a joint operations responsibility and once supplies are released to them no visibility on storage locations or stock usage levels are visible. Anticipation of demands on industry therefore cannot be secured and budget allocations cannot be planned for.

It is recommended that CMs are included in the joint operations logistic team when their system specific platforms (ships) are deployed. This will facilitate better planning, decision-making and control. Response times will also be reduced and a greater degree of supply certainty will be achieved.

6.4 Operational level recommendations

6.4.1 Mission frequency and duration

Mission frequency and duration define the support resources needed to sustain operations. In other words, the more you deploy a ship, the more maintenance is needed, and thus the more spares will be required to carry out the additional maintenance. The current Naval Operations Plan is a very broad concept and is often subject to radical changes. This does not facilitate good planning at commodity level.

It is recommended that the Navy Office provide better planning forecasts to the fleet. These forecasts should be drawn up in consultation with the other Arms of Service and government stakeholders. This will ensure the accurate forecasting of spares required to support operations. This impacts on planning and decision- making functions.

6.4.2 Anticipated service life

Maintaining a support capability for outdated technology is expensive and restrictive as there is a limit to the number of sources that can support the older technology. Diminishing Manufacturing Sources and Material Shortages (DMSMS) is defined as the loss of the last known supplier of an item and has plagued supply managers for many years. It is particularly relevant within a small service like the SAN where it is not profitable for industry to develop specific systems for exclusive SAN usage. The challenge can be overcome to a certain extent by reclamation of items currently in inventory, but ultimately is only achieved through the use of COTS.

The current acquisition of the popular class 209 submarine and Meko patrol corvette is a step in the right direction as spares for these vessels will be available for many years to come. Other vessels currently in operation, however, pose a far greater risk. It is therefore recommended that the support of older vessels be sustained through the reclamation process. It is further recommended that any subsequent design changes or additional equipment fitted to the submarines or patrol corvettes be carefully considered regarding the life availability of component parts. Engineers working on redesigning and upgrading systems should include the expected technology life duration of an item when forwarding codification data to the CMs. This will facilitate the planning and decision-making function.

6.4.3 Commercial equipment integration

The SAN will benefit greatly by moving away from the development of custom designed items to commercial procurement. The reason for this is that many off-the-shelf items developed for commercial use meet DoD needs. Commercial items are also cheaper and more readily available. It is recommended that a clear doctrine on the use of COTS items be promulgated. The reason for this is that the SAN is better suited to COTS items due to the organisation's not having the financial power to support purpose-designed equipment. This will facilitate better decision-making within the SAN supply organisations.

6.4.4 Maintenance levels

The maintenance level doctrine determines what spares, special tools and publications are kept in inventory. The SAN currently has no published doctrine regarding maintenance levels. The implication of this is that the ship's staff currently determines what special purpose tools and spares should be ordered and it is often the CM who bears the brunt for not keeping these stocks in the

depot. It is recommended that the Navy Office publish a clear policy on maintenance levels of responsibility as this will greatly enhance the planning and decision-making function.

6.4.5 Local storage location – Simon's Town mini-depot

Currently all stocks are stored at the supply depot at Wingfield in Goodwood. This places the depot about 35 km from the end users in Simon's Town. This means that even fast-moving items, where there is ample stock available, cannot be issued immediately as they have to be packed in a truck and delivered to the Simon's Town distribution centre.

The supply of fast-moving items can be greatly enhanced by the implementation of an on-site store in Simon's Town. This will enable end users to obtain items of supply simply by walking into the store with the necessary documentation and immediately signing for the required items.

It is recommended that the Navy Office investigate the implementation of a mini-depot in Simon's Town. This will enhance the control aspect as the possibility of breakages during transit will be eliminated and transportation costs will be reduced.

6.4.6 Outsourcing

Outsourcing occurs when specialist suppliers are used to perform activities within the supply chain. The result can be a faster reaction to needs, or lower costs with a higher value added. The advantage to the SAN is that it could help reduce operating costs and fee up capital funds for core areas.

