CHAPTER 7
FREIGHT TRANSPORT
7.1 Introduction

The objective of all freight transport is to achieve economic efficiency in the movement of goods. Freight transport must be primarily directed at creating conditions that support this objective.

In South Africa, a very large proportion of freight transport movement is provided by parastatals in railways, ports, pipelines, and aviation.

The annual tonnage handled by major freight transport infrastructures in 2013 is indicated in Figure 7-1, whereas the movement on national corridors is illustrated in Figure 7-2.

Figure 7-1 reflects that, in 2013, 1.53 billion tonnes of freight were transported by road in South Africa, representing 76% of the total amount of freight transported, with the balance of freight in the country having been transported through ports (13%), rail (10%), pipelines (1%) and airports (0.02%). It is evident that road carries the majority share of freight when compared to other modes, followed by shipping and then rail. The NATMAP 2050 and Transnet intend to rebalance this unequal split to maximise the efficiencies of each mode in support of socio-economic development. This objective supports the aspirations defined in the Medium Term Strategic Framework (2014–2019), the Road-to-Rail Strategy and Transnet’s Market Demand Strategy.

7.2 Overview of Freight Transport

Four pertinent issues are discussed in this chapter, including road-rail competition, road freight overloading, the lack of freight planning information, and aviation.

7.2.1 Road-rail competition

The development of road freight transport was restricted by the Road Transportation Act (introduced in the 1930s) with the distinct purpose of developing the rail network of South Africa. In 1987, the road freight industry was deregulated because the road freight industry had developed sufficiently in competency to provide services to the whole country. South African Transport Services (SATS) was relieved from common carrier obligations. A prerequisite for these policy changes was the successful implementation of the Road Transport Quality System (RTQS), which is set out in the National Road Traffic Act (Act 93 of 1996). The RTQS has still not been implemented.

The rapid expansion of the road freight industry between 1980 and 1990 resulted in an over-supply of transport, reducing profitability and decreasing quality standards. The industry successfully negotiated with the authorities the need to increase the vehicle-carrying capacity, which is generally dictated by the weight, semi-trailer length, height, width, and overall combination length. This placed the road freight industry in a favourable position to compete with long-haul railway services for high-value commodities.

The road freight market share along major corridors is now considerably higher than in the 1980s. This expansion covers high-value commodities and other goods that are normally regarded as suitable commodities for rail haulage, such as maize, fuel, coal, vehicles, containers, and cement. Table 7-1 indicates the road and rail freight split in 2013 in million tonnes (mt).

Figures 7-3 and 7-4 indicate the percentage road and rail freight annual tonnages for 2013, whereas Table 7-2 illustrates the road-rail split for the annual tonnages of 2013 expressed in percentage.

The data presented in the figures and table reflect that road carries the majority share of freight distribution in the country and confirm that road is a major role-player in freight transport. The only exception is bulk mining, where rail has the advantage in terms of market share.

The rail market share declined due to operational policy constraints on the rail service provider resulting from the transport policy decisions of the government as a major shareholder. Table 7-3 illustrates the causes in reduced efficiency in rail freight.

7.2.2 Road-to-rail strategy

Road is currently the primary mode of transport for freight for various reasons, with rail taking the backseat due to the sector’s being characterised by significant constraints. While road freight delivery has significant advantages, the great number of freight vehicles on the road contributes to overloading and the subsequent significant deterioration of the road network and traffic congestion. This has resulted in the development and formulation of Transnet’s road-to-rail strategy, the primary aim of which is to rebalance the road freight–rail freight split in an attempt to create a more appropriate market share and to reduce the number of heavy trucks on the roads to decrease overloading on the road network. The implication is a reduction in overall transport and logistics costs and externality costs (e.g. road damage, road accidents, road congestion, noise pollution and carbon emissions). The strategy is based on a qualified assessment of the state of South Africa’s current rail infrastructure, costs of repair and maintenance, capital requirements and future market demands.

The Road Freight Strategy 2011 (RFS) supports this initiative and notes that the following commodities are best suited to be transported exclusively by rail in the form of break-bulk, liquid bulk and bulk due to factors such as route, type, distance, quality and high pressure:

- Timber
- Sugar
- Cement
- Zinc
- Coal
- Grain
- Liquid bulk
- Car parts.

The ongoing NFLS 2005 review process also notes a gradual movement back to rail. Overall, the objective is that 2% of the rail-friendly cargo stated above be moved by rail annually.


7.2.3 Road freight overloading

Since deregulation in 1987, internationally proven long-haul trucking technology and equipment that have been imported to South Africa and adapted for South African conditions have steadily improved in both vehicle performance and durability. Modern truck tractor–semi trailer combinations haul 38 tonne payloads at 80 km/h.

South Africa currently permits some of the largest vehicle combinations in the world for general freight haulage – an overall combination length of 22 m and load heights of 4.3 m, permitting a load area of 124 m³ and 38 tonne payloads and 56 tonne gross vehicle mass (GVM). The carrying capacities and dimensions of these vehicles are undoubtedly a contributory factor in attracting large volumes of bulk commodities.

At present, a feature of the road freight market is the extent to which road freight operators are able to offer competitive rates on the main corridors for the haulage of bulk commodities such as steel, fertiliser, cement, maize, timber, containers, and fuel. The rates are comparable to railway tariffs. However, road freight provides increased flexibility and negotiable back-haul cargoes.

The large numbers of heavy vehicles on the major freight corridors and on many provincial roads contribute to accidents, overloading, road damage, congestion, and pollution, and emphasise the importance of the externalities of the mode. Provincial authorities who are tasked with controlling and enforcing road traffic legislation have not been provided with the additional capacity necessary to keep pace with the growth in the industry. One of the possible measures to internalise the impacts of heavy vehicles is to implement a user-pay principle.

