PROVINCE OF KWAZULU-NATAL
DEPARTMENT OF TRANSPORT

ANNUAL REPORT:
OVERLOAD CONTROL 2011

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Executive Summary

Introduction:

This report presents important statistics on the vehicle weighing activities of the KwaZulu-Natal Department of Transport during 2011 and makes comparisons with weighing in previous years. The weighing data has been computerised since 1988 making it possible to evaluate twenty four years of time series data and identify long-term trends.

All analyses of weighing data are done using the CSIR Vehicle Overloading Management System (VOMS) both on a monthly and an annual basis. The system has been utilised in the province since 1988 and has been updated on an on-going basis to meet the growing needs of the Department.

General Weighing Statistics:

During 2011, 167 215 vehicles were weighed at the KwaZulu-Natal Department of Transport's weighbridges of which 30 521 (18.3%) were overloaded and 7 115 (4.3%) chargeable. The percentage of vehicles overloaded increased from 16.7% in January to 17.4% in December, while the percentage of vehicles chargeable varied between 3.9% and 5.3% for the year.

The number of vehicles weighed in 2011 represent a decrease of 18.3% compared with the 204 589 vehicles weighed during 2010, which was the highest number of vehicles weighed in a year. The number of vehicles overloaded decreased by 16.2% from 36 429 to 30 521 and the number of vehicles chargeable decreased by 17.9% from 8 661 in 2009 to 7 115 in 2011.

One of the reasons for the reduction in the number of vehicles weighed in 2011 compared with 2010 is the Telkom lines serving the Midway and Groutville weighbridges that were repeatedly stolen. Telkom eventually refused to have these lines replaced. Without the Telkom lines no network connectivity is available and no weighing can then take place. Midway weighbridge is historically the most active in KwaZulu-Natal in terms of the number of vehicles weighed and in 2011 weighed 22% less vehicles compared with 2010. At Groutville no weighing took place from April to December 2011.

A further reason for the reduction in the number of vehicles weighed is the Ladysmith weighbridge that could not weigh any vehicles in 2011 due to the reconstruction of the road past the weighbridge by SANRAL. No vehicles could be directed to the weighbridge due to the construction. In 2010, 4 094 vehicles were weighed at the Ladysmith weighbridge.

Prior to 1990, less than 10% of the overloaded vehicles were overloaded within the tolerance. This percentage increased to 78% in 2005, which is an indication of a reduction in the degree of overloading. In 2006, the percentage of overloaded vehicles overloaded within the tolerance reduced to 73% and remained at 73% until 2009. In 2010 the percentage of vehicles overloaded within the tolerance increased to 76% and increased slightly to 77% in

2011.

Of the 167 215 vehicles weighed in 2011, 117 236 (70%) were weighed on the N3 corridor. Of these, 20 787 (17.7%) were overloaded and 3 991 (3.4%) chargeable. In comparison, in the remainder of the province (primarily the N2 north corridor) 19.5% of the vehicles weighed were overloaded and 6.3% were chargeable.

Enforcement at Individual Weighbridges:

There are 15 active weighbridge sites in KwaZulu-Natal. The highest number of vehicles weighed at a single weighbridge was 42 173 vehicles weighed at Midway, representing an average of 3 514 vehicles per month. This is 22% lower than the Midway monthly average of 4 513 vehicles for 2010. Midway experienced network connectivity problems in 2011, resulting in many lost days when weighing could not take place.

The lowest number of vehicles weighed was 2 043 vehicles at Vryheid representing an average of 170 vehicles per month. Vryheid was also the weighbridge where the lowest number of vehicles was weighed in 2010. The monthly average of 170 vehicles in 2011 is 41% higher than the Vryheid monthly average of 121 vehicles during 2010.

The average overload per overloaded vehicle for 2011 at Empangeni remained significantly higher than that of the other weighbridges, suggesting that the level of enforcement should be increased.

Overload Monitoring Using Weigh-in-Motion Equipment

Weigh data from permanent weigh-in-motion sites and from sites monitored using portable weigh-in-motion equipment on key provincial routes show an average extent of overloading on these routes of 17.2% in 2011, with an extent of overloading as high as 34% recorded in the Newcastle area.

Average Overloads:

There was a steady downward trend in the average overload per overloaded vehicle from 1997 to 2007. From 2007 to 2009 the average overload per overloaded vehicle remained at approximately 780 kg, but further decreased to approximately 740 kg in 2010 and remained at this level in 2011.

The annual average overloads in contravention of Regulation 234/5 (permissible maximum axle and axle unit masses) have decreased from 2 420 kg in 1988 to 722 kg in 2006.Since 2007 it has been varying between 725kg and 769 kg, with a value of 742 kg in 2011. The annual average overload in contravention of Regulation 236/237 (permissible maximum vehicle/combination mass) has decreased from 2 920 kg in 1996 to 1 053 kg in 2006 and then to 827 kg in 2008, which represents a reduction of 21.5% from 2006 to 2008. In 2011 it was 758 kg, which is a decrease of 5% from 2010 to 2011. The stabilising of the average overload in contravention of Regulations 236 and 237 can be ascribed to the continuous impact of the introduction of the 2% tolerance (previously 5%) for maximum

vehicle/combination mass on 15 June 2006.

Considering the average overload of single axles (non-steering with dual tyres), tandem axle units (dual tyres) and tridem axle units for the past five years, the average overload of tandem axle units and tridem axle units have remained relatively constant since 2002, while the average overload for single axles with dual tyres has been varying between 700 kg and 900 kg for the same period, with a value of 855 kg in 2011.

Maximum Overloads:

The highest overload recorded in 2011 was 24 960 kg by the company GK Transport transporting sand. The vehicle was weighed at the Umdloti weighbridge on the N2. The second highest recorded overload of 22 560 kg was by the company Urban Dynamics transporting containers and was weighed at Mkondeni weighbridge on the N3.

In 2011 there were four overloads above 20 t, while in 2010 there were six overloads above 20 t. A decrease in the annual averages of the 100, 250, 500 and 1 000 maximum overloads were recorded in 2011 compared to 2010, with decreases in the annual averages ranging from 11% for the 100 maximum to 13% for the 500 maximum overloads. This is a continuation of the trend since 2009.

Distribution of Vehicle Overloads:

Since 2007, the percentage of overloaded vehicles in the various overload bands has remained more or less constant, with the percentage of vehicles overloaded by less than 1 t remaining at approximately 80% and the percentage overloaded by less than 2 t, remaining at approximately 93%.

Company Statistics:

Vehicles from 11 368 different companies were weighed during 2010. 3 793 companies had only one vehicle weighed each while a further 5 169 had less than 10 vehicles weighed each. 13 companies had more than 1 000 vehicles weighed, with the highest number weighed for a single company being 3 846. The company name was not recorded for 10 103 vehicles (6% of the vehicles weighed).

In terms of overloaded vehicles, 6 212 companies had no overloaded vehicles weighed. This is 55% of all the companies. 1 779 vehicles, for which the company name was not recorded, were overloaded.

In terms of vehicles overloaded by more than the prosecution tolerances, 8 496 companies (74.7%) had no vehicles in this category, while a further 2 797 companies (24.6%) had less than 10 overloaded vehicles in this category. 135 vehicles, for which the company name was not recorded, were overloaded by more than the prosecution tolerances.

The problem with the non-recording of company names should be addressed with the staff at the weighbridges.

In order to identify the worst offending companies, a Company Overload Number (CON) is calculated for each company, based on the degree and extent of overloading by the company and the impact of the company's overloading. The twenty worst offenders identified by way of the Company Overload Number are reported in this section. Four of these companies were amongst the twenty worst offenders in the 2010 report as well.

As previously, it is recommended that the CEOs of these companies be approached with a view to requesting improved compliance in future.

Vehicle Class Statistics:

The ten most common vehicle classes weighed during 2010 are the 7-axle interlink with three tandem axle units (class 1222); the 6-axle articulated vehicle with a rear tridem axle unit (class 123); the 2-axle rigid truck (class 11); the 3-axle rigid truck (class 12); the 5-axle articulated vehicle with a rear tandem axle unit (class 122); the 4-axle articulated vehicle, with a single drive axle and tandem axle unit on the semi-trailer (class 112); the 3-axle articulated vehicle, with a single drive axle and a single axle on the semi-trailer (class 111); the 5-axle articulated vehicle, with a single drive axle and a tridem axle unit on the semi-trailer (class 113); the 8-axle interlink with two tandem axle units and a tridem axle unit (class 1232); and the 5-axle articulated truck, with a tandem drive axle and single axle unit on the semi-trailer pulling a tandem axle trailer (class 1212). These ten vehicle classes represent 97.4% of all heavy vehicles weighed and 97.1% of all overloaded vehicles.

Of these ten vehicle classes, the extent of overloading of class 1222 was the highest at 22%. The average overload per vehicle in this class was however the lowest at 658 kg, representing an average degree of overloading of 1.2%, well below the 2% prosecution tolerance applicable to total combination mass. The vehicle class with the highest average degree of overloading is class 11 at 4.8%, almost two and a half times the prosecution tolerance of 2%. The other vehicle classes with a high average degree of overloading are mostly the classes with single drive axles. One of the reasons for this could be load distribution problems relating to the "five times the mass on the drive axle" requirement.

In terms of E80s, the long term trend in the average E80s per overloaded vehicle for the articulated vehicles (class 122 and class 123) and interlinks (class 1222 and class 1232) is downward, while for the rigid vehicles (class 11 and class 12) the trend over the last three years is slightly upwards.

Cargo Statistics:

The top four commodities, in terms of the number of vehicles weighed in 2011, were classified as "goods"; "containers"; "mixed load"; and "unknown cargo". This once again highlights the need to improve the correct recording of the cargo during the weighing procedure and this should be communicated to the staff at the weighbridges.

The top ten commodities in terms of percentage of vehicles overloaded in 2011 are mostly bulk commodities, such as tar; manganese; maize; grain; cement; diesel; wheat; stones; and

sand. Between 45% and 53% of all vehicles carrying these commodities that were weighed, were overloaded. The average overloads in most cases are however below 750 kg per vehicle, while the construction related bulk commodities, such as tar, stones and sand all have average overloads of more than 1 200 kg, with tar having the highest average overload of 1 654 kg per vehicle. Commodities with less than 100 vehicles weighed were not included in this analysis.

Conclusions:

Through the continuous efforts of the KwaZulu-Natal Department of Transport, the heavy vehicle overload situation in KwaZulu-Natal in terms of the extent and degree of overloading has stabilised since 2006 and this trend continued during 2011, which is an indication that an increased effort would be required to reduce it further.

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1. INTRODUCTION

Road and rail are the predominant means of freight transport in South Africa. Growth in the movement of freight in South Africa over the years has been significant, and in recent years the majority of growth in land freight has been captured by road. The deregulation of freight transport in the late 1980s, combined with the shortcomings in the rail system, were major causes of the migration of cargo from rail to road. This migration resulted in the high growth of cargo movement by road, to such an extent that approximately 85% of all goods are currently transported by road.

