

# LAND FREIGHT MARKET ANALYSIS AND STRATEGY

**Masango, P.D.**

Transport Policy and Decision Support, CSIR Transportek,  
PO Box 395, Pretoria, 0001. Tel: (012) 841 3494. Fax: (012) 841 4044.  
E-mail: [pdmasango@csir.co.za](mailto:pdmasango@csir.co.za)

## ABSTRACT

**Studies over the past years showed that South Africa needs to become more internationally competitive despite its location, remote from some of the world's major markets. So, one means of achieving this is to optimise inland freight transport costs, especially on the corridors between the coast and Gauteng. It has been argued that there is inequality in terms of regulations and charges governing road and rail transport in favour of road haulage and that there could be capacity on rail. On the other hand, overloaded trucks are inflicting considerable damage to the road system, while at the same time imposing hidden costs on society in the form of accidents, congestion and pollution.**

**To date, only parts of this complex issue have been investigated and there is a danger that ad hoc decisions could negatively affect the competitiveness of certain commodities unless the entire logistical chain is considered, including private industry's perspectives. Some key factors include time costs, crime-related risks, flexibility and general level of service.**

**The paper will address the following topics:**

- **Give a broad overview of what commodities are moved where and by whom. An attempt is made to identify the total size of the Land Freight Transport Market, in order to establish the size of rail, private road, public road and pipeline freight movements in South Africa.**
- **The identification of strategic transportation corridors, capacity constraints and bottlenecks (current and future gaps)**
- **A discussion of current and future investment needs to overcome bottlenecks and possibly areas where an investment strategy would be more appropriate.**

## 1. INTRODUCTION

### 1.1 Background

South Africa needs to become more internationally competitive despite its location, remote from some of the world's major markets. One means of achieving this is to optimise inland freight transport costs, especially on the corridors between the coast and Gauteng.

It has been argued that there is inequality in terms of regulations and charges governing road and rail transport in favour of road haulage and that there could be capacity on rail. On the other hand, overloaded trucks are inflicting considerable damage to the road system, while at the same time imposing hidden costs on society in the form of accidents, congestion and pollution.

However, road transport is very flexible and a recent study (reference to study) undertaken by CSIR Transportek showed that many customers would prefer to pay higher costs and continue to use the road mode, because of unreliable delivery times by rail. This factor is especially critical when it is

necessary to ensure factory production processes are not interrupted. To date, only parts of this complex issue have been investigated and there is a danger that ad hoc decisions could negatively affect the competitiveness of certain commodities unless the entire logistical chain is considered, including private industry's perspectives. Key factors include time costs, warehousing and stockholding costs, crime-related risks, flexibility and general level of service.

### 1.2 Objectives of the study

The objectives of the study that was undertaken are:

- to provide an overview of the volumes, origin and destination of commodities moved by key industries;
- to identify strategic transportation corridors and identify capacity constraints and bottlenecks;
- to identify investment needs to overcome bottlenecks and possibly areas where a disinvestment strategy would be more appropriate; and
- to identify possible future new opportunities and developments.

Ad hoc measures are unlikely to resolve the problem. What is needed is an integrated freight strategy that ensures a “seamless” flow from origin to destination. This means examining which commodities can best be conveyed by which mode, identifying where inter-modal co-ordination can be improved and prioritising which investments or regulations would be appropriate. For example, a particular industry may identify the need for better tracking of rail consignments, an emergency procedure to facilitate the movement of urgently needed goods in the event of an unexpected bottleneck, improvements in crane productivity at the quayside and national roads that do not stop at local authority boundaries, but that end in the ports themselves.

In order to discover what the “drivers” of this analysis are it is necessary to have in-depth discussions with the representatives of selected industries. It is also important to examine why some customers shifted from one mode to another and discover what it would take to attract them back again and whether this is beneficial or indeed possible given the structural changes in the South African freight transport market in recent years.