The RFS also draws attention to the improvement of the overload control system through a series of coordinated solutions such as the establishment of a national inspectorate, the utilisation of mobile technologies,
administrative enforcement approaches, credible deterrents and data intelligence.

In 1993, the DoT increased legal axle mass (LAM) loads of goods from 8 200 to 9 000 kg. Using the fourth power rule, the additional wear introduced by the increased axle weight amounted to a 60% increase in the road loading for the same amount of traffic, if all axles were loaded to the permissible maximum. This increase, combined with the rapid increase in the volumes of traffic, is the primary cause of the deterioration of the roads in all the provinces. The provincial and national authorities responsible for providing and maintaining roads are faced with an ongoing concern about the levels of overloading recorded across South Africa.

With the abandonment of these aspects of rail, the road freight industry designed new vehicle configurations and moved in to fill the gap in the market. The expansion of the road freight industry was facilitated by the existing spare road capacity in most areas of South Africa.

7.2.4 Development of integrated regional corridors

Regional integration is defined within the context of Tripartite: SADC, EAC and COMESA. The tripartite region is characterised by both landlocked (semi-landlocked) and coastal/maritime countries. There are common issues affecting both corridors and borders.

Within the region, the following documents are key to the challenges the region faces:

- SADC Protocol on Transport, Meteorology and Communication
- Regional Indicative Strategic Development Plan (RISDP)
- SADC Infrastructure Master Plan
- SADC Regional Corridor Strategy.

Challenges in the tripartite transport and transit facilitation landscape are listed below:

- Lack of harmonised laws, policies, regulations, standards and procedures
- 11 out of 22 mainland countries landlocked
- Modal imbalance – road 80% vs rail 20%
- Long distances to ports crossing multiple borders
- Multiplicity of government agencies at borders and road blocks
- Multiple licences, permits, fees and processes
- Each country is a separate legal jurisdiction
- Regulation through multiple bilateral agreements
- 5 languages (Arabic, English, French, Portuguese and Swahili) and many local languages
- Corruption.
  - The challenges listed above contribute to the following negative results:
  - Commercial drivers are exposed to health risks, crime and corruption
  - High transportation costs and long delays

<table>
<thead>
<tr>
<th>CAUSE OF REDUCTION IN EFFICIENCY</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reduced accessibility</td>
<td>Rail stations started to close in the 1980s and 1990s as a result of abandonment and disuse in response to the rapid expansion of the road freight transport industry. Siding to siding rail transport is generally only available for more than 10 wagons in a consignment – i.e. a minimum of approximately 400 tonnes per consignment. This is too much for most farmers and small businesses. This policy has resulted in several million tonnes of coal, chrome, timber, etc. being delivered over long distances by road all over the country.</td>
</tr>
<tr>
<td>Safety and damage</td>
<td>In addition to the effort required to resolve claims for the high levels of damage and theft, the high costs of meeting railway packaging requirements and double-handling from road to rail and back to road for delivery make rail unattractive by comparison with direct road haulage. The problems are aggravated by derailments, collisions and criminal actions such as cable theft and vandalism.</td>
</tr>
<tr>
<td>Reliability</td>
<td>For many industries, the reliability of service is as important as cost, and the erratic provision of empty wagons and the unreliability of delivery schedules make rail transport uncompetitive. Failure to provide timely funding to acquire and maintain adequate rolling stock and locomotives has resulted in the unreliability of rail services. The cause for the delay in funding can be ascribed to the misalignment of planning cycles.</td>
</tr>
<tr>
<td>Time from collection to delivery point</td>
<td>Travel speed is only crucial for a limited amount of cargo but, for some specific loads, such as containers to meet ship stack schedules, timing is essential. For other goods, payment is only released when deliveries are completed, so speed is important and, therefore, road is generally the preferred mode of freight.</td>
</tr>
<tr>
<td>Costs, rates &amp; tariffs</td>
<td>Railway tariff increases for timber, sugar cane and grains have exceeded the rate increases for road transport – in many instances forcing industries to turn to road haulage, despite their preference for rail.</td>
</tr>
</tbody>
</table>
7.2.5 Context of freight information

Road vehicle movements on main national and provincial roads are monitored respectively by the South African National Roads Agency SOC Limited (SANRAL) and the provinces. The information is used for the management of the roads maintenance programmes in the related agencies. Axle loads are measured or estimated to gauge the road loading at each point.

Road freight origin and destination (OD) information is unavailable in South Africa, as there is no legislation in place to compel the disclosure of this data. The lack of information on road freight volumes, operators, commodities, and movements is a continuous concern for planning authorities. The introduction of an effective registration and licensing system for road freight operators will resolve this problem.

7.2.6 Aviation

Air freight constitutes a small proportion of the total freight market, yet it plays an important part in the economy to transport high-value low-density cargo. Shippers are well served by a well-developed air cargo service industry.

The OR Tambo International Airport (ORTIA) plays an important role in the air freight market, receiving export and import commodities from neighbouring provinces where volumes are too low to warrant dedicated air freight facilities. ORTIA handles 86% of the total air freight of all ACSA airports. There is heavy reliance on the overnight road transport of perishable and high-value commodities to and from ORTIA. Table 7-4 illustrates air freight volumes in 2014.

<table>
<thead>
<tr>
<th>AIRPORT</th>
<th>INTERNATIONAL (t)</th>
<th>DOMESTIC (t)</th>
</tr>
</thead>
<tbody>
<tr>
<td>ORTIA</td>
<td>351 145</td>
<td>38 030</td>
</tr>
<tr>
<td>CTIA</td>
<td>38 149</td>
<td>26 117</td>
</tr>
<tr>
<td>KSIA</td>
<td>5 993</td>
<td>9 405</td>
</tr>
<tr>
<td>UIA</td>
<td>5 680</td>
<td>0</td>
</tr>
</tbody>
</table>
### 7.3 Freight Transport Analysis and Forecasting

#### 7.3.1 Rail freight

According to the 2013 State of Logistics Survey, rail handled 210 million tonnes of freight in 2013, consisting mainly of block train consignments of primary minerals, such as ores and coal, and primary and secondary commodities. The latter include timber, steel, grains, fuels, and smaller proportions of industrial outputs, and imports and exports, such as motor vehicles, containers, and chemicals, where rail has a distinct advantage over road. The tonnages represented in Table 7-5 report on the rail freight commodities for 2013 on the respective network links identified in the National Freight Logistics Strategy (2015, review currently in progress) and should be interpreted as such.