The road system is facing gradual degradation due to the underlying shortcomings of the system. On the one hand, the current budget allocation to maintain roads is only 25% of the estimated amount of R 32 billion that is required per annum. On the other hand, the significant increase in heavy vehicle volumes on the road network is causing accelerated deterioration of the road network. According to a 2008 AA Report[1], the backlog on road maintenance for the entire national and provincial road network (paved and unpaved) is currently estimated at about R 100 billion of which R 95 billion is needed for provincial roads and R 5 billion for national roads.

KwaZulu-Natal is in similar situation and the condition of the provincial network has deteriorated considerably from 1988 to 2005. According to the 2008 AA Report1, in 1988, 54% of the provincial network was in a good or very good condition, while 15% of the network was in a poor or very poor condition. By 2005 this has changed to only 18% of the provincial network being in a good or very good condition and 52% being in a poor or very poor condition.

Because of the limited funds available for the construction of new roads and also for road maintenance, it is essential that the effective enforcement of axle and vehicle mass regulations is executed throughout South Africa in order to protect the country's road network.

The KwaZulu-Natal Department of Transport (the Department) identified this need a number of years ago and during 1998 a strategy for vehicle overload control was formulated for the KwaZulu-Natal Department of Transport by the CSIR. This overload control strategy has been implemented in phases since January 2000 and currently the Department is operating 15 weighbridges throughout KwaZulu-Natal.

This report presents important statistics concerning the vehicle weighing activities of the Department during 2010 and makes comparisons with weighing in previous years. The weighing data has been computerised since 1988 making it possible to evaluate twenty four years of time series data and identify long-term trends. All analyses of overloading data are

[1]Road Conditions and Funding 2008: a 20 Year Review of National and Provincial Roads in South Africa (Report prepared by Transport Traffic Technology Africa for the Automobile Association, October 2008)

done using the CSIR Vehicle Overloading Management System (VOMS) both on a monthly and an annual basis. The system has been utilised in the province since 1988 and has been updated on an on-going basis to meet the growing needs of the Department.

2. GENERAL WEIGHING STATISTICS

During 2010, 167 215 vehicles were weighed, 30 521 vehicles were overloaded and 7 115 vehicles were chargeable

The term “chargeable” refers to vehicles that exceed the tolerance (a prosecution guideline) applied to all the mass limits. If the mass of an axle, axle unit, vehicle or combination of vehicles exceeds one of the legal limits, the vehicle is overloaded, but only if the tolerance limit is exceeded can the driver/operator be prosecuted.

The 167 215 vehicles weighed during 2011 is a decrease of 37 374 vehicles or 18.3% compared with 2010. The number of vehicles weighed in 2010 (204 589) is the highest number weighed per year since 1990.

One of the reasons for the reduction in the number of vehicles weighed in 2011 compared with 2010 is the Telkom lines serving the Midway and Groutville weighbridges that were repeatedly stolen. Telkom eventually refused to have these lines replaced. Without the Telkom lines no network connectivity is available and no weighing can then take place. Midway weighbridge is historically the most active in KwaZulu-Natal in terms of the number of vehicles weighed and in 2011 weighed 22% less vehicles compared with 2010. At Groutville no weighing took place from April to December 2011.

A further reason for the reduction in the number of vehicles weighed is the Ladysmith weighbridge that could not weigh any vehicles in 2011 due to the reconstruction of the road past the weighbridge by SANRAL. No vehicles could be directed to the weighbridge due to the construction. In 2010, 4 094 vehicles were weighed at the Ladysmith weighbridge.

The number of overloaded vehicles in terms of the legal limit was 30 521 (18.3%) compared with 36 429 (18%) in 2010. The number of vehicles chargeable was 7 115 (4.3%) compared with 8 661 (4.2%) vehicles chargeable in 2010. The number of vehicles weighed decreased by 18.3% from 2010 to 2011, the number of vehicles overloaded decreased by 16.2% and the number chargeable decreased by 17.9%.

The numbers of vehicles weighed, overloaded and chargeable per month during 2011 are presented in Figure 2-1 and Table 2-2. Also shown in Figure 2-1 are the percentage vehicles overloaded and the percentage vehicles chargeable per month. The percentage of vehicles overloaded increased from 16.7% in January to 17.4% in December, while the percentage of vehicles chargeable varied between 3.9% and 5.3% for the year.

The annual statistics from 1991 to 2011 are presented in Table 2-1 and Figure 2-2. Included in Figure 2-2 are the percentage vehicles overloaded and the percentage vehicles chargeable per month, indicating that the percentage of vehicles overloaded and chargeable have stabilised at around 18% and 4% respectively.

During 2011 the number of vehicles weighed per month varied from a minimum of 7 285

vehicles in December to a maximum of 13 380 vehicles in January. Both the minimum and maximum values are lower than the equivalent values for 2010.

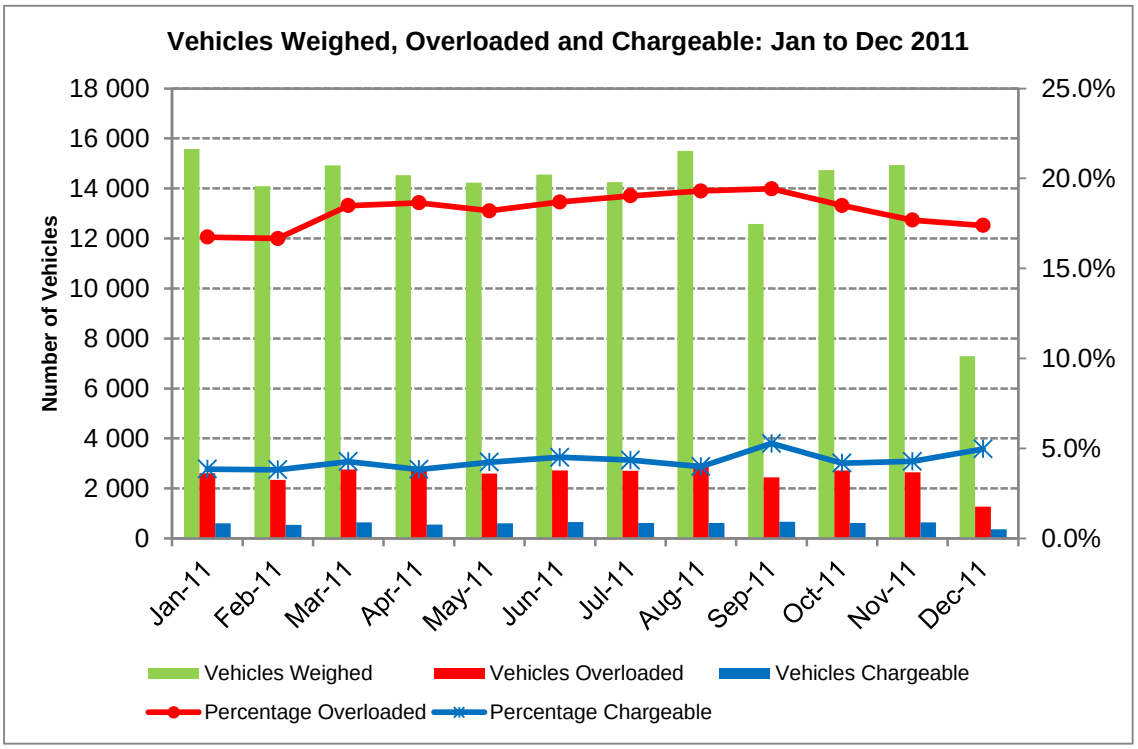


Figure 2-1: Number of vehicles weighed, overloaded and chargeable: January to December 2011

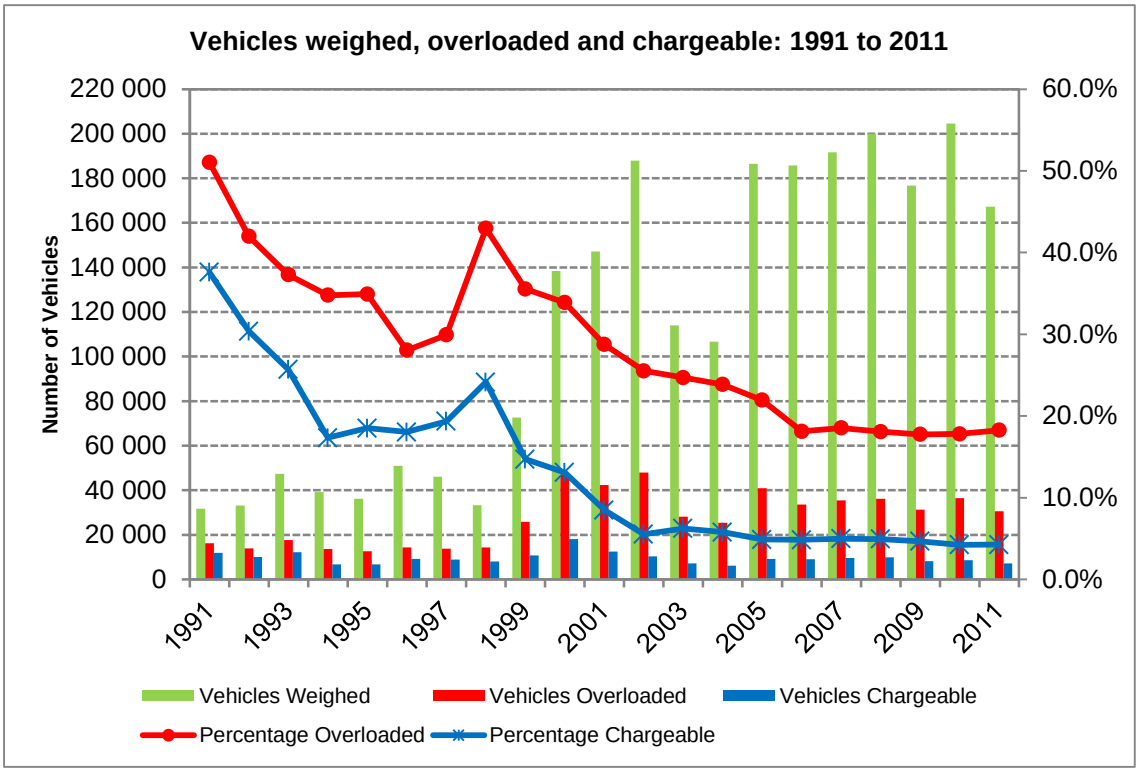


Figure 2-2: Numbers of vehicles weighed, overloaded and chargeable: 1991 to 2011

Table 2-1: Number of vehicles weighed, overloaded and chargeable: 1991 to 2011

Year	Vehicles weighed	Vehicles overloaded	Vehicles chargeable	Percentage overloaded	Percentage chargeable
1991	31 725	16 195	11 927	51	38
1992	33 108	13 897	10 057	42	30
1993	47 395	17 673	12 175	37	26
1994	39 230	13 643	6 803	35	17
1995	36 238	12 655	6 705	35	19
1996	50 969	14 295	9 191	28	18
1997	46 071	13 785	8 911	30	19
1998	33 312	14 313	8 045	43	24
1999	72 640	25 819	10 690	36	15
2000	138 367	46 883	18 117	34	13
2001	147 113	42 291	12 496	29	8
2002	187 961	47 961	10 386	26	6
2003	113 196	28 158	7 104	25	6
2004	106 619	25 432	6 166	24	6
2005	186 488	40 899	9 118	22	5
2006	185 710	33 648	8 977	18	5
2007	191 616	35 487	9 461	19	5
2008	200 030	36 177	9 901	18	5
2009	176 739	31 352	8 238	18	5
2010	204 589	36 429	8 661	17.8	4.2
2011	167 215	30 521	7 115	18.3	4.3