For many years, road freight transport in South Africa was highly regulated which was advantageous to the rail mode, but as the country's economy became more outward-facing, it was recognised that there was a need for deregulation of road haulage.

However, during the period of transition, deregulation of freight haulage occurred against a background of inability to enforce regulation due to the need for a co-ordinated approach between new authorities and a lack of resources to ensure that traffic law enforcement took place. This has led to a situation characterised by a rising level of disregard for vehicle and driver safety regulations, increased overloading of trucks, increased incidence of accidents and increased risk of environmental harm due to a spillage of hazardous or toxic loads.

At the same time, Spoornet has been experiencing difficult times having to carry the costs of uneconomic branch lines, an excessively large labour force and the need to re-capitalise the bulk ore lines. Although the past financial year has shown a profit on paper, concerns are expressed at the need for substantial capital investment to sustain and improve the system.

Realistically, bulk freight will in most cases continue to be moved by rail so it is the general freight traffic that is the focus of the discussion. A switch could possibly be achieved through an increase in road user charges, stricter enforcement of the road traffic regulations or through permits for certain types of goods, or changes in the axle load limits. The question is what will be the consequences of such actions?

## 1.3 Approach

### 1.3.1 Establish in Broad Terms What Commodities are Moved Where and by Whom

The objectives of the approach are to:

- Endeavour to identify the size of the land freight transport market in key industries, in order to establish the size of rail, private road, public road and pipeline freight movements in South Africa.
- Identify the current snapshot as well as a 10-year view (forecasted demand) for these modes mentioned above.

This was done through surveys, but it was time-consuming and costly due to the need to involve survey teams and traffic police. It also gives a “once-off” snapshot and does not create a system that can show changes in the flows year-by-year.

A preferred approach (at least initially) was to gather information from a number of possible sources:

- the industries themselves;
- customs and excise/import export data;
- cross border surveys;
- Moving South Africa data;
- existing survey information;
- outputs from CSIR’s transport-economic model (MOTE); and
- modal information, where available.

### 1.3.2 Identification of Key Facilities, Warehouses, Distribution Centres, Ports and Corridors

As part of the status quo analysis, key facilities was recorded using the computerised CSIR facilities framework tool, which enables key statistics (e.g. size, condition, amenities, equipment, staff, etc.) to be captured. The advantage of the computerised system is that comparisons and trends can easily be shown.

DTI has identified their strategic corridors through another project, some of which have already been modelled. The same definition will be used in this project for strategic corridors and will co-ordinate with the DTI initiative.

## **2. FREIGHT NETWORK**

### 2.1 Background

Roads and rail lines are an essential component of the South African transport system and one of the biggest investments by the country in transport infrastructure. It also plays a crucial part as enabling infrastructure, supporting the interaction (flow of materials and goods) between producers, manufacturing and consumers nationally. A national freight network is essential to sustain this interaction.

This section provides an overview of the key freight network(s) and focuses on the following modes of transport:

- Roads
- Rail lines
- Pipelines

Based on work done during the MSA project (1999) it is clear that there are various key transport corridors in South Africa. The majority of freight customers are geographically concentrated, requiring transport from dense industrial locations (usually large urban areas) to destinations. These are fed by relatively dense ‘corridors’. A key outcome of this study is to identify (within the context of the key industries) those parts of the road and rail network that form the ‘backbone’ of freight

movement nationally. It must be emphasised that the intention here is **not** to reclassify networks, but rather to identify those parts of the network as they relate to freight movement of this study. The objective of defining freight networks is to use the network in relation to the movement of freight for the chosen industries/sectors profiled in this report.

## 2.2 Road Network

### 2.2.1 Overview of Road Network

The South African road network can be classified by looking at the authorities responsible for such roads and its functionality.