Table 7-6 shows that three sections of the South African railway network have practically reached their maximum capacity measured in terms of capacity utilisation.

<table>
<thead>
<tr>
<th>NETWORK LINK</th>
<th>FREIGHT COMMODITIES</th>
<th>RAIL TONNE (MT)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gauteng–Durban</td>
<td>containers, steel, cars, coal, manganese, fuels, perishables</td>
<td>24</td>
</tr>
<tr>
<td>Gauteng–Cape Town</td>
<td>cars, grains, containers, perishables, cement, steel</td>
<td>11</td>
</tr>
<tr>
<td>Gauteng–Musina</td>
<td>foods, fuels, vehicles, cement, perishables, beverages</td>
<td>4.5</td>
</tr>
<tr>
<td>Gauteng–Tlokpngen</td>
<td>fuels, cement, containers, vehicles, food</td>
<td>2</td>
</tr>
<tr>
<td>Gauteng–Resano Garcia</td>
<td>mineral ore, fruit, sugar, timber, cars, paper</td>
<td>7</td>
</tr>
<tr>
<td>Cape Town–Namibia</td>
<td>fish, containers, fertilisers, cement, machinery</td>
<td>0</td>
</tr>
<tr>
<td>Cape Town–Port Elizabeth</td>
<td>cars, fuels, fruit, perishables, steel, tyres</td>
<td>0.3</td>
</tr>
<tr>
<td>East London–Durban</td>
<td>beverages, foods, fuels, vehicles</td>
<td>0</td>
</tr>
<tr>
<td>Durban–Pongola</td>
<td>containers, fuel, chemicals, timber</td>
<td>5.2</td>
</tr>
<tr>
<td>Winburg–Harrismith</td>
<td>maize, livestock, perishables, steel, containers</td>
<td>0</td>
</tr>
<tr>
<td>Gauteng–Upington</td>
<td>foods, cement, steel, machinery, vehicles, perishables</td>
<td>0.7</td>
</tr>
<tr>
<td>East London–Bloemfontein</td>
<td>vehicles, steel, grains</td>
<td>1.6</td>
</tr>
<tr>
<td>George–Colesberg</td>
<td>fuels, grains, perishables</td>
<td>0</td>
</tr>
<tr>
<td>Britstown–Nakop</td>
<td>food, cement, steel, machinery, cars, perishables</td>
<td>0.7</td>
</tr>
<tr>
<td>Gauteng–Swaziland</td>
<td>beverages, cement, coal, vehicles, grains, sugar</td>
<td>0</td>
</tr>
<tr>
<td>Thaba Nchu–Maseru</td>
<td>containers, fuel, cement, grains, coal, foods</td>
<td>0</td>
</tr>
<tr>
<td>Ermelo–Richards Bay</td>
<td>coal, steel, timber, chrome</td>
<td>78</td>
</tr>
<tr>
<td>Sishen–Saldanha</td>
<td>iron ore, lead</td>
<td>62</td>
</tr>
</tbody>
</table>

**TABLE 7-5: RAIL FREIGHT COMMODITIES ON MAJOR LINES/LINKS (2013)**
(Source: Draft National Freight Logistics Strategy Review March 2015)

<table>
<thead>
<tr>
<th>RAIL SECTION</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kimberley–De Aar</td>
<td>The Kimberley–De Aar section was initially a double line but one line was closed and the other electrified about 20 years ago. However, the number of passing loops for long trains was limited; this now presents a problem when two trains with 104 wagons need to pass each other. The second line needs to be electrified and signalled for passing loops.</td>
</tr>
<tr>
<td>Overvaal tunnel</td>
<td>The Overvaal tunnel on the Ermelo–Vryheid section was constructed as a single line tunnel when the coal line was built. The single section is four kilometres long and is the only point on the coal line where the track is single. It has reached its capacity and requires expansion to address the bottlenecks.</td>
</tr>
<tr>
<td>Orex line–Saldanha Bay</td>
<td>The Orex line–Saldanha Bay section has reached its capacity and is undergoing substantial upgrading to allow for longer trains and extra passing loops.</td>
</tr>
</tbody>
</table>

**TABLE 7-6: RAILWAY NETWORK CAPACITY CURRENT RAIL OPERATIONAL PROBLEMS AND CONSTRAINTS**
However, Transnet, through its market demand strategy, is in the process of rolling out its capital investment programme as well as focussing on improving operational efficiencies. Some of the highlights of the strategy are:

- R300bn capital investment programme
- Expanding rail, port and pipeline infrastructure
- Increase in capacity to meet market demand
- Continued financial stability and strength
- Significant productivity and operational efficiency improvements
- Shift from road to rail – reducing the cost of doing business and carbon emissions
- Enabling economic growth
- Job creation, skills development, localisation, empowerment and transformation opportunities.

The strategy will result in the improvements detailed in the following sections.

### 7.3.2 Road freight corridors

The road freight corridors presented in this section do not directly correlate with the national and regional corridors reflected in Chapter 6, but rather, focus on the major road links carrying the largest volumes of freight on the national road network.

The NDP 2030 identifies the strengthening and optimisation of these corridors as one of the key policy and planning priorities under the wider focus area of economic infrastructure. The Durban–Free State–Gauteng freight corridor is seen as a model corridor in this regard by the NDP 2030 and is supported by the NATMAP 2050.