Table 2-2: Number of vehicles weighed, overloaded and chargeable: January to December 2011

Month	Vehicles weighed	Vehicles overloaded	Vehicles chargeable	Percentage overloaded	Percentage chargeable
Jan-11	15 580	2 608	600	16.7	3.9
Feb-11	14 092	2 348	538	16.7	3.8
Mar-11	14 919	2 758	637	18.5	4.3
Apr-11	14 537	2 711	558	18.6	3.8
May-11	14 229	2 590	603	18.2	4.2
Jun-11	14 559	2 721	657	18.7	4.5
Jul-11	14 253	2 713	620	19.0	4.3
Aug-11	15 506	2 993	619	19.3	4.0
Sep-11	12 580	2 444	664	19.4	5.3
Oct-11	14 738	2 726	617	18.5	4.2
Nov-11	14 937	2 642	640	17.7	4.3
Dec-11	7 285	1 267	362	17.4	5.0

Max/Min

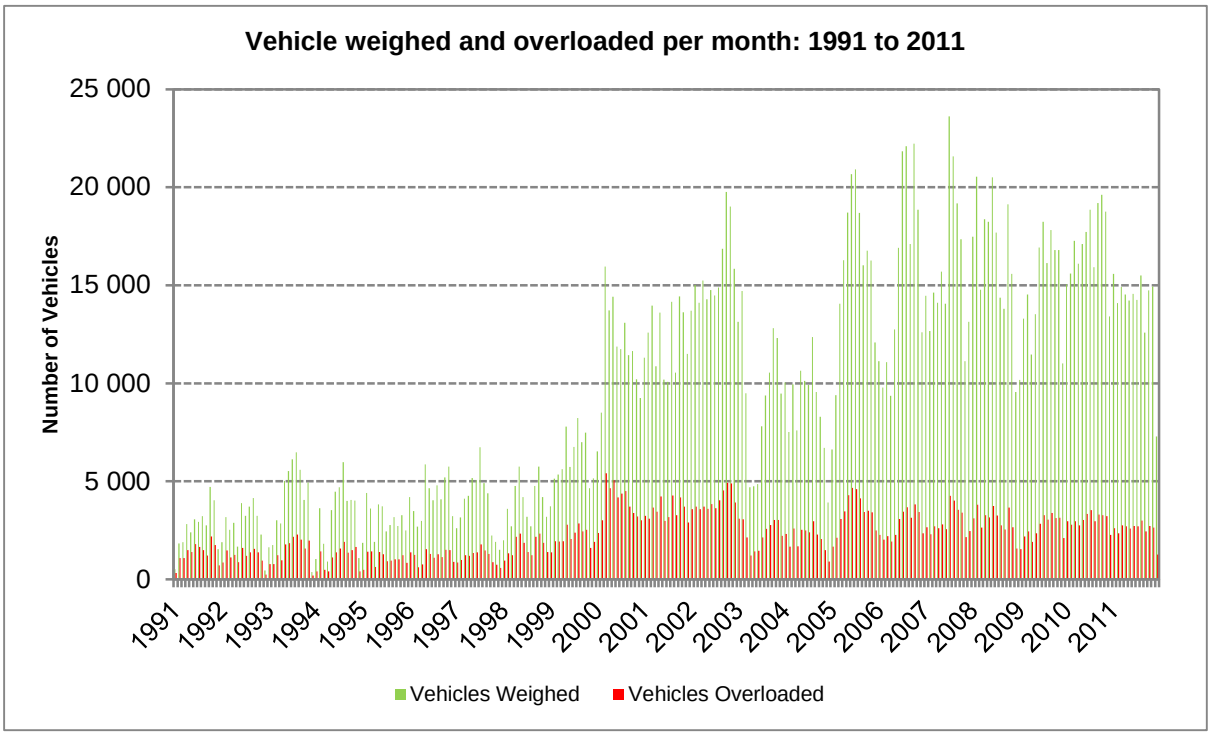


Figure 2-3: Vehicles weighed and overloaded per month: 1991 to 2011

3. WEIGHING STATISTICS RELATIVE TO THE PROSECUTION TOLERANCES

As mentioned previously, a prosecution for overloading offences may only be instituted if the overloading exceeds the prosecution tolerances. The prosecution tolerances are laid down by the National Prosecuting Authority and are contained in Part 29 of the National Prosecutors Manual. These prosecution tolerances are as follows:

"10. In respect of prosecutions for overloading the following guidelines apply:

a. The following tolerances must be allowed before a prosecution for overloading offences may be instituted:

i. 5% on the permissible maximum axle and axle-unit mass loads, as referred to in regulations 234 and 235, and on the minimum steering axle mass loads as referred to in regulation 242 of the Road Traffic Regulations, 2000; and

ii. 2% on the permissible maximum vehicle and combination mass loads as referred to in regulations 236 and 237, and the maximum mass allowed on a group of axles in terms of regulation 241 (bridge formula) of the Road Traffic Regulations, 2000"

In this section, the weighing statistics are presented in terms of the number of overloaded vehicles within and outside these prosecution tolerances.

Table 3-1 and Figure 3-1 show a significant trend since 1990 in terms of the number of overloaded vehicles within the tolerance versus those exceeding the tolerance. In 1990, only 23.7% of the 9 280 overloaded vehicles weighed at weighbridges were overloaded within the tolerance. This percentage increased to almost 78% in 2005, indicating that the tolerance was being utilised by many operators to maximise vehicle payloads. This prompted a review of the tolerance resulting in a recommendation by the National Overload Control Technical Committee (NOCTC) to reduce the tolerance on permissible vehicle and combination masses from 5% to 2%. This recommendation was approved by COTO and the National Prosecuting Authority and was implemented on 15 June 2006.

The effect of this change can be seen from 2006 onwards, with the percentage of vehicles overloaded within the tolerance reducing to around 73% for the period 2006 to 2009. In 2010 and 2011, the percentage of vehicles overloaded within the tolerance increased to 76%.

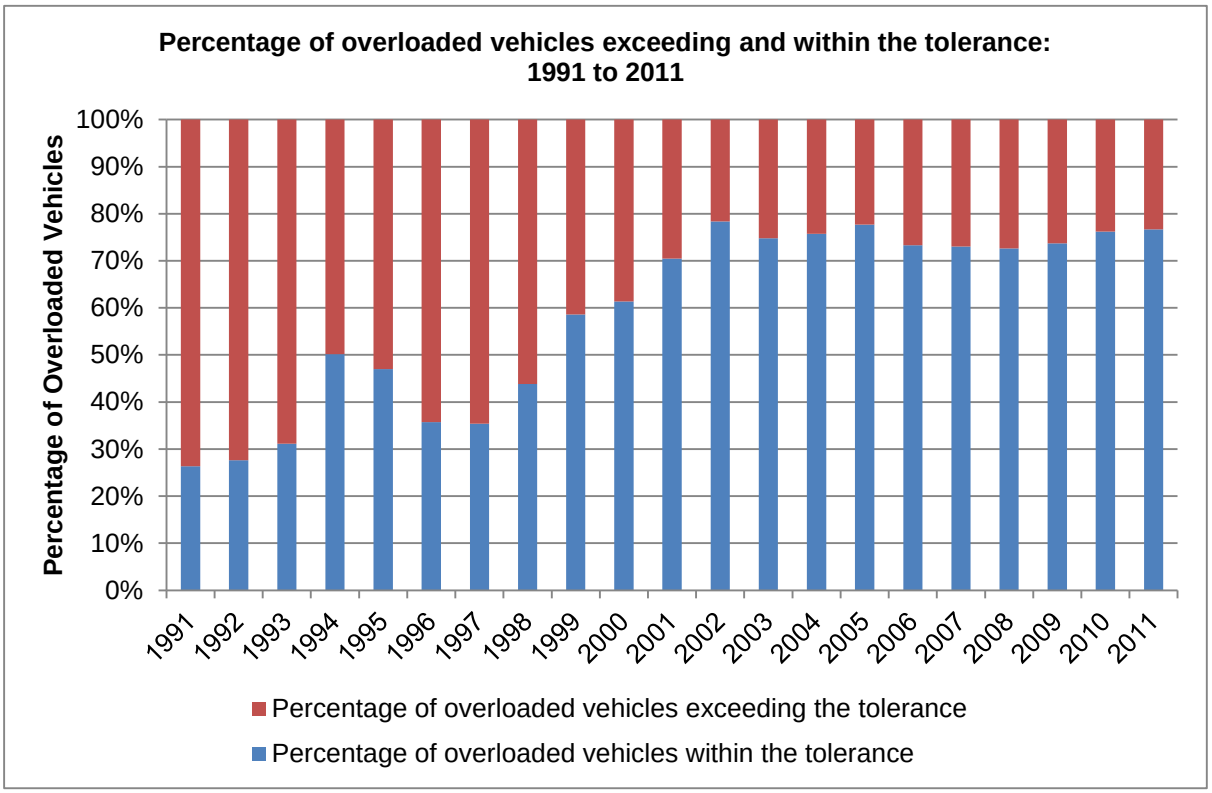


Figure 3-1: Percentage of overloaded vehicles exceeding and within the tolerance: 1991 to 2011

Table 3-1: Percentage of overloaded vehicles within and exceeding the prosecution tolerance: 1990 to 2011

Year	Vehicles weighed	Vehicles overloaded	Vehicles Chargeable	Percentage not chargeable (ito vehicles overloaded)	Percentage chargeable (ito vehicles overloaded)
1990	15 472	9 280	7 085	23.7	76.3
1991	31 725	16 195	11 927	26.4	73.6
1992	33 108	13 897	10 057	27.6	72.4
1993	47 395	17 673	12 175	31.1	68.9
1994	39 230	13 643	6 803	50.1	49.9
1995	36 238	12 655	6 705	47.0	53.0
1996	50 969	14 295	9 191	35.7	64.3
1997	46 071	13 785	8 911	35.4	64.6
1998	33 312	14 313	8 045	43.8	56.2
1999	72 640	25 819	10 690	58.6	41.4
2000	138 367	46 883	18 117	61.4	38.6
2001	147 113	42 291	12 496	70.4	29.6

Year	Vehicles weighed	Vehicles overloaded	Vehicles Chargeable	Percentage not chargeable (ito vehicles overloaded)	Percentage chargeable (ito vehicles overloaded)
2002	187 960	47 961	10 386	78.3	21.7
2003	113 996	28 158	7 104	74.8	25.2
2004	106 619	25 432	6 166	75.8	24.2
2005	186 488	40 899	9 118	77.7	22.3
2006	185 710	33 648	8 977	73.2	26.8
2007	191 616	35 487	9 461	73.3	26.7
2008	200 030	36 177	9 901	72.6	27.4
2009	176 739	31 352	8 238	73.7	26.3
2010	204 589	36 429	8 661	76.2	23.8
2011	167 215	30 521	7 115	76.7	23.3

4. WEIGHING STATISTICS RELATIVE TO THE MASS REGULATIONS

The Road Traffic Act, 1996 (Act No. 93 of 1996), and the Road Traffic Regulations made in terms of this Act determine the maximum mass limits of vehicles used on public roads. The relevant regulations are 234, 235, 236, 237, 238, 239, 240, 241, 242 and 243.