The classification is as follows (SANRAL, 2002):

- **National roads.** Roads providing mobility of national importance. These roads are primarily provided for economic reasons and to support and improve economic growth. There are at present N-route sections that are provincial road sections but have been identified to form part of the long-term strategic national road network.
- **Provincial roads.** Roads providing access and mobility in a regional context. These roads forms links between towns not situated along national roads.
- **Urban Roads.** Roads providing mobility and access in urban areas.
- **Rural roads.** Roads providing mobility and access to remote areas.

It is clear that the routes used by road freight industry are substantial. There are however gaps as some areas of SA are not served when using this network. The SA National Roads Agency also has defined a primary road network. This network includes roads that of lesser importance for freight and more important for tourist and other economic flows. It was felt that the current and proposed primary network could be used in addition to the network captured based solely on freight flow data

The network should also connect freight customers with the **main freight facilities** in South Africa.

Such facilities would include the following:

- Ports;
- Airports;
- Border posts; and
- Main facilities used in storage and distribution of material or goods.

## 2.3 Rail Network

The approximate length of rail track in South Africa is 34 000 km. It falls under the control of SPOORNET and the South Africa Rail Commuter Corporation (SARCC). SPOORNET a division of TRANSNET Ltd. provides rail transport mainly for goods and containers, but also transport for passengers travelling long distances between major cities. The SARCC is responsible for providing commuter services in six major urban centres in the country. (Anon, 2003)

## 2.4 Pipeline Networks

PETRONET owns, operates, manages and maintains a network of 3000km of high-pressure petroleum and gas pipelines that transports petroleum products from the coastal and inland refineries to South Africa's main business centres. The network traverses 5 provinces from KwaZulu-Natal to Gauteng. The pipelines range from 6" (150mm) to 20" (508mm) in diameter. Products are transported through the various pipelines at a maximum allowable pressure of up to 100 Bar for petroleum products and 59 Bar for gas.

The company has branched out recently to include a tank farm among its assets managed, which allows PETRONET to offer a one-stop service for industry, fulfilling functions such as stock management, loading of road and rail vehicles and the injection of additives. The location of the pipeline network was until recently unknown due to security constraints.

### **3. POSSIBLE STRATEGIC INVESTMENT FOCUS AREAS**

#### 3.1 Introduction

This chapter briefly highlights a number of strategic options available to Government in an attempt to address some of the bottlenecks and other supply chain constraints that exist in key industries. A few issues should, however, be contextualised from the offset.

Firstly, the recommendations should not be seen as a panacea for all South Africa's supply chain problems, as only selected industries were analysed in this study, due to time and budgetary constraints. In reality, one would only be in a position to provide universal solutions to existing problems once the whole economy, including all relevant industries and sectors, has been investigated. However, as the selected key industries are of strategic importance to the country, there are solutions suggested in this chapter that hold true irrespective of how many other industries are analysed.

Secondly, as in some of the key industries and commodities, feedback and co-operation from industry role players were poor, resulting in limited data being available for analysis. In this regard, bottlenecks resulting from information received from a restricted number of role players in a particular industry/commodity might not necessarily correctly reflect the situation of the whole industry/commodity.

Thirdly, this paper focuses only on those system-level bottlenecks in which Government can effect a change. For instance, if bottlenecks in a specific industry are the result of inefficiencies at a company-level, then Government might not have any jurisdiction, or desire, to act in any way to address the situation. However, should the problem lie at an institutional level, such as cumbersome statutory administration, then Government holds the lever, which it can pull to redress the problem.

#### 3.2 Bottlenecks

Resulting from the interview/questionnaire feedback from industry, the following four main system-level bottlenecks were identified:

- Lack of adequate rail operational and infrastructure capacity and efficiency;
- Port congestion;
- Customs clearance;
- Border post delays.

Possible solutions to each of the above problems are briefly outlined below.