#### Table 7-7

**Table 7-7.**

<table>
<thead>
<tr>
<th>IMPROVEMENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Additional capacity across all commodities</td>
</tr>
<tr>
<td>Strong growth in general freight</td>
</tr>
<tr>
<td>Significant improvement in rail operational performance</td>
</tr>
<tr>
<td>Productivity improvements and improved asset utilisation at ports</td>
</tr>
<tr>
<td>Reduction in the cost of doing business by means of the promotion of a shift from road to rail</td>
</tr>
<tr>
<td>Positioning of South Africa as the integrated hub in sub-Saharan Africa</td>
</tr>
<tr>
<td>Suppliers’ partnering with Transnet to deliver capital spend and achieve localisation and empowerment objectives</td>
</tr>
<tr>
<td>Reduction in the cost of doing business (0.5% of GDP)</td>
</tr>
<tr>
<td>Driving of regional integration</td>
</tr>
<tr>
<td>Localisation programme supports local products and skills development</td>
</tr>
</tbody>
</table>

#### Table 7-8

**Table 7-8** indicates the road freight commodities for 2013 on the respective major network sections according to the National Freight Logistics Strategy Review of March 2015. The table shows that the Gauteng–Durban section carries the largest share of freight commodities, followed by the Gauteng–Swaziland, Cape Town–Port Elizabeth and Gauteng–Cape Town corridors.

<table>
<thead>
<tr>
<th>NETWORK SECTION</th>
<th>FREIGHT COMMODITIES</th>
<th>ROAD TONNE (mt)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gauteng-Durban</td>
<td>containers, steel, cars, coal, manganese, fuels, perishables</td>
<td>44</td>
</tr>
<tr>
<td>Gauteng-Cape Town</td>
<td>cars, grains, containers, perishables, cement, steel</td>
<td>15</td>
</tr>
<tr>
<td>Gauteng-Musina</td>
<td>foods, fuels, vehicles, cement, perishables, beverages</td>
<td>12</td>
</tr>
<tr>
<td>Gauteng-Tlokweng</td>
<td>fuels, cement, containers, vehicles, food</td>
<td>6</td>
</tr>
<tr>
<td>Gauteng-Ressano Garcia</td>
<td>mineral ore, fruit, sugar, timber, cars, paper</td>
<td>8</td>
</tr>
<tr>
<td>Cape Town-Namibia</td>
<td>fish, containers, fertilisers, cement, machinery</td>
<td>4</td>
</tr>
<tr>
<td>Cape Town-Port Elizabeth</td>
<td>cars, fuels, fruit, perishables, steel, tyres</td>
<td>37</td>
</tr>
<tr>
<td>East London-Durban</td>
<td>beverages, foods, fuels, vehicles</td>
<td>6</td>
</tr>
<tr>
<td>Durban-Pongola</td>
<td>containers, fuel, chemicals, timber</td>
<td>7</td>
</tr>
<tr>
<td>Winburg-Harrismith</td>
<td>maize, livestock, perishables, steel, containers</td>
<td>5.8</td>
</tr>
<tr>
<td>Gauteng-Upington</td>
<td>foods, cement, steel, machinery, vehicles, perishables</td>
<td>2.1</td>
</tr>
<tr>
<td>East London-Bloemfontein</td>
<td>vehicles, steel, grains</td>
<td>1.2</td>
</tr>
<tr>
<td>George-Colesberg</td>
<td>fuels, grains, perishables</td>
<td>1.6</td>
</tr>
<tr>
<td>Britstown-Nakop</td>
<td>food, cement, steel, machinery, cars, perishables</td>
<td>0.2</td>
</tr>
<tr>
<td>Gauteng-Swaziland</td>
<td>beverages, cement, coal, vehicles, grains, sugar</td>
<td>38</td>
</tr>
<tr>
<td>Thaba Nchu-Maseru</td>
<td>containers, fuel, cement, grains, coal, foods</td>
<td>3</td>
</tr>
<tr>
<td>Ermelo-Richards Bay</td>
<td>coal, steel, timber, chrome</td>
<td>0</td>
</tr>
<tr>
<td>Sishen-Saldanha</td>
<td>iron ore, lead</td>
<td>0</td>
</tr>
</tbody>
</table>
A summary of the current road freight operational problems and constraints is given below:

- **Cost of roads**
  The road freight transport system in South Africa is totally dependent on the availability of road space and roads of condition suitable for transporting goods. The transport of heavy loads on maximum dimension road vehicles is the main land transport mode in South Africa. One of the major causes of concern in the road freight system is the fact that it is evident that heavy goods vehicles do not currently contribute adequately to compensate for the wear, damage, and externalities caused on the roads in South Africa. Another of the strategic thrusts of the RFS is road infrastructure management and funding and the NATMAP 2050 supports this.

- **Availability of diesel**
  There is an impending shortage of diesel worldwide – also in South Africa, due to current manufacturing trends and economics. In addition, the implications of the present electricity shortages are very bad for road freight transport. This is due to the rapidly escalating usage of diesel for power generation – a fact that is exacerbated by failures in the electrified railway system that lead to the tonnage of freight moving to road transport, which causes additional pressures on fuel supplies.

- **Personnel and staffing**
  One of the severe pressures the road freight industry is currently experiencing is the skills shortage and lack of adequately trained and competent personnel in a wide range of disciplines. The national technical training structures are inadequate and do not ensure the supply of competent technicians in the automotive trades. The management training for managers in road transport is ineffective. There is also growing concern about the ineffectiveness of the driver training systems and institutions in South Africa. That gap results in a failure to supply an adequate number of trained mature (25–40 years old) drivers, who are the typical candidates for employment as Code 14 drivers.