The weighing statistics relating to the various regulations are covered in this section. The statistics are presented relative to the following three groups of mass regulations:

- Axles and axle units:
  - Reg. 234: Permissible maximum axle mass
  - Reg. 235: Permissible maximum axle unit mass

- Vehicles and combination of vehicles:
  - Reg. 236: Permissible maximum vehicle mass
  - Reg. 237: Permissible maximum combination mass,

- Bridges
  - Reg. 241: Massload carrying capacity of bridges (bridge formula)

The number of vehicles overloaded per mass regulation group per month for the year 2011 is illustrated graphically in Figure 4-1 and summarised in Table 4-1. The long term trend in the number of vehicles overloaded per mass regulation group is illustrated graphically in Figure 4-2 and listed in Table 4-2.

From Figure 4-2 and Table 4-2 it can be seen that more vehicles are overloaded on axles and axle units than on vehicle or combination mass, while very few vehicles are overloaded in terms of the bridge formula (Regulation 241). The latter is in all probability due to the limited application of the bridge formula at the weighbridges.

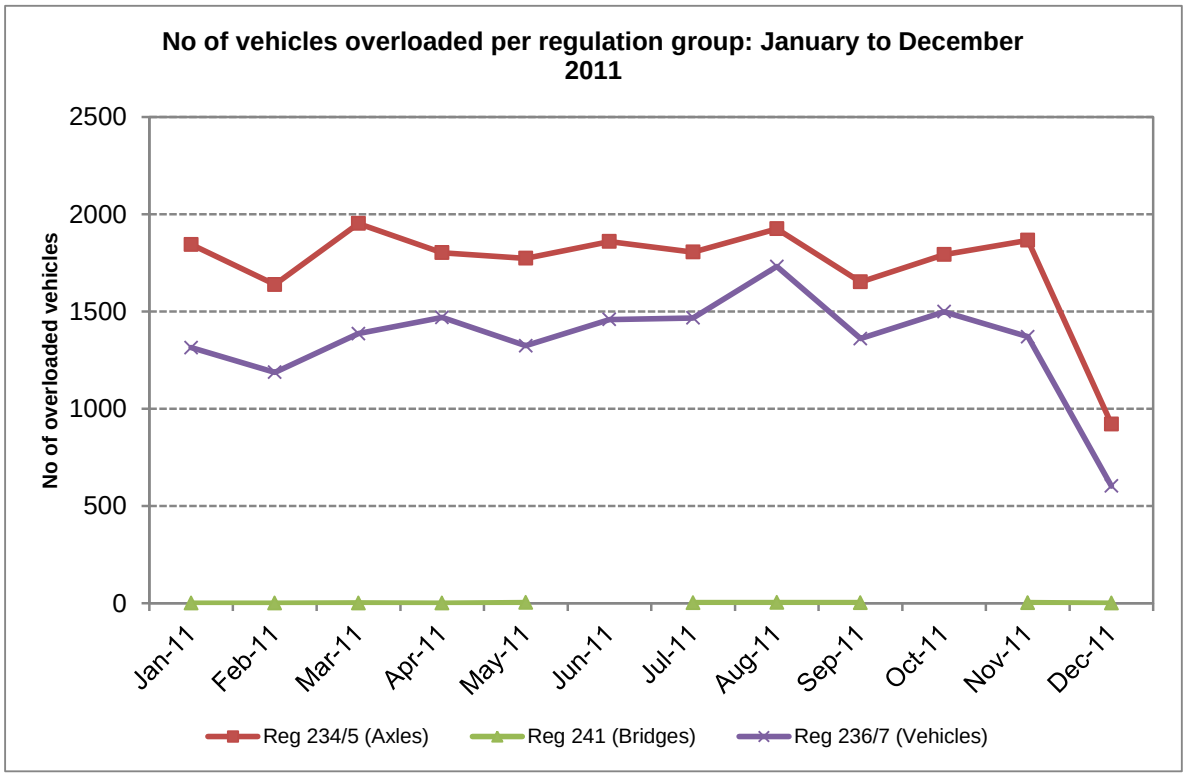


Figure 4-1: Number of vehicles overloaded per regulation group: January to December 2011

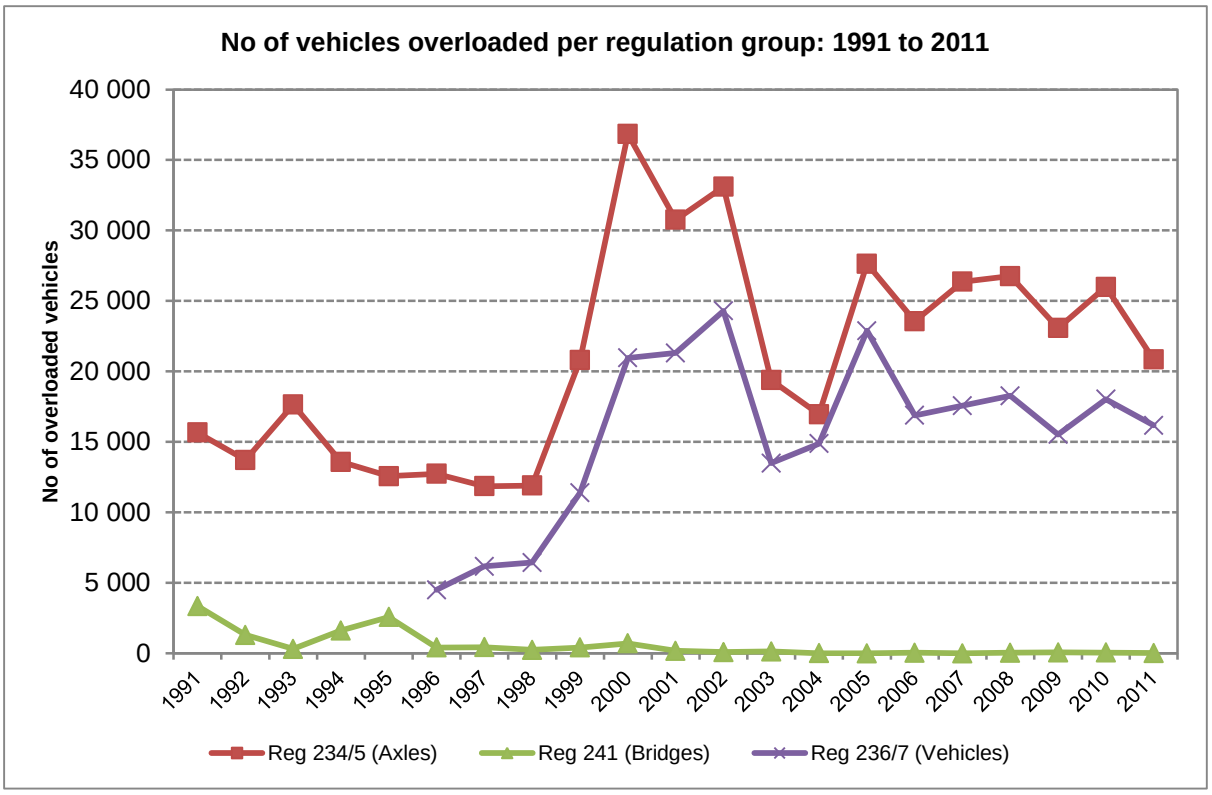


Figure 4-2: Number of vehicles overloaded per regulation group: 1991 to 2011

Table 4-1: Number of vehicles overloaded per regulation group: January to December 2011

Month	Vehicles overloaded (Reg 234/5)	Vehicles overloaded (Reg 241)	Vehicles overloaded (Reg 236/7)
Jan-11	1 845	1	1 315
Feb-11	1 639	1	1 188
Mar-11	1 953	2	1 387
Apr-11	1 803	1	1 470
May-11	1 774	4	1 324
Jun-11	1 860		1 459
Jul-11	1 806	3	1 467
Aug-11	1 926	4	1 732
Sep-11	1 653	3	1 361
Oct-11	1 793		1 499
Nov-11	1 867	3	1 371
Dec-11	922	1	603

Table 4-2: Number of vehicles overloaded per regulation group: 1991 to 2011

Year	Vehicles overloaded (Reg 234/5)	Vehicles overloaded (Reg 241)	Vehicles overloaded (Reg 236/7)
1991	15 663	3 356	
1992	13 722	1 309	
1993	17 651	312	
1994	13 579	1 620	
1995	12 565	2 581	
1996	12 735	415	4 507
1997	11 854	438	6 167
1998	11 898	240	6 435
1999	20 811	409	11 394
2000	36 837	709	20 958
2001	30 763	177	21 311
2002	33 097	85	24 292
2003	19 385	136	13 493
2004	16 955	11	14 877
2005	27 640	0	22 881
2006	23 556	38	16 877
2007	26 367	0	17 566
2008	26 761	37	18 263
2009	23 071	61	15 529
2010	25 999	58	18 036
2011	20 841	23	16 176

5. ENFORCEMENT AT INDIVIDUAL WEIGHBRIDGES

The vehicle weighing activities at each of the 15 weighbridge sites in KwaZulu-Natal during 2010 are presented graphically in Figure 5-1 and summarised in Table 5-1. The locations of the 15 weighbridges are shown on the map in Appendix A.

The highest number of vehicles weighed at a single weighbridge was 42 173 vehicles at Midway, representing an average of 3 514 vehicles per month. Midway was also the weighbridge where the highest number of vehicles was weighed in 2010. The monthly average of 3 514 vehicles in 2011 is 22% lower than the Midway monthly average of 4 513 vehicles during 2010. The lowest number of vehicles weighed was 2 043 vehicles at Vryheid representing an average of 170 vehicles per month. Vryheid was also the weighbridge where the lowest number of vehicles was weighed in 2010. The monthly average of 170 vehicles in 2011 is 41% higher than the Vryheid monthly average of 121 vehicles during 2010.

Weighing was restricted at the Midway and Groutville weighbridges due to the repeated theft of the Telkom cables serving these weighbridges. Without the Telkom lines no network connectivity is available and no weighing can then take place. No vehicles could be weighed at the Ladysmith weighbridge in 2011 due to the reconstruction of the road past the weighbridge by SANRAL.

The percentage of vehicles overloaded varies from a maximum of 34% at Empangeni to a minimum of 13% at Greytown, while the percentage of vehicles chargeable varies from a maximum of 14% at Empangeni to a minimum of 3% at Midway.