It is recommended that Navy Office include the concept of outsourcing within supply chain doctrine, as aspects of the Commodity Management subsection can benefit from outsourcing certain activities. A policy is however needed before investigations can commence. Outsourcing will impact mainly on the decision-making function.

6.4.7 Open tender vs closed tender

The use of Armscor as the chosen procurement agent as opposed to the SPSC has a large impact on commodity management. Currently within the Navy, most of the procurement requests are processed through the SPSC, which uses the open tender system. The Air Force and Army, however make use of Armscor as their main procurement agent. The advantage of using Armscor is that suppliers are physically sourced and have to be accredited before dealing with the state. This enhances quality. The disadvantage is that items tend to cost more. A clear policy is required from the Navy Office regarding the use of Armscor purchases as opposed to open tender purchases. This impacts on the planning, decision-making and control functions of the CMs.

6.4.8 Naval RO-RO capability

A ship with RO-RO capability coupled with a containerised depot system will greatly enhance the ability of the Navy to support its ships anywhere in the world. This is particularly important in our current situation where the SANDF is being called upon to participate in African Peace Support Operations.

It is recommended that the Navy Office consider a specialised military supply ship with RO-RO capability as part of the naval fleet.

6.4.9 Bulk issue reversal system

The time and cost associated with the reversal of supplies issued but not required are enormous. This occurs during operations when a change in the situation renders the initial requirement void. It is recommended that an acceptable process be approved for the quick and painless return of the unused items. This impacts the control function.

6.5. Tactical level recommendations

6.5.1 Updating of Fleet Order number 0080

As the procurement function is now part of the Secretariat it is recommended that the Fleet Order be updated. This impacts the planning function.

6.5.2 Updating of Fleet Order number 0070

It is recommended that the Fleet Order be updated to indicate the change of Manager Reprovisioning, to Manager General Commodities and Services. This impacts the planning function.

6.5.3 Full implementation of PAS

The PAS system created by Cdr Huisamen has an enormous potential for real-time progress tracking. Visibility into this system will empower all supply chain stakeholders with accurate progress information.

It is recommended that the PAS system be fully implemented and included into the State Information Agency (SITA) programmes. This system impacts on planning, decision-making and control functions.

6.5.4 Supplier appraisal

At present no data is kept by CMs regarding the performance and quality of suppliers. Suppliers are currently only evaluated by the SPSC on their delivery performance after the order is placed.

It is recommended that CMs maintain a database on suppliers and that suppliers be evaluated on service capability prior to the placing of the order. This will legally enable the SPCS to restrict the placing of orders on SMEs and HDIs that are not capable of providing items to the required standard. This will impact on decision-making and control functions.

6.5.5 Promulgation of SAN terminology

As the supply chain process consists of terminology that has different meanings within different environments, it is recommended that CMs conduct presentations to regularly educate end users regarding supply chain terminology within the SAN. This will impact on communication and the planning function.

6.5.6 Identification of sources

CMs should become more proactive in the identification of supplier sources. This will eliminate the "no quote received" scenario as the SPSC only advertises on the electronic bulletin network and suppliers are often not aware

of the advertisement. Quotations sent directly to identified suppliers will ensure a greater degree of return on advertisements.

It is recommended that CMs and their staff become more involved in supplier sourcing as this will impact the decision-making and control functions.

6.5.7 Supply support information

This is information used to determine the initial requirement and cataloguing of support items. It is important that the relevant information is obtained in order to provide continued availability of the items.

It is recommended that all new items to be codified are supplied with the relevant Cage code, Reference number, NSN and official manufacturer's name of item. This will enhance decision-making and control functions.

6.5.8 Supply categories

Items of supply should be classified into the categories: Retail stock, War reserves, Initial system stock and CLD stock. This will enable greater effort to be allocated to CLD calculations, as this is the area in which critical stock-outs occur.