- **Externalities**
  The externalities associated with the rapid increases in the road freight operations in South Africa are a growing cause for concern. The growing externalities are, in part, due to the high percentage of goods being transported by road instead of rail. The main city centres suffer from considerable congestion during peak hours, aggravated by the presence of heavy vehicles. The rising heavy vehicle accident rates in cities and on the main national road corridors are partly caused by, though not limited to, competition for road space and the inadequate control of operating standards in the trucking industry. Externality factors include driving hours, driver training, and control of speeds and loads. Heavy goods vehicle exhaust emissions are a major cause of air pollution in cities, and traffic jams and congested roads further aggravate this situation.

- **Forecasting of road and rail freight**
  A multimodal freight demand model (with the base year of 2010) was developed to compare future demand. The information of the freight data bank was one of the sources of information used to prepare the model.

**FUTURE FREIGHT VOLUMES**

Road freight volumes are expected to change over time, with major corridors handling increased general cargo and some reduction in the localised transportation of coal and crops. Gauteng tends to be the hub for most of the corridors (N3, N11, N4E, N4W, N1S, N1N, N12, N14, and N17). All corridors will, therefore, be affected by the levels of economic activity in the industrial core of South Africa, which also holds the largest concentration of population.

**Figure 7-5** shows the anticipated growth in road freight traffic to 2050 and it can be seen that the demand for road freight on most of the national corridors is expected to increase over the period.

General cargo will increase on the N1–N11 and N1–N12 corridors due to population and industrial growth. The N2 via Piet Retief will experience increases in volumes that will include further mineral and timber traffic from Mpumalanga to Richards Bay. The growth of traffic from the Lephalale area of Limpopo will be due to power generation and mining development in the area.

Traffic between Durban and East London will increase the volumes on the N2 Central section. Increased traffic between Durban and Richards Bay will be due to cross-traffic between the ports and industrial growth in the coastal area. Some traffic increase is anticipated on the N4 to Maputo due to the expansion of port capacity.

The increases in rail freight tonnage are shown in **Figure 7-6** for the period 2050. The annual tonnage on rail between Mpumalanga and Richards Bay is anticipated to grow to approximately 95 million tonnes, subject to extensive capitalisation of the infrastructure. Further expansion of the Sishen–Saldanha iron ore line to 45 million tonnes is planned for this period. Volume growth on the Western Cape main lines is expected to be gradual.

The limited handling facilities available at the ports and industrial plants are inadequate to accommodate the volumes proposed by railway plans and budgets.

It is anticipated that the number of road freight vehicles will rise from 400 000 to over one million by 2050. The result will be unprecedented delays on the already congested roads in industrial areas and around the ports. The cost (at 2009 reported prices) of road freight transport is expected to rise to over R400 billion per annum or much more if fuel shortages result in hefty price increases. Cross-border traffic will rise to more than one million freight vehicle border crossings annually by 2050. The current border arrangements are already inadequate and will definitely not be able to handle the increased flow of traffic.
FIGURE 7-5: FORECASTED ROAD FREIGHT VOLUMES (VEHICLES PER ANNUM) 2050 (Source: NATMAP Phase 4 Report, 2011)
FIGURE 7-6: RAIL FREIGHT VOLUMES (TONNES PER DAY) 2050 (Source: NATMAP Phase 4 Report, 2011)
7.3.3 Analysis of overloading

Ineffective overloading control systems in many areas struggle to cope with the increase in road freight traffic on most of the national routes—an increase that ranged between 20% and 35% over the past four years. An overloading control system is dependent on three factors: the probability of being apprehended, the severity of the penalty, and the likelihood of prosecution for overloading—all of which should deter carriers from loading more than is legally permissible.

The level of effectiveness of the control of overloading differs from province to province. The available compliance information is evidence of the inadequacy of the system. Current attempts to change legislation (the Road Traffic Act) to incorporate liability by consignors and consignees are likely to be fraught with challenges and legal wrangling, which will negatively affect results and possibly increase the cost of enforcement.

The ineffectiveness of the system is exacerbated by the lack of an underlying operator registration system. Currently, operator registration is only recorded within the vehicle registration process, which limits the lack of control. Other contributing factors include a lack of personnel and adequate resources in the prosecution system to enforce legal load standards. In turn, the absence of supporting record systems results in payment avoidance and makes it difficult for the authorities to prosecute repeat offenders.

The only regulation/enforcement currently available in South Africa is the Road Transport Management System (RTMS), which is a self-regulating scheme. The lack of the implementation and enforcement of the RTQS contributes to the occurrence of overloading.

The SADC transport technical committees are working towards achieving a harmonisation of gross vehicle mass, maximum permissible axle loads, height and length of vehicles, and overloading control strategies.

7.3.4 Analysis of freight planning information

The lack of current road freight data is an ongoing concern—outdated provincial databank information will make future estimates less reliable. In a bid to address this concern, the DoT has embarked on developing a national transport databank as well as a national freight databank. (Refer also to Chapter 6 for information on freight planning.)

7.3.5 Analysis of aviation freight transport

Apart from ACSA, which is government-owned, the air freight service providers are private companies that operate in a highly competitive market.

The lack of outbound air freight from South Africa, when compared to imported goods, is a major obstacle in the growth of the air freight market. Another constraint is the lack of belly-hold capacity on passenger aircraft. Limited air freight demand in rural provinces will negatively affect the viability of dedicated air freight, and reliance on efficient road access to the OR Tambo International Airport, the Cape Town International Airport, and the King Shaka International Airport will become important.
7.4 Implications for Future Freight Transport Planning

The NATMAP 2050 also focuses on the evaluation of the capacity of all the freight transport modes. It addresses the projection of future changes and the implications for the provision of transport services, and identifies current and future operational capacity constraints. All of these aspects provide the basis for the planning of funding and investment in infrastructure, equipment, personnel development, and the simultaneous need for the development of institutional capacity.