The vehicle weighing activities per month at each weighbridge during 2011 are presented in Appendix B. The numbers of vehicles weighed, overloaded and chargeable per year per weighbridge from 1999 to 2011 are presented in Appendix C.

Of the 167 215 vehicles weighed in 2011, 117 236 (70%) were weighed on the N3 corridor. Of these, 20 787 (17.7%) were overloaded and 3 991 (3.4%) chargeable. In comparison, in the remainder of the province (primarily the N2 north corridor) 19.5% of the vehicles weighed were overloaded and 6.3% were chargeable.

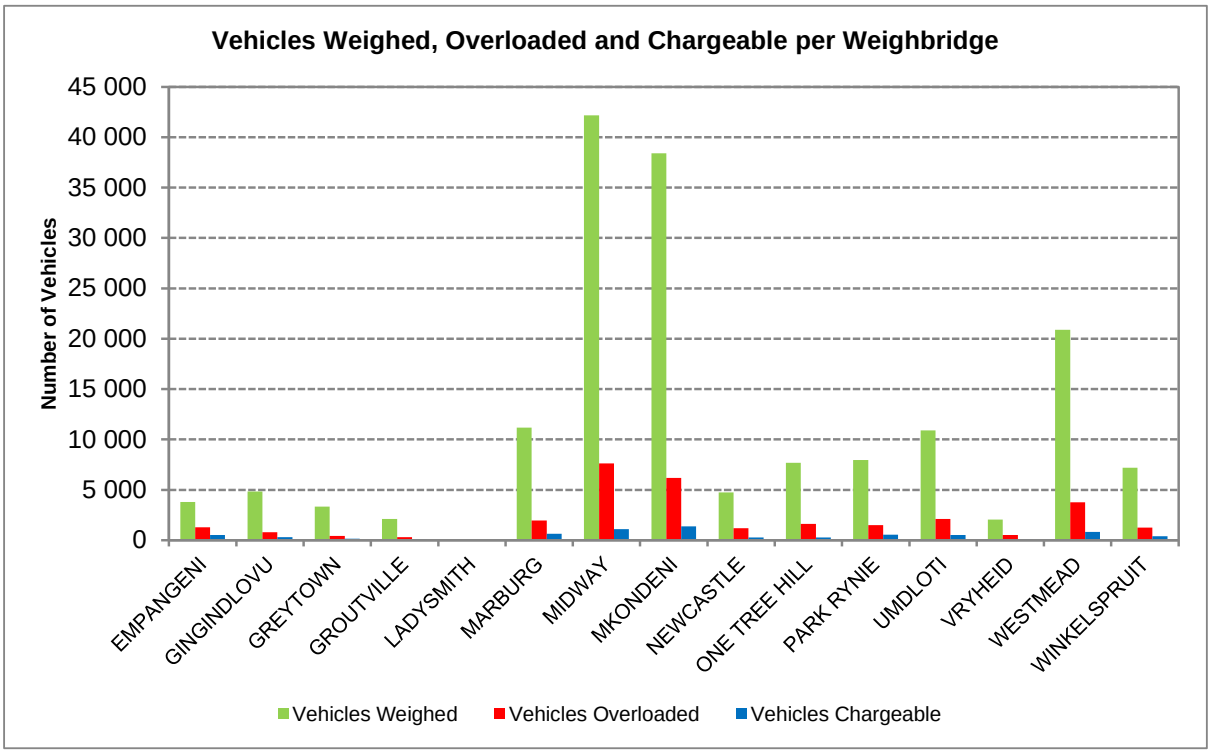


Figure 5-1: Number of vehicles weighed, overloaded and chargeable per weighbridge: January to December 2011

Table 5-1: Individual weighbridge statistics: January to December 2011

Locality	Number of Vehicles Weighed	Number of Vehicles Overloaded	Percentage Overloaded	Average Overload (kg)	Number of Vehicles Chargeable	Percentage Chargeable
Empangeni	3 782	1 295	34.2	1 329	528	14
Gingindlovu	4 843	807	16.7	785	289	6
Greytown	3 325	417	12.5	921	147	4.4
Groutville	2 115	298	14.1	656	77	3.6
Ladysmith[(1)]						
Marburg	11 171	1 970	17.6	754	647	5.8
Midway	42 173	7 617	18.1	599	1 101	2.6
Mkondeni	38 409	6 190	16.1	800	1 366	3.6
Newcastle	4 738	1 175	24.8	858	284	6
One Tree Hill	7 694	1 624	21.1	579	259	3.4
Park Rynie	7 943	1 482	18.7	706	558	7
Umdloti	10 901	2 123	19.5	809	509	4.7
Vryheid	2 043	504	24.7	759	124	6.1
Westmead	20 897	3 764	18	725	834	4
Winkelspruit	7 181	1 255	17.5	739	392	5.5
Total	**167 215**	**30 521**	**18.3**	**743**	**7 115**	**4.3**

(1) *No weighing could take place due to reconstruction of road past weighbridge*

The average overload per overloaded vehicle per weighbridge for 2010 is presented in Figure 5-2. The average overload varies between a maximum of 1 088 kg at Empangeni to a minimum of 620 kg at Midway. During 2009 the weighbridge with the highest average overload was Newcastle.

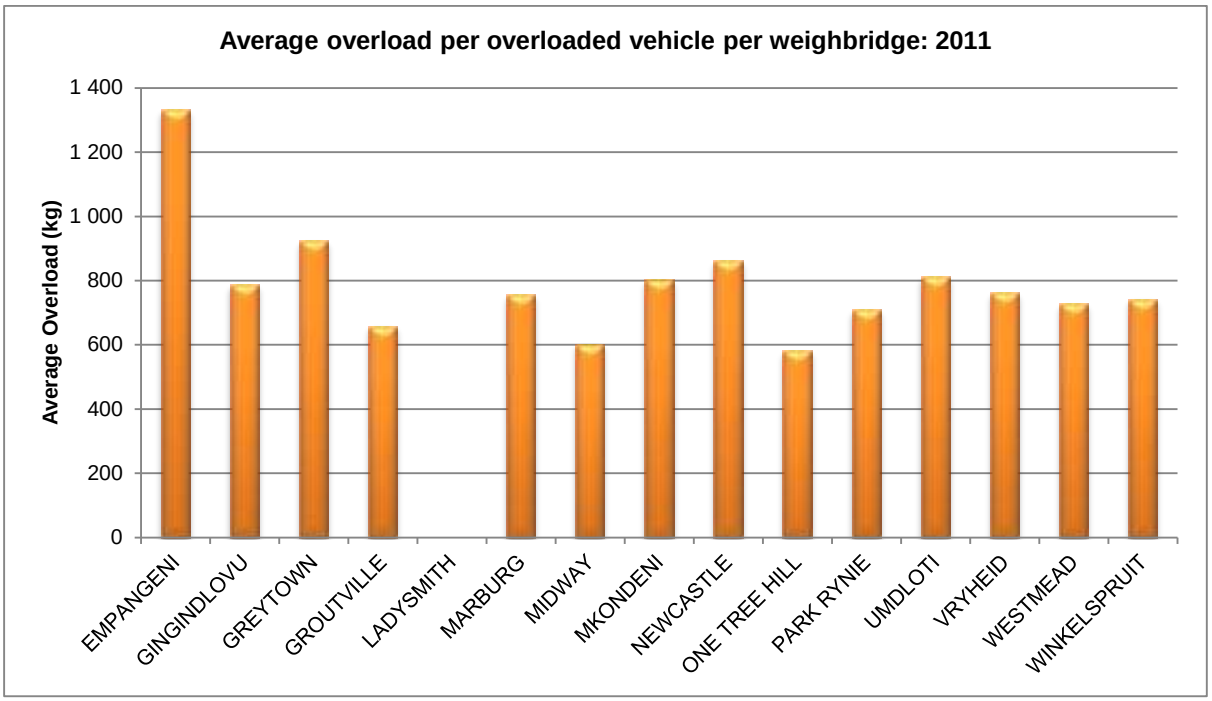


Figure 5-2: Average overload per overloaded vehicle per weighbridge: 2011

6. OVERLOAD MONITORING USING WEIGH-IN-MOTION EQUIPMENT

In KwaZulu-Natal there is extensive overload control on the national road network, while overload control on the provincial road network is currently being somewhat neglected, which is of concern to the Department of Transport. In order therefore to determine the extent of overloading on the key provincial routes, the KwaZulu-Natal Department of Transport have installed permanent weighing-in-motion (WIM) sites to monitor light and heavy vehicle trends. In addition, portable WIM scales are used on alternative routes to randomly measure overloading trends.

The results from the permanent WIM sites for 2010 and 2011 are summarised in Table 6-1 showing that the extent of overloading on these provincial roads varied from approximately 4% to 20% in 2010 and from approximately 5% to 21% in 2011. The percentage vehicles overloaded in Table 6-1 and Table 6-2 refers to vehicles overloaded above the legal limit.

Table 6-1: Permanent WIM sites statistics: 2010 to 2011

			2010			2010		
Locality	**Station**	**Route**	**ADT**	**ADTT**	**%OL**	**ADT**	**ADTT**	**%OL**
Ixopo	1263	R612	-	-	-	Not operational		
Thornville	1106	R56	5 836	562	10.3	5 867	513	12
Eston	1103	R603	2 725	431	18.5	2 679	403	
Merrivale	1264	R617	6 865	584	4.2	6 969	610	5
Balgowan North	1267	R103	-	-	-	3 924	273	6
Verulam	1261	R102	-	-	-	Under construction		
Kwa Dukuza	1268	R74	9 503	680	15.4	9 416	582	11
Nkobida	1269	R618	5 425	265	13.0	5 747	312	12
Utrecht	3601	R34	n/a	n/a	n/a	2 416	230	12
KZN Bergville	3602	R74	n/a	n/a	n/a	2 428	229	12
Brackenham	1270	MR231	14 821	1331	19.8	15 692	1 482	7
Gingindlovu	1107	R66	5 248	527	7.2	Not operational		

Portable weigh-in-motion scales are used to monitor vehicles that use alternate routes to avoid static weighbridges. The results for 2010 and 2011 are summarised in Table 6-2 showing that the extent of overloading varied from 9% to 50% in 2010 and from 16% to 34% in 2011. The highest percentage of overloaded vehicles recorded in 2010 was 59% at Westmead and in 2011 it was 34% at Newcastle. On the alternate routes monitored with portable weigh-in-motion scales, the average percentage vehicles overloaded was 23% in 2010 and 26% in 2011.