It is recommended that these supply categories be implemented, giving greater attention to CLD stock. This will impact on planning, decision-making and control functions.

6.5.9 Readiness Based Sparing (RBS) – Repair commodities

RBS links closely to the aspect of mission frequency but is more commodity-focused, as it includes items that can be repaired as a source of supply. This is important in today's financially restricted environment. Great costs can be achieved by linking the repair authority to the Commodity Management subsection.

It is recommended that the repair authority should be part of the CMs' domain. This will enable CMs to give greater attention to repair items as a source of supply. This will impact on the planning and decision-making functions.

6.5.10 Term contracts

The use of term contracts enables a more reliable and speedy replenishment of items. Once in place, it also becomes far less time consuming, as quotations do not have to be requested for every request within the contract term. The time spent in setting up a term contract is therefore well worth the effort.

It is recommended that CMs investigate greater use of term contracts as they will enhance planning, speed up lead times and enable greater control.

6.5.11 Life Cycle Costing (LCC)

LCC involves the evaluation of all costs involved over the supportable life span of a commodity. CMs need to adjust their mindset to evaluating the whole life cost of commodities and not just the initial lowest up front cost. It is recommended that CMs give greater attention to this activity, as it has an enormous impact on the decision-making function.

6.5.12 Manual provisioning reports

The current system of relying on automated provisioning advices to manage the stock levels of the SAN is causing major bottlenecks at certain times of the year. This was highlighted in the statistics provided by Huisamen. The only way of overcoming this challenge is to revert to a manual form of provisioning. Manual provisioning will enable CMs to better plan the scheduling of procurement packages. This cannot, however, be carried out on all the items in the inventory owing to the enormous range carried by the SAN, but should be applied to the CLD items.

It is recommended that CMs manually provision for CLD items. This will enhance the planning, decision-making and control functions.

6.5.13 Interface with general items and services

As many of the commodities within the general item section impact on the operational effectiveness of ships, it is recommended that CMs develop a close working relationship with this section to ensure that ships remain operational. This impacts on the planning and decision making functions.

6.5.14 NSN screening assistance

BSO and ship's staff currently do not have complex NSN search capabilities. This results in the submission and processing of many lengthy NPN packages when NSNs and sometimes stock are already available. The consequence of this is a waste of time and effort. This problem could be resolved by making commodity management technical staff available to assist with NSN searches.

It is recommended that a standing procedure be put in place that provides a framework for a clear process enabling BSO staff and end users to obtain NSN screening assistance from commodity management staff. This impacts on the decision-making and control functions.

6.5.15 Crisis management system to deal with stock outs over the petty cash limit

As stock levels are reduced owing to the current financial constraints, more and more stock out situations will occur. As the provisioning process takes many months to fulfil using the routine cycle, end users must be provided with, and educated on, a standing procedure to notify CMs of the importance of particular requirements. CMs will then be able to process the request using the emergency purchase channel.

It is recommended that BSO staff and end users be provided with a standing procedure for emergency purchases and that they are educated on the use of this procedure. This will impact on the decision function.

6.5.16 Allowance /allocation committee

With the current problem regarding end users budgeting for items that are centrally purchased and then deviously issued to end users who did not budget for said items, it is recommended that a committee be formed to finalise bulk central purchases at the beginning of each financial year. End users are to submit their requirements with their fund series code at the beginning of each financial year. The committee approves the quantities to be purchased per end user and a schedule is promulgated indicating the end users to receive the items. This will enable greater control to be exercised, as deviations will be easily identified.

6.5.17 Terminology – Use of the term provisioning planning

The term MRP is only suited to the continuous production "estimate of volumes" environment. The SAN should therefore stop using the term to describe its planning process. It is recommended that a term such as "provisioning planning" be used to describe the process of CMs. This impacts the planning function.