Currently, road is unavoidably the default freight transport mode, absorbing whatever traffic cannot be accommodated in other modes. The road industry is an extremely competitive one – its future will be influenced by policy and related successfully implemented developments envisaged for other modes. Critical implications for the future freight transport planning are summarised in the following sections.

7.4.1 Freight strategies proposed

- **National freight transport strategic imperatives: Rail freight strategies**
  - Green Paper on National Rail Policy: This paper is currently in development by the DoT and the strategies listed below must be aligned with this process.
  - The road-to-rail strategy developed by Transnet must be implemented.
  - The road freight strategy supporting the move back to rail must be implemented.
  - An ongoing review of NFLS supports the same strategy and must be implemented.
  - The strategies listed above must be aligned and combined into a single strategy.
  - A review and the liberalisation of the regulatory framework of South Africa in support of the development of integrated regional corridors are important.

- **Investment base**: Introduce policies to permit the widening of the investment base in rail freight operations.
- **Training**: Develop national training capacity for the development of operational, technical, and managerial skills in the rail freight sector.
- **Research capacity**: Provide research capacity to inform national policy decisions on railway development.
- **Legislative framework**: Commission research into the creation of a legislative framework for sustainable intermodal rail freight systems.
- **Electrified railways research**: Commission a technical and economic evaluation of the role of electrified railways in relation to possible future restrictions on hydro-carbon liquid fuels.
- **Branch lines in rural areas**: Commission an urgent investigation into strategies to maximise the potential for the use of branch lines in rural areas.

- **National freight transport strategic imperatives: Road freight strategies**
  - **Research**: Commission research to:
    - Establish the necessary conditions for creating a sustainable road freight infrastructure funding system.
    - Investigate the creation of operator competence and development of skills in the road freight sector.
    - Investigate the logistics systems surrounding the major ports and the need for infrastructure planning.
    - Establish the implications of reducing the availability of fuel for road freight applications.
    - Review and liberalise the regulatory framework of South Africa in support of the development of integrated regional corridors.

- **Weighbridges**: Establish weighbridges at identified strategic points along the road network.
- **Road user cost recovery**: Develop effective methods for road user cost recovery, including a re-evaluation of toll roads strategies and practicable nation-wide alternatives.
- **Institutional structure**: Create structures and institutional changes to achieve effective operator regulation.
- **Provincial management**: Evaluate the potential for developing effective provincial management of road freight operations quality.
- **Cross-border analysis**: Complete the analysis of cross-border road freight operations and plan for large-scale upgrades to facilities and systems at key border posts.

- **Overloading**
  - The differences in the levels of control of overloading from province to province in South Africa reveal systemic inadequacies with regard to enforcement. This can be addressed by an underlying operator registration system. Another solution is the introduction of compensatory charging when trucks are found to be overloaded.
  - To charge consignors and consignees with overloading, the Road Transport Management System (RTMS) process relies on the intended application of the terms of the Administrative Adjudication of Traffic Offences (AARTO) Act. Assize weighbridges enable the sanctioning of the operators of overloaded vehicles, which encourages them to exercise voluntary compliance and to obtain accreditation. The application of the system across South Africa may not be achievable, given the instances of mixed loads, sites with no weighbridges, indeterminate consignors, cross-border transport, and multi-drop deliveries.
It is noteworthy that, of the 200,000 vehicles weighed in KwaZulu-Natal in 2008, 18% were overloaded – but by less than 3% of GVM, which indicates a high level of voluntary compliance. The success of the RTMS does, however, underscore the recommendations that road freight quality depends on:

- Operator registration – linked to vehicles, drivers, and competency
- Professional weighing systems management
- Competent operations management
- Effective monitoring, reporting and analysis.

While all of these are elements of the Road Transport Quality System (RTQS) and are reflected in the National Road Traffic Act and related legislation, the challenge is the implementation of an integrated national system across the whole spectrum of road freight operators.

A practical solution to overloading control is to install more weighbridges and to ensure that these weighbridges are strategically placed, well manned, and operational for extensive periods of time to deter carriers from being non-compliant. The use of properly controlled public–private partnership (PPP) weighbridge operations could address the supply of trained traffic officers and improve the management of the weighing and enforcement operations.

South Africa needs to legalise the use of weigh-in-motion equipment so that random weighing is possible by small teams who are capable of monitoring carrier movements and impeding diversion tactics, which are common in the carrier industry.

It is apparent that the re-development of the road freight management system is required to achieve the objectives of the RTQS and to reduce the cost impact of inefficiencies in road freight transport. Cost contributing factors include road deterioration, traffic accidents and congestion, pollution, the lack of control over the transporting of dangerous goods, the inadequate control of driver training, vehicle licensing, driving hours, and the frequency of extensive overloading.

Strategic imperatives to address overloading include:

- Implementation of weighbridges at identified strategic points along the road network and standardisation of data collection mechanisms
- Development of effective methods for road user cost recovery, including the re-evaluation of toll roads strategies and practicable nation-wide alternatives
- Implementation of structures and institutional changes to achieve effective operator regulation
- Commissioning of research for creating operator competence, and skills development in the road freight sector.
- Development of effective provincial quality management for road freight operations.

**Freight planning information**

- Freight operations need to be flexible and demand-responsive. Data that is older than 6 to 12 months is likely to lead to inaccuracies in planning. The data sourced for the NATMAP 2050 on road, rail, and ports has contributed to a higher level of accuracy than would have been possible with a more mechanistic process. The keys to effective freight planning information are:
  - Information systems based on real observed data that provide essential information and feedback from modal operators, for policy formulation and research.
  - Econometric modelling related to physical reality for checks and balances and audits.