Table 6-2: Portable WIM statistics on alternative routes: 2010 to 2011

Locality	2010			2011		
	Number of Vehicles Weighed	Number of Vehicles Overloaded	Percentage Overloaded	Number of Vehicles Weighed	Number of Vehicles Overloaded	Percentage Overloaded
Empangeni	180	26	14	650	158	24
Greytown	101	29	29	0		
Ladysmith	256	23	9	0		
Marburg	175	16	9	347	80	23
Midway	0			62	10	16
Mkondeni	261	68	26	529	151	28
Newcastle	94	13	14	65	22	34
Park Rynie	228	31	14	166	41	25
Umdloti/Groutville	195	33	17	606	128	21
Westmead	85	50	59	461	151	33
Pongola	279	139	50	0		
Total	**1 854**	**428**	**23%**	**2 886**	**741**	**26**

7. AVERAGE OVERLOADS

This section presents information on average overloads per vehicle, average overloads per regulation group and average overloads per axle/axle unit type[1]. Figure 7-1 and Table 7-1 highlights the downward trend since 1996 in the average overload per overloaded vehicle in the province. There was a steady downward trend in the average overload per overloaded vehicle from 1997 to 2007. From 2007 to 2009 the average overload per overloaded vehicle remained at approximately 780 kg, but further decreased to approximately 740 kg in 2010 and remained at this level in 2011.

Figure 7-2 shows the average overload per month per regulation group for 2011, while Figure 7-3 and Table 7-2 show the long-term trend in the degree of overloading in KwaZulu-Natal in terms of the regulation groups. Statistics for Regulation 241 have not been included in these tables and graphs, due to the small number of vehicles for which the bridge formula is applied.

The annual average overloads in contravention of Regulation 234/5 (permissible maximum axle and axle unit masses) have decreased from 2 420 kg in 1988 to 722 kg in 2006. Since 2007 it has been varying between 725 kg and 769 kg, with a value of 742 kg in 2011. The average overload in contravention of Regulations 236 and 237 (maximum vehicle/combination mass limit) historically has been significantly higher than the average overload in contravention of Regulations 234/235 (between 88% and 60% higher), but declined sharply during the period 2006 to 2007. For the period 2007 to 2008 it remained fairly constant at approximately 827 kg and then went up to 856 kg in 2009. Since 2009 it has been decreasing again to a value of 758 kg in 2011, which is only 2.2% higher than the average overload in contravention of Regulations 234/235 in 2011. The decline in the average overload in contravention of Regulations 236 and 237 since 2006 is as a result of the lowering of the prosecution tolerance from 5% to 2% for contravention of Regulations 236 and 237 in June 2006.

Figure 7-4 shows the average overload per axle and axle unit type per month for 2011. The axles and axle units included are single axles (non-steering with dual tyres), tandem axle units (dual tyres) and tridem axle units. The average overloads in kg per axle and axle unit type for the period 1996 to 2011 are presented in Table 7-3 while Figure 7-5 shows the long-term trends in the degree of overloading for these three axle and axle units as a percentage. From Figure 7-5, it can be seen that since 2002 the average overload of tandem axle units and tridem axle units has more-or-less stabilised at approximately 3.6% for tandem axle units and 3.2% for tridem axle units, while the average overload for single axles with dual

[1] Note: Average overloads are calculated in terms of the legal limits

Before March 1996:	Legal Single Axle = 8 200 kg; Legal Tandem Axle Unit = 16 400 kg; Legal Tridem Axle Unit = 21 000 kg.
After March 1996:	Legal Single Axle = 9 000 kg; Legal Tandem Axle unit = 18 000 kg; Legal Tridem Axle Unit = 24 000 kg

tyres increased from approximately 8% in 2002 to 10% in 2008, but decreased to 9.5% in 2011.

Table 7-4 shows the average overload per permissible axle and axle unit masses. What is significant is the number of axles with a permissible mass of 7 700 kg that were weighed, namely 150 928. These are steering axles for which the permissible maximum mass in terms of Regulation 240 is 7 700 kg. The permissible maximum axle mass for the steering axle was therefore taken as 7 700 kg for 90% of the vehicles weighed. However, in the majority of cases, the vehicle manufacturer's rating for steering axles is lower than 7 700 kg. There should therefore be very few axles with a permissible mass of 7 700 kg; this is therefore an indication that the vehicle manufacturer's plates are not checked to establish the manufacturer's rating for the steering axle.

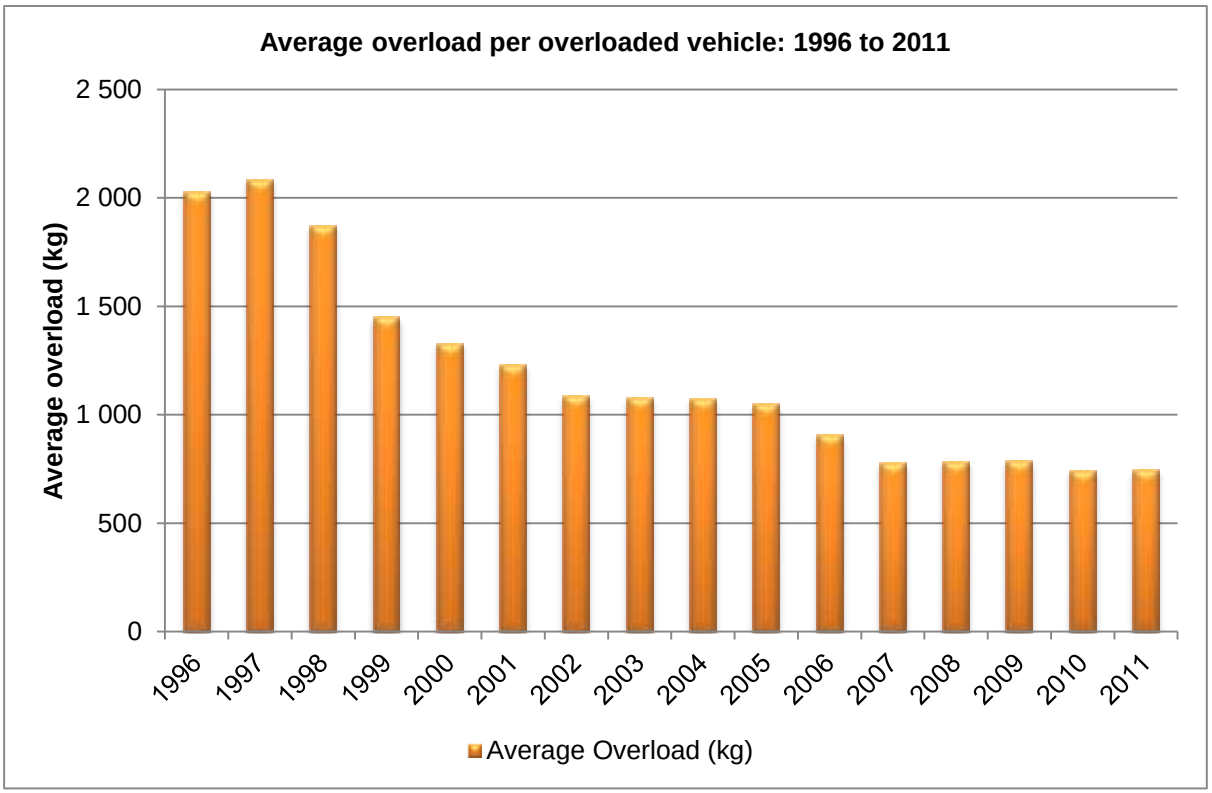


Figure 7-1: Average overload per overloaded vehicle: 1996 to 2011

Table 7-1: Average overload (kg): 1996 to 2011

Year	Average Overload (kg)
1996	2 027
1997	2 083
1998	1 870
1999	1 449
2000	1 327
2001	1 227