#### 3.3 Strategic Investment Options

##### 3.3.1 Lack of Rail Capacity and Efficiency

Comments from industry here range from “unavailability of rail trucks” to “inefficient service”. Although it is accepted that a large organisation such as Spoornet needs to change and adapt to the market incrementally, due to its size, one must also concede that, in some instances, current levels of service and lack of capacity are alienating customers. In many cases the point was made by customers that they would in fact prefer to use rail as a first-choice mode of transportation, but that inherent problems at Spoornet are rendering that option obsolete. Government needs to facilitate a speedier transformation aimed at improving efficiency at Spoornet.

Delays at marshalling yards also seem to be a thorn on the side of many industries. A thorough investigation should be undertaken into all major marshalling yards to investigate their efficiency and to suggest improvements. Additions to current marshalling yards, i.e. capital cost as a stand-alone solution, are unlikely to improve the situation effectively and it is recommended that the latent value be unlocked through continuous improvement processes at existing yards.

A substantial investment in rolling stock is also required to address the issue of lack in carrying capacity. Rolling stock here could imply carriages (general and custom-made) and locomotives. Options available are, inter alia, Government to either finance the recapitalisation itself, to guarantee loans from the capital market to Spoornet, or to issue bonds/debentures to access the required capital.

### 3.3.2 Port Congestion

With the unbundling of the former Portnet into SAPO and NPA, the operations of South Africa's ports are bound to increase in efficiency. However, a port such as Durban would require an increase in capacity, irrespective of the efficiency of current infrastructure. Durban Container Terminal handles 65% of the country's container volumes, but frequent delays of shiploads are commonplace.

In this regard, there are shortages of port infrastructure, such as gantry cranes, although SAPO is in the process of acquiring a further 6 cranes by 2005. In addition, berth capacity seems to be a problem. It is thus clear that capital is required to enable an increase in capacity.

An additional problem seems to be poor interface and compatibility of computer systems. For instance, it is claimed that 30% of containers arrive at the port with incorrect information, leading to delays. It is therefore imperative that compatible information technology systems be put in place to streamline operations.

### 3.3.3 Customs Clearance

A number of customers complained that customs clearance takes too long and is cumbersome. Whilst it should always be a priority to monitor imports/exports through proper customs administration to curb possible illegal activities, it should at the same time be borne in mind that smooth and seamless monitoring and administration can go a long way in ensuring optimal supply chain operations. It is therefore recommended that the current methods of customs clearance be evaluated to possibly contribute to a reduction in delays.

### 3.3.4 Border Post Delays

Border posts have notoriously been responsible for major delays of both imports and exports to South Africa's neighbouring countries and into the rest of Africa. Border posts that are specifically named, resulting from interviews conducted as part of this study, are Beit Bridge and Komatipoort. Although it should be noted that in many cases that above-mentioned customs problems translate into delays at border posts, the actual infrastructure at these posts should be investigated and improved where necessary. In addition, operating hours should be adjusted to suit the demands of the market.

## 4. RECOMMENDATIONS AND CONCLUSIONS

The benefit of freight transportation to any economy has the potential to be enormous. Freight transportation increases the value of goods by moving them to locations where they worth more and encourages competition and production by extending the spatial boundaries of commodity and labour markets. Freight transportation stimulates demand for goods and services and employs a significant number of people. Furthermore, freight infrastructure forms a significant component of South Africa's wealth and productive capacity.

The volume of freight moved on the South African transportation system has grown significantly over the past few years. As demand for freight service grows, concerns have intensified about capacity shortfalls, congestion and even safety and security issues. Reliable, predictable travel times are especially important in an economy where many goods are expensive and are needed in tightly scheduled manufacturing and distribution systems. Late arrivals can have significant economic costs for manufacturing plants waiting for parts to assemble and for haulers who are missing guaranteed delivery times. When transportation system performance decreases, freight-related businesses and their customers are affected in two ways. First, freight assets become less productive. Second, more freight transportation must be consumed to meet the needs of a thriving and expanding economy. Thus, when freight transportation under-performs, the economy pays the price. Hence it becomes apparent that in order for the South African Government to make the correct decisions around freight related issues, it is essential to have access to accurate, reliable and updated freight transportation data.