**Aviation freight transport**

- Gradual growth in wide-bodied air freighters is expected, as is the continued dependence on belly-freight capacity in passenger airliners. Containerised air freight is expected to penetrate and increase in the air freight market. Research is required into the future potential industrial development that will support demand for air freight, especially around the major air freight hubs in Gauteng, Cape Town and eThekwini. Planning for air freight capacity has been focused on the OR Tambo International Airport, the Cape Town International Airport and the new Dube Trade Port at the King Shaka International Airport. Space constraints at the OR Tambo International Airport will become a problem within the planning horizon.
7.4.2 Freight interventions proposed

- **SIP2: Durban–Free State–Gauteng logistics corridor**
  - SIP 2 includes the Durban–Free State–Gauteng logistics corridor, which is expected to create 135 000 jobs, strengthen the logistics and transport corridors between the major industrial hubs in the country, improve access to the port, raise the efficiency of and, integrate the proposed intermodal terminal in Harrismith, in the Free State, into the corridor, and make sure that we can provide better services to the agricultural sector.
  - The corridor programme includes the construction of a new railway line between Gauteng and Durban, a new R75 billion dugout port in Durban, and the planned development of an aerotropolis at the OR Tambo International Airport.
  - The Durban–Gauteng corridor, by far the most important economic corridor in the country, is expecting massive increases in freight volumes. In 2013, Transnet indicated an estimated 152% increase in freight along the corridor, from 762 million tonnes a year in 2011 to 1.93 billion tonnes a year in 2014, at a compound annual growth rate of 3.1%. According to freight forecasts, it is expected that, during the next 25 to 30 years, containers moved from the Port of Durban to Gauteng will grow almost eightfold, from about 1.75 million to 13 million a year. Without a new rail line, these expected increases in freight will see a disastrous mushrooming in the number of freight trucks travelling between the port and South Africa’s economic hub. The existing rail line is in a poor condition and has speed limits in some places of as low as 50km/h. The new line will be built to have a maximum speed of 120km/h and will largely be dedicated to carrying freight.

- **SIP 1: Waterberg–Mpumalanga–Richards Bay rail link/export coal line expansion**
  - In July 2014, Transnet issued tenders to allow for formal investigations into the rail requirements of the Waterberg region. Transnet wants a prefeasibility study on the Waterberg infrastructure and on the rail infrastructure linking the coal-mining town of Lephalale in Limpopo with Ermelo in Mpumalanga, which is a key coal-logistics junction. The study is expected to be finalised by August 2015 and will form part of a plan to connect the coalfields in Waterberg, as well as those in Botswana, with export terminals in KwaZulu-Natal, as well as with Eskom's power stations.

- **SIP 3: Manganese export line**
  - TFR is developing the rail network between the manganese-rich Northern Cape and the Port of Ngqura in the Eastern Cape, to become the utility's third heavy-haul export channel. The development aims to increase South Africa’s annual manganese export capacity to 16 million tonnes. The business case for this expansion was completed in November 2013. Earlier in 2013, Transnet indicated that TFR would invest R10.8 billion between 2012/13 and 2018/19 in rolling stock and infrastructure to support the manganese corridor project. The manganese export line development also involves port-related expenditure, including at the Ngqura manganese terminal. The project will entail expanding the export coal line from Mpuamalanga to Richards Bay to increase its capacity to 81 mt and, ultimately, to 97.5 mt. This project is currently ongoing.

- **SIP 2: Cato Ridge dry port**
  - The dry port is in its final planning stages and one proposal is to establish the dry port in Cato Ridge on the northern side of the N3. The development framework for Cato Ridge is under way, with proposals that the N3 be widened to four lanes each way from Clifftdale to Pietermaritzburg and a dedicated freight road be constructed from Durban to Cato Ridge. Container and bulk cargo will be railed from the port to reduce road traffic congestion in both the port and the CBD. The port will be situated on the outskirts of the metro and will be adjacent to the N3 and Cato Ridge shunting yards for trans-shipment purposes. Import containers for destinations other than Durban will be shuttled by rail from the port to Cato Ridge, from where they will be hauled by either rail or road to their final destination. Similarly, all export containers from outside of the Durban area will first have to go to Cato Ridge, where they will be assembled ahead of the relevant ship arrival. A shuttle train operation will then deliver the containers to the container terminals on a just-in-time basis, eliminating much of the road congestion now being experienced in Durban and many of the stack capacity problems at the Durban container terminal. The Cato Ridge project will include not only containers but also break-bulk, liquid and bulk cargo, with the facility acting as a truck stop for road-hauled bulk cargo destined for the port. The inland terminal will provide truck stop facilities for road hauliers, including the repair and maintenance of trucks (much of which now takes place on Durban’s roads). The terminal will also have container stuffing and unloading facilities (groupage) for less than container load (LCL) boxes, as well as customs offices for inspection, scanning, etc.

- **City Deep terminal**
  - Plans are underway to further increase the City Deep terminal capacity to 400 000 TEUs by 2016. An additional 4 million TEU handling capacity is forecast to be required in the Gauteng area by 2042. It is envisaged that Gauteng will require seven standard container terminals, one or two standard automotive terminals and four standard palletised terminals by 2042. To achieve this, it will, operationally speaking, be more efficient to develop a few super terminals rather than many smaller ones. At least three locations (Pyramid, Sentrarand and Tambo Springs) have been identified for the development of these super terminals.

- **Pyramid inland port rail super terminal**
  - Develop a mega intermodal terminal in Pyramid, which is located in the north of Pretoria, to serve the northern Gauteng region. Pyramid will be developed to accommodate one container terminal, one palletised
The Pyramid intermodal terminal will handle container, palletised and automotive traffic and it will be developed in three phases.