Year	Average Overload (kg)
2006	906
2007	775
2008	783
2009	785
2010	741
2011	743

2002	1 086
2003	1 076
2004	1 073
2005	1 047

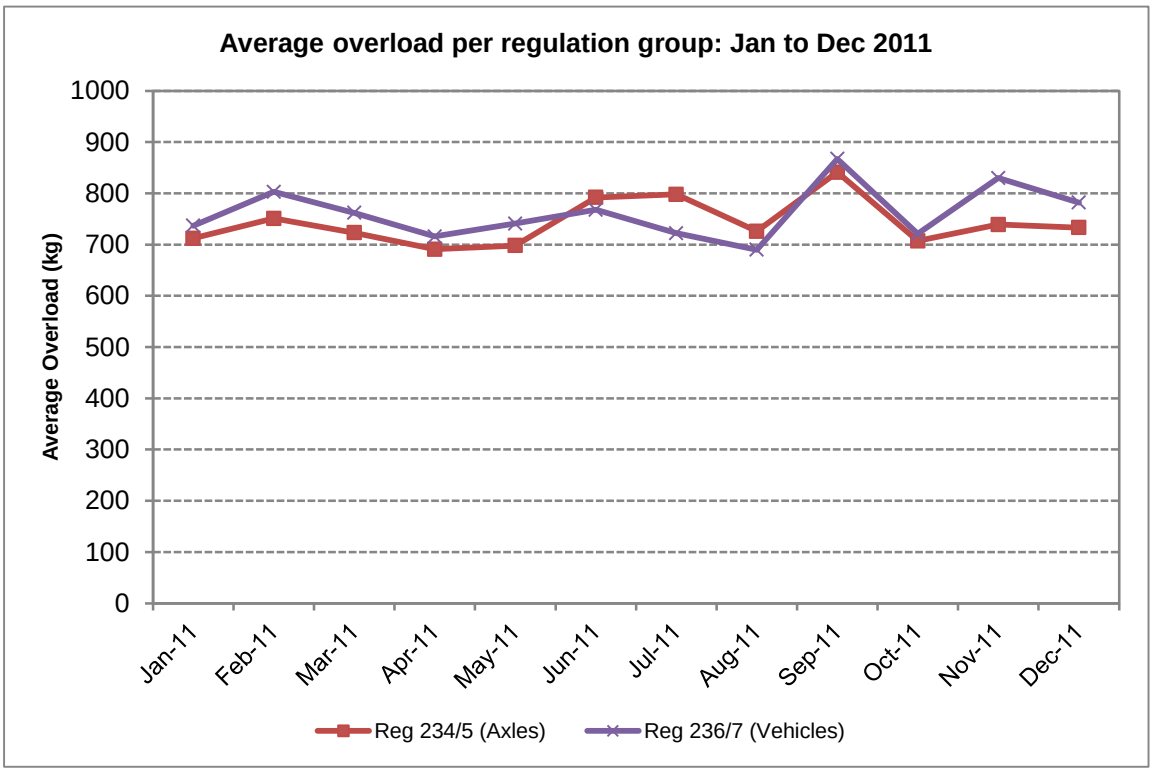


Figure 7-2: Average overload per regulation group: January to December 2011

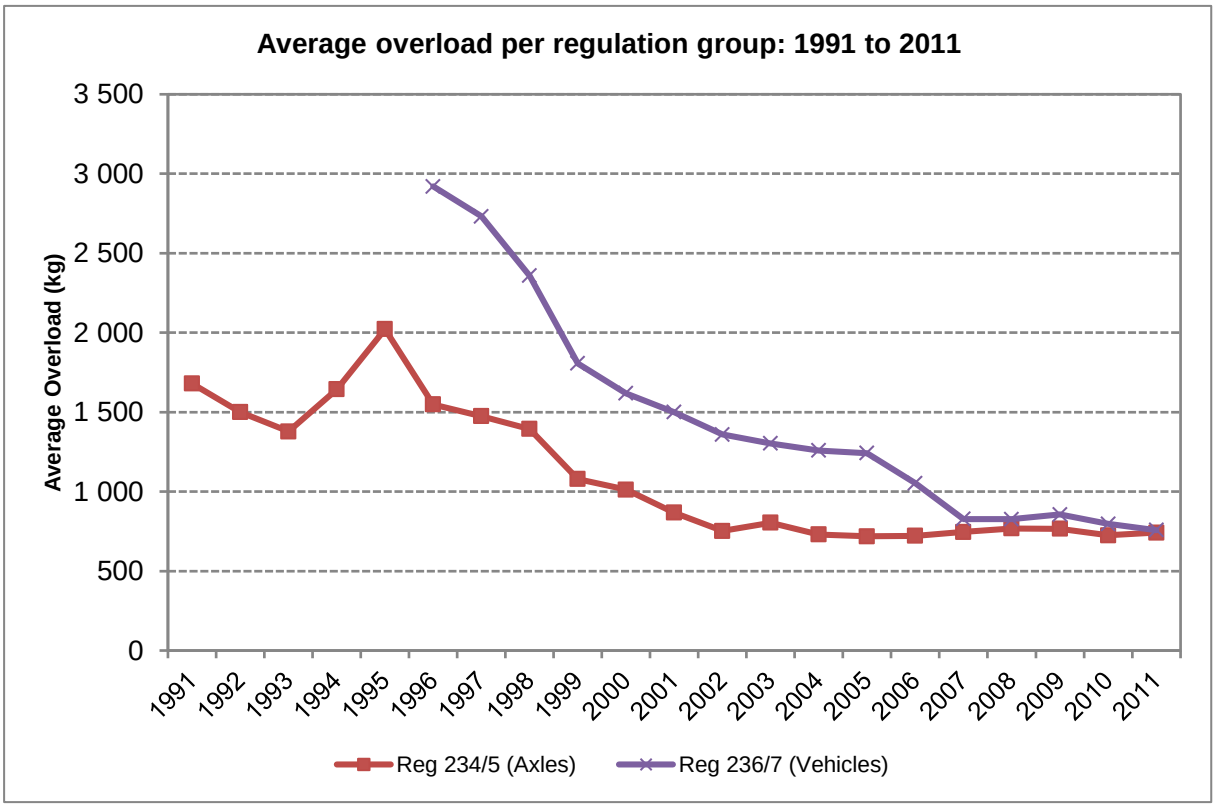


Figure 7-3: Average overload per regulation group: 1991 to 2011

Note: Regulation 237 came into effect in March 1996

Table 7-2: Average overload (kg) per regulation group: 1991 to 2011

Year	Regulation 234/235	Regulation 236/237
1991	1 682	-
1992	1 496	-
1993	1 378	-
1994	1 644	-
1995	2 022	-
1996	1 549	2 920
1997	1 475	2 731
1998	1 394	2 358
1999	1 079	1 806
2000	1 013	1 618
2001	868	1 500
2002	753	1 359
2003	805	1 303
2004	731	1 259
2005	725	1 254
2006	722	1 053
2007	747	828

Year	Regulation 234/235	Regulation 236/237
2008	769	827
2009	767	856
2010	725	797
2011	742	758

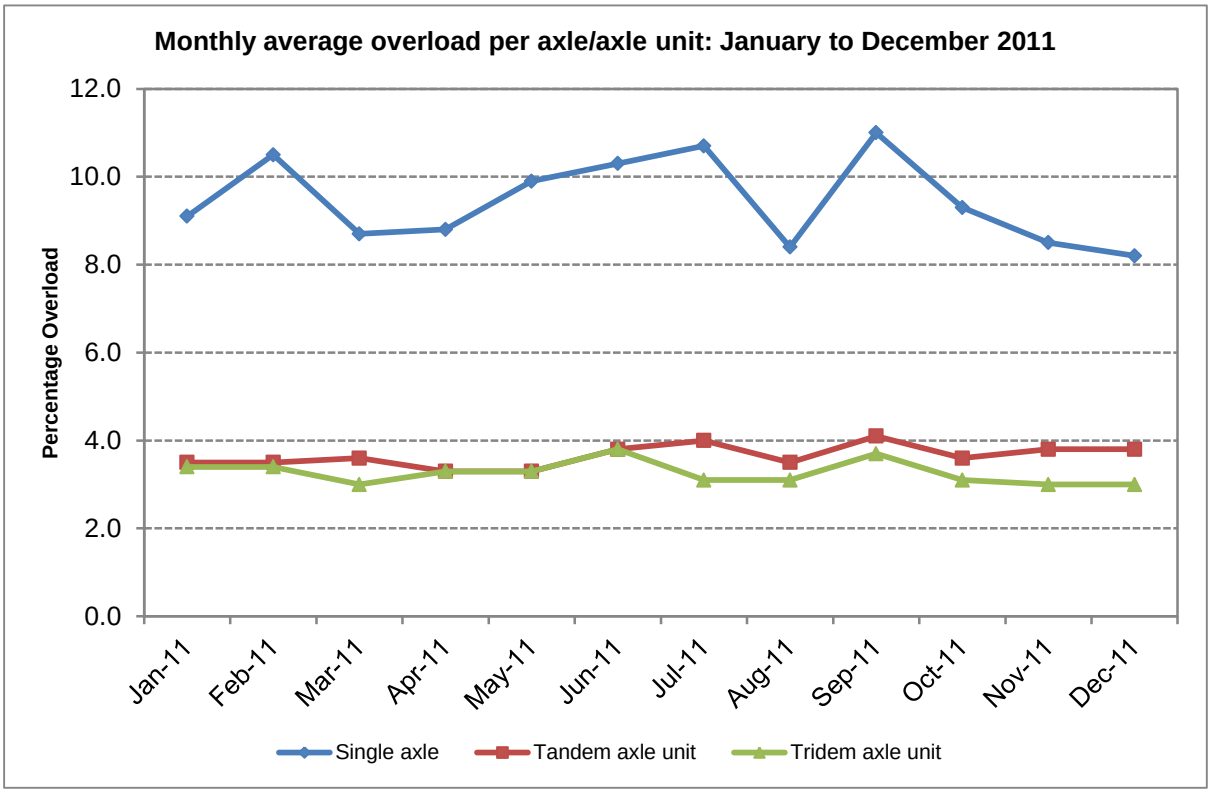


Figure 7-4: Monthly average overload per axle/axle unit: January to December 2011

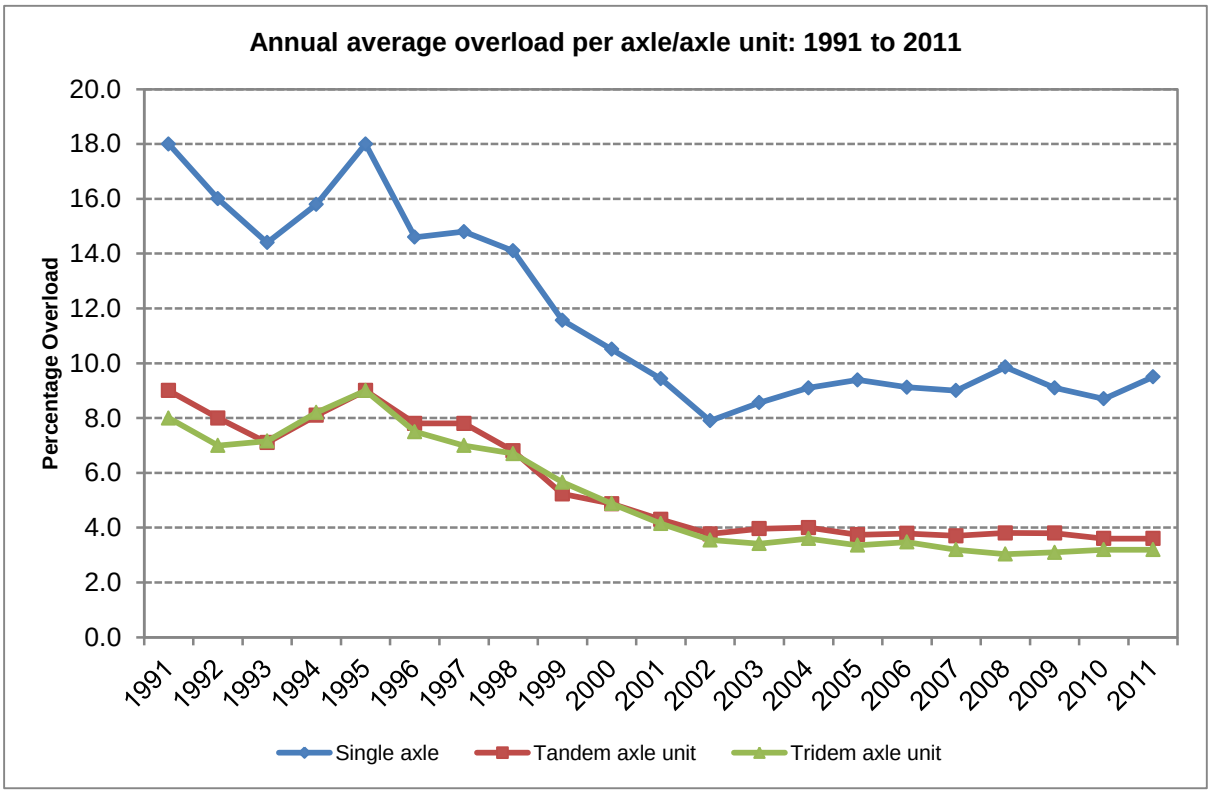


Figure 7-5: Annual average overload per axle/axle unit: 1991 to 2011

Table 7-3: Average overload (kg) per axle/axle unit of overloaded vehicles: 1996 to 2011

Year	9 000 kg axles	18 000 kg axle units	24 000 kg axle units
1996	1 310	1 401	1 803
1997	1 333	1 396	1 673
1998	1 273	1 232	1 602
1999	1 041	941	1 358
2000	946	878	1 171
2001	848	774	997
2002	711	680	853
2003	770	712	821
2004	822	711	871
2005	845	673	806
2006	821	682	834
2007	785	656	746
2008	884	684	721
2009	816	684	738
2010	783	639	779
2011	855	655	779

Table 7-4: Average overload per permissible axle and axle unit masses: 2011

Permissible Mass (kg)	Average Overload (kg)	Number Weighed	Number Overloaded	Percentage Overloaded	Average Overload (%)
6000	557	540	63	11.7	9.3
6500	589	1 734	78	4.5	9.1
7000	635	175	12	6.9	9.1
7500	383	8 811	373	4.2	5.1
7700	281	150 928	1 546	1	3.7
8000	670	2 752	80	2.9	8.4
9000	855	34 486	2 446	7.1	9.5
16000	738	10 080	956	9.5	4.6
18000	655	285 635	12 906	4.5	3.6
24000	779	45 762	3 796	8.3	3.2

8. DISTRIBUTION OF VEHICLE OVERLOADS

The long term distribution of individual vehicle overloads in terms of number of vehicles and percentages are presented in Table 8-1 and Table 8-2 respectively and shown graphically in Figure 8-1 and Figure 8-2. These two figures show that from 1996 to 2007 there has been a significant trend in terms of the overload distribution. During this period, the number of overloaded vehicles in the 0 to 1 000 kg range has increased significantly, while the number of overloaded vehicles in the greater than 2 000 kg range has shown a marked decrease. This correlates with the increase in the number of overloaded vehicles within the prosecuting tolerance (see Figure 3-1). Since 2007, the percentage of overloaded vehicles in the various overload bands have remained more or less constant, with the percentage of vehicles overloaded by less than 1 t remaining approximately 78% and the percentage overloaded by less than 2 t, remaining approximately 93%. In 2011 the percentage of vehicles overloaded by less than 1 t increased to 80%, while the percentage overloaded by less than 2 t remained at 93%.