Under this Land Freight Market Analysis study, the Department of Trade and Industry in partnership with Spoornet, commissioned the CSIR to undertake a land freight market analysis and strategy study for South Africa. Apart from establishing in broad terms what commodities are moved by the land based transport modes as well as identifying supply chain bottlenecks along the major freight corridors, the study's primary aim has been to provide Government with freight flow data to be used in making the right freight policy and infrastructure investment choices, to ensure that South Africa remains globally competitive.

The project team has also recognized that shippers, carriers, operators and infrastructure providers need incentives to collect and standardize data that can be turned into useful information for freight planners, researchers and policy makers.

In essence, it is therefore recommend that:

- The phased sector specific land freight market analysis surveys continue and become the foundation for a National Freight Movement Database. This will provide Government with a tool to evaluate emerging freight transport congestion and bottlenecks as well as capacity challenges related to freight.
- The Land Freight Market Analysis phases should form a key part of Governments National Logistics Strategy Project being driven by the Interdepartmental Task Team on National Logistics.
- A National Logistics Conference should be convened where the importance and benefits of freight data collection is addressed in detail. It is obvious that the availability of reliable freight data empowers Government to make the correct freight policy decisions. However, freight data collection as a culture needs to become embedded within the South African transport industry, with all stakeholders understanding and recognising its importance in making South African supply chains globally competitive.
- Technology needs to play an ever-increasing role in freight transportation. Specifically, effective use of technology facilitates data collection, training, institutional reform, and infrastructure development among others.
- A possible further recommendation could be to embark on a freight education campaign within the transport sector. This could allow policy makers and the general public to better understand the contributions made by freight operations to local, regional and national economies. Within the context of striving for national competitiveness, training and retraining opportunities could provide the freight industry with a well-educated workforce.

These recommendations can be made in light of the fact that:

- Freight volume has been and is expected to continue to grow at a more rapid pace than projected transportation infrastructure investment in South Africa.
- Funding, and access to funding, for freight projects of the various transportation state owned enterprises in South Africa is constrained and representation is lacking at times in the planning process for certain freight modes.
- There is growing concern about the lack of freight data with which to make informed policy decisions
- There is limited coordination between the public and private sectors as well as among different Government departments responsible for freight transportation matters.
- The lack of education at the operation level within many organisations as it pertains to the relationship of efficient freight transportation and the competitiveness of the economy is of concern.

## 5. LIST OF ABBREVIATIONS

GIS	Geographic Information System
RISFSA	Road Infrastructure Strategic Framework for South Africa
SANRAL	South African National Road Agency Ltd.

## 6. REFERENCES

- [1] Anon. 2003. Country profile of South Africa – Infrastructure: Roads, Ports Airports Power and Telecoms. Internet site: <http://www.bisnetworld.net/bisnet/countries/southafrica6.htm>.
- [2] Infrastructure Strategic Framework for South Africa. 2002. National Department of Transport. Prepared by CSIR Transportek.
- [3] Nordengen, P. 2003. Heavy Vehicle Overload Control Strategy.
- [4] PETRONET. 2003. General information - <http://www.petronet.co.za>.
- [5] RISFSA see Road Infrastructure Strategic Framework for South Africa.
- [6] SANRAL see South African Roads Agency Limited.
- [7] South African Roads Agency Limited. 2002. Declaration of Intent 2002 – 2005. 29p.
- [8] South African Roads Agency Limited. 2002. Horison twenty ten. 57p.
- [9] SPOORNET. 2003. Network scope: Current active network. SPOORNET Freight density – Diagram (supplied by Mr. U. Davids ).
- [10] SPOORNET. 2003. SPOORNET Freight Transport database (Supplied by Mr. U Davids).