- The first phase of the development will be an automotive terminal with a capacity of 558 000 units per annum by 2019.
- The second phase will be a container terminal with a capacity of 500 000 TEUs per annum (the capacity will initially be 250 000 TEUs but will be ramped up to 500 000 TEUs by 2026).
- The last phase of the development will be a terminal for palletised goods with a capacity of 4 500 000 pallets per annum by 2032.
- The Doornpoort site is well connected to the road network and the existing railway lines at Pyramid South, and is well placed to capture freight for the North West, Limpopo and the north of Gauteng. It can pick up freight for the Maputo corridor and can be a location to consolidate freight to Botswana and Zimbabwe.
- Potential demand for the site is estimated as follows:
  - Container (Phase 1): 500 000 TEUs/pa (16 trains/day) by 2025, starting with 250 000 TEUs/pa from 2023 to 2025.
  - Automotive terminal (Phase 2): 558 000 TEUs/pa (12 trains/day) by 2024.
  - Container (Phase 3): 500 000 TEUs/pa (16 trains/day) by 2027.

- **Sentrarand inland port rail super terminal**
  - Develop a mega intermodal terminal at Sentrarand to handle both container and palletised freight. The intermodal terminal will consist of two terminals for palletised goods and four container terminals. The development of Sentrarand will increase Gauteng’s total intermodal terminal handling capacity to a total of 4 million TEUs per annum by 2040.
  - The site is well positioned to have direct access to the proposed Gauteng freight ring and the NatCor. There is sufficient land available for a mega intermodal terminal. The land is largely in Transnet’s ownership, which is a benefit to the development of the site.
  - Potential demand for the site is estimated as follows:
    - Container terminal (Phase 1): 500 000 TEUs/pa (16 trains/day) by 2035, starting with 250 000 TEUs/pa from 2033 to 2035.
    - Container terminal (Phase 2): 500 000 TEUs/pa (16 trains/day) by 2037.
    - Container terminal (Phase 3): 500 000 TEUs/pa (16 trains/day) by 2040.
    - Container terminal (Phase 4): 500 000 TEUs/pa (16 trains/day) by 2042.

**SIP 2: Durban future terminals: Development plan**

- Durban’s back-of-port rail development plans are as follows:
  - 2016 – Improve efficiencies in the Pier 1 and DCT/Pier 2 terminals. These are system upgrades, not capital interventions.
  - 2019 – Adapt Kings Rest as a rail terminal and reconfigure the Bayhead Yard to handle 75-wagon trains. Establish a domestic terminal at Durban Goods.
  - 2022 – Construct a second Kings Rest terminal. Decommission the Pier 1 and Durban Container Terminal (DCT)/Pier 2 terminals.
  - 2024 – Construct the first Durban Dig Out Port (DDOP) terminal and DDOP yard aligned to DDOP port development.
  - 2028 – Expand the Bayhead Yard handling capacity.

- 2033 – Construct a third Kings Rest terminal. Construct a second DDOP terminal. Expand Cato Creek to handle longer automotive trains.
- 2034 – Upgrade the Island View terminal to improve train turnaround times.
- 2041 – Construct a third DDOP terminal.
- 2042 – Construct an automotive terminal/facility in Isipingo, near DDOP.

**Additional actions:**

- Separate freight and passenger/metro traffic as far as feasible to streamline operations and capacity.
- Develop the airport link.
- Consider a terminal on Natcor at the urban edge (Cato Ridge or Umlaas Road).
- Consider a terminal in the vicinity of the new airport (Dube Trade Port).
- Consider a new high-capacity bypass line (such as Cato Ridge Bypass) to complement the Natcor line.
- Consider longer trains, such as 150 wagons on NatCor.

### 7.4.3 Critical freight transport planning proposals

**Adoption of a general policy principle to rebalance the road vs rail market share**

- An important element of the strategic policy direction is to keep the expansion of the current road network to a minimum, to focus on improving the quality and the application of demand management mechanisms, and to align all of these elements with the policy processes currently taking place in the transport environment.

**A capacity-driven dedicated rail network strategy**

- To rectify the unbalanced 89% to 11% modal split between road and rail freight in line with current policy processes in the transport sector such as the draft
Green Paper on National Rail Policy, the adoption of policy directives and principles needs to include:

- Users’ freedom of freight service choice based on the allocation of cost
- Technical and economic regulatory measures that validate reasons for protecting the road network by an all-embracing body, such as a single-transport economic regulator (STER), that is applicable to all transport modes, including roads
- The general characteristics that determine appropriate modes for freight commodities – value, volume and weight, perishables, and consumer requirements – such as time, speed, reliability, packaging, and general product conditions
- Rail network availability for other operators on the branch lines but not on the primary network. The mechanism exists in the private sector participation (PSP) programme, which is currently under review by the DoT.
  - The rail mode will systematically recover from historic market losses and regain the market share on commodities that would usually be transported by rail freight. In turn, rail will become competitive – at least for long-distance traffic.
  - Air freight transportation will continue with its high growth and gain in total market share.

- Freight transport regulatory measures
  - High-priority new regulatory measures for freight transport that are aligned with the policy processes taking place in the transport environment should include:
    - Addressing the bulk movements of:
      - Iron ore, coal and other unrefined bulk mining commodities
      - Agricultural products that are less likely to perish or get damaged
      - Any liquid or gas product not transported by pipeline, and dangerous goods
  - Subjecting any future economic activity-generating new freight traffic of a bulk nature to statutory planning and the provision of infrastructure at the developers’ own cost
  - Subjecting cargo road transportation to severe increased pricing, and new mechanisms for the use and access of public roads and designated areas
  - Restricting the continuous expansions on the current road network to those strategic roads that improve quality, standards, and efficiency, the application of demand management mechanisms, and capacity.

- Given the far-reaching effects of South Africa’s current and projected demographic, economic and land use profile, aspects of freight and passenger transport cannot be viewed in isolation. The realisation of the transport vision for 2050 will require a solid infrastructure that will result in an efficient and effective integrated transport system with consideration to financial realities.

- Competition in the management of container terminals
  - Greater competition in the management of container terminals is encouraged. The approach to competition should be nuanced and properly timed or linked to a broader strategy for the container freight system and should be linked to private sector involvement. The mechanism for this is hosted in the PSP currently under review by the DoT.