6.5.18 Routine decision-making

At present the "Provisioning Administration System" bases provisioning quantities on past usage. It is recommended that inventory decisions should preferably be based on the following factors:

- Operating level – quantity of material required to support normal system operations in the interval between orders and the arrival of successive shipments of material.
- Safety stock – additional stock to compensate for unexpected demands, repair times, pipeline and unforeseen delays.
- Reorder cycle – interval between successive orders.
- Procurement lead time – time from date of order to receipt of shipment in the inventory.
- Order point – Point in time when orders are initiated for additional quantities of spares / repair parts.

6.5.19 Fleet approved end-user procedure

A management document approved at fleet HQ level should be in place to facilitate daily activities governing provisioning and supply support transactions. This will ensure that end users are aware of the complexities of the supply

support procedures. A promulgated process will also provide clear lines of responsibility and give clarity as to who is responsible for the various activities within the supply chain. This will provide greater understanding and facilitate better working relations between CMs, the BSO staff and end users.

It is recommended that a supply support process be formalised and promulgated to the fleet in order to facilitate the control function. It is also recommended that end users be educated regarding these procedures and the controls under which CMs work in order that they understand the consequences of poor planning.

6.6 Conclusion

The recommendations provided in this chapter are a result of the findings of this research project. They are divided into four categories, starting with the national strategic level, followed by the military strategic level, the operational level, and finally the tactical level. The reason for this is the level at which the change or decision can be authorised.

The approval of any of the recommendations proposed will lead to an enhancement in the applicable planning, decision-making or control functions of the provisioning activities carried out by CMs. A combination of approved recommendations will lead to the formulation of an effective commodity management process that will enhance end-user service delivery, utilising fewer funds and with a reduced staff.

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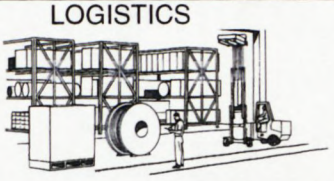
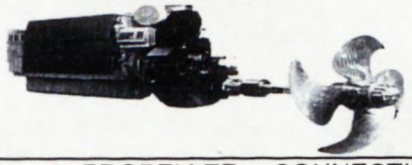
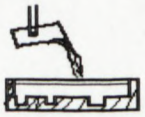
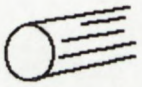
THE SYSTEM HIERARCHY

SYSTEM	LEVEL	EXAMPLE-CONFIGURATION
OPERATIONAL FORCE	8	
COMBAT GROUPING	7	TASK FORCE 
USER SYSTEM	6	STRIKE CRAFT + PERSONNEL + SUSTAINMENT + BASE 
PRODUCT SYSTEM	5	STRIKE CRAFT  LOGISTICS 
PRODUCT	4	WEAPON PLATFORM 
PRODUCT SUBSYSTEM	3	PROPULSION SYSTEM 
COMPONENT	2	CRANKSHAFT  PROPELLER  CONNECTING ROD 
CHARACTERISTIC MATERIAL/PROCESS	1	CASTING PROCESS  SHAFT STEEL  ALUMINIUM BRONZE 

APPENDIX B

CITY OF CAPE TOWN
MATERIALS MANAGEMENT

Maintain Material Master

Ref. No. .....

Requester Name		**Contact Number**	

Create ☐ Change ☐ Archive ☐

Basic data Requester Name

Plant(s) Number & Description

Material description

Unit of measure

Purchasing data

Buyer code

Unit of order

Classification

Maintenance group

Recoveries group

Warranty period

Planning data

MRP type*

Lot size*

Minimum order qty

Reorder point

Maximum stock level

Maximum order qty

Safety stock

Storage data

Storage bin

Profit center

Accounting data

Moving average price

Additional comments (or specifications)

Codification Office use only

Materials Management approval	**Codification Section use only**
Checked by	Material number
Date	Material type
Signature	Material group
	Created by
	Date
	Signature