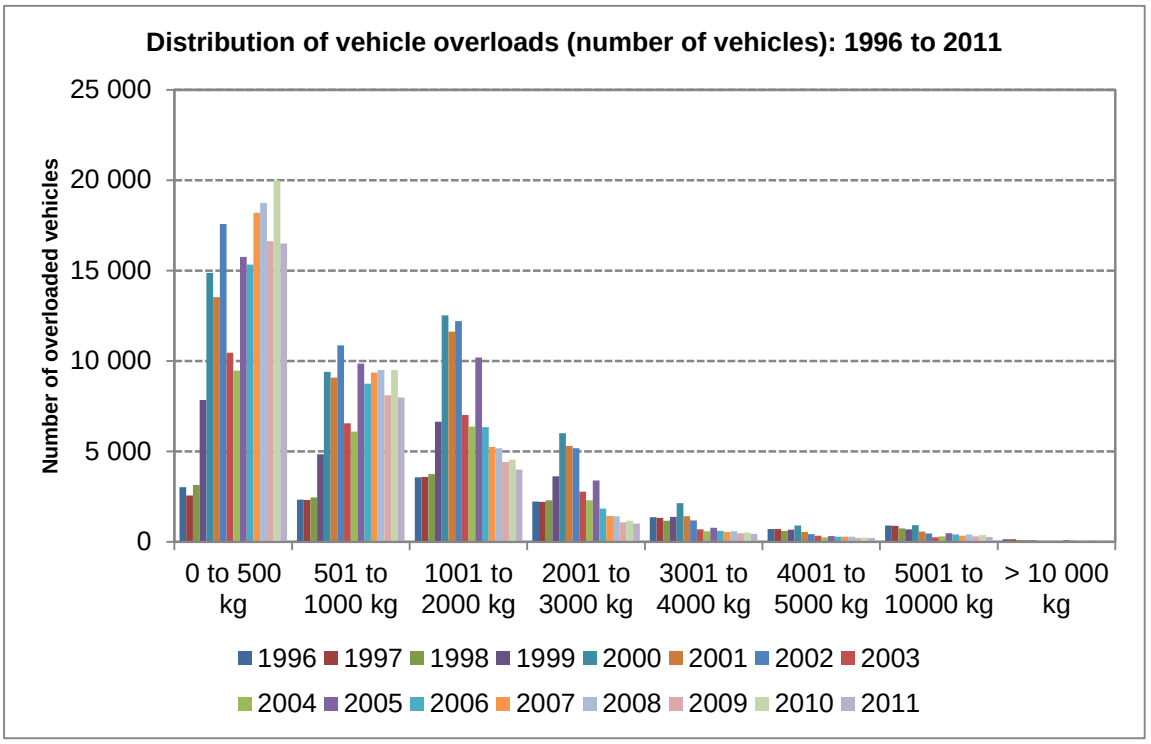


Figure 8-1: Distribution of vehicle overloads (number of vehicles): 1996 to 2011

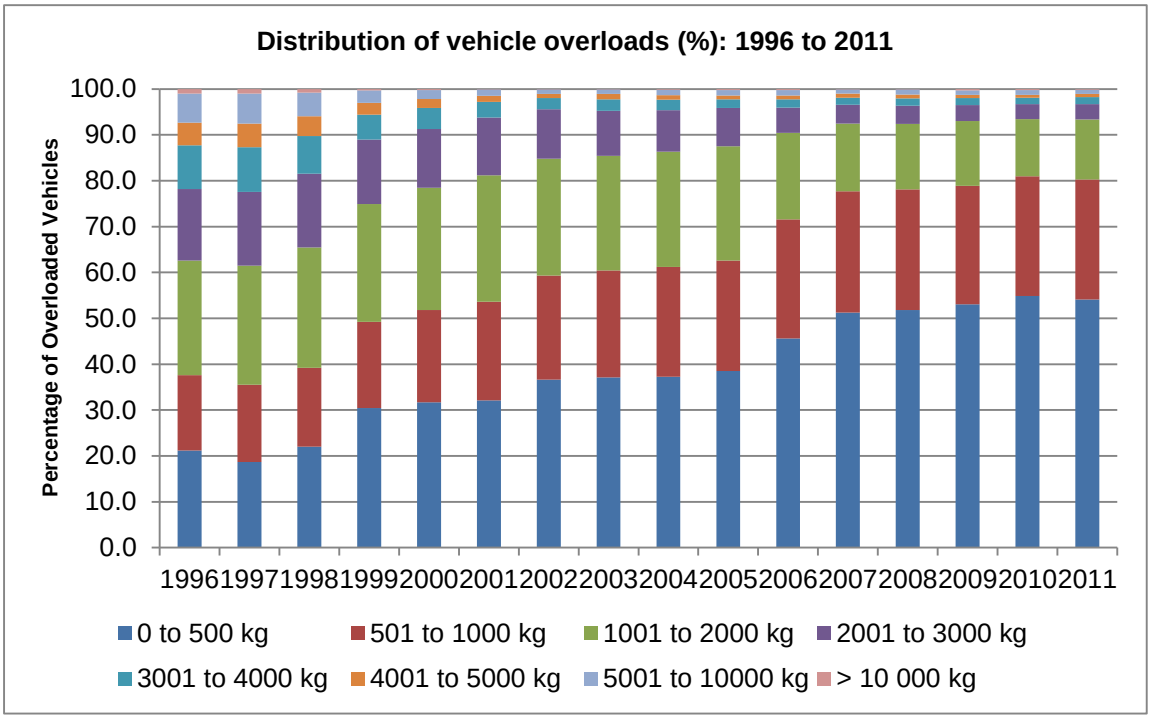


Figure 8-2: Distribution of vehicle overloads (percentage): 1996 to 2011

Table 8-1: Distribution of vehicle overloads (number of vehicles): 1996 to 2011

Year	Overload Band							
	0 to 500 kg	501 to 1 000 kg	1 001 to 2 000 kg	2 001 to 3 000 kg	3 001 to 4 000 kg	4 001 to 5 000 kg	5 001 to 10 000 kg	>10 000 kg
1996	3 020	2 347	3 569	2 226	1 364	708	901	146
1997	2 570	2 324	3 585	2 216	1 339	712	898	141
1998	3 150	2 462	3 752	2 302	1 181	610	743	113
1999	7 855	4 854	6 640	3 631	1 390	676	692	83
2000	14 869	9 409	12 522	6 003	2 136	911	929	104
2001	13 536	9 075	11 633	5 313	1 427	555	581	58
2002	17 580	10 869	12 202	5 177	1 182	432	474	45
2003	10 453	6 566	7 025	2 779	697	341	263	34
2004	9 466	6 102	6 388	2 295	582	248	303	48
2005	15 750	9 861	10 192	3 394	791	326	487	107
2006	15 340	8 743	6 348	1 837	610	293	406	71
2007	18 197	9 366	5 255	1 441	561	298	343	26
2008	18 748	9 505	5 174	1 420	593	290	407	40
2009	16 630	8 103	4 428	1 089	478	221	311	92
2010	19 983	9 512	4 544	1 180	515	234	379	82
2011	**16 502**	**7 997**	**4 000**	**1 022**	**451**	**226**	**276**	**47**

Table 8-2: Distribution of vehicle overloads (percentage of vehicles): 1996 to 2011

Year	Overload band							
	0 to 500 kg	501 to 1 000 kg	1 001 to 2 000 kg	2 001 to 3 000 kg	3 001 to 4 000 kg	4 001 to 5 000 kg	5 001 to 10 000 kg	> 10 000 kg
1996	21.1	16.4	25.0	15.6	9.6	5.0	6.3	1.0
1997	18.6	16.9	26.0	16.1	9.7	5.2	6.5	1.0
1998	22.0	17.2	26.2	16.1	8.3	4.3	5.2	0.8
1999	30.4	18.8	25.7	14.1	5.4	2.6	2.7	0.3
2000	31.7	20.1	26.7	12.8	4.6	1.9	2.0	0.2
2001	32.1	21.5	27.6	12.6	3.4	1.3	1.4	0.1
2002	36.7	22.7	25.4	10.8	2.5	0.9	1.0	0.1
2003	37.1	23.3	24.9	9.9	2.5	1.2	0.9	0.1
2004	37.2	24.0	25.1	9.0	2.3	1.0	1.2	0.2
2005	38.5	24.1	24.9	8.3	1.9	0.8	1.2	0.2
2006	45.6	26.0	18.9	5.5	1.8	0.9	1.2	0.2
2007	51.3	26.4	14.8	4.1	1.6	0.8	1.0	0.1
2008	51.8	26.3	14.3	3.9	1.6	0.8	1.1	0.1
2009	53.0	25.8	14.1	3.5	1.5	0.7	1.0	0.3
2010	54.9	26.1	12.5	3.2	1.4	0.6	1.0	0.2
2011	**54.1**	**26.2**	**13.1**	**3.3**	**1.5**	**0.7**	**0.9**	**0.2**

9. MAXIMUM OVERLOADS

The ten highest overloads for 2011 are listed in Table 9-1. In 2011, the four highest overloads in KwaZulu-Natal were above 20 t, whereas during 2010, the six highest overloads were above 20 t.

The highest overload in 2011 was an overload in terms of Regulation 237.1, which means in this case the limiting factor in terms of the permissible maximum combination mass was the 56 000 kg overall limit, while the majority of the ten highest overloads were all overloaded in terms of Regulation 239.3, which means in these cases the limiting factor in terms of the permissible maximum combination mass was the five times the mass on the drive axle requirement. This is indicative of a load distribution problem.

Table 9-1: Ten maximum overloads: 2011

Regulation	Overload (kg)	Company	Cargo	Locality
237.1	24 960	GK Transport	Sand	Umdloti
237.1	22 560	Urban Dynamics	Containers	Mkondeni
239.3	22 440	Swallow Rigging	Steel	Westmead
237.1	21 680	Trans Freight	Containers	Mkondeni
239.3	17 500	Trademodel	Logs	Vryheid
239.3	16 940	Milco	Milk	Greytown
239.3	16 620	Escombe Cartage	Container	Mkondeni
239.3	16 500	D & A Timbers	Sand	Empangeni
239.3	16 280	Siyasebenza Logistics	Container	Mkondeni
237.1	16 260	Transport.Com	Containers	Mkondeni

Figure 9-1 shows the monthly averages of the maximum overloads for 2011. The averages of the maximum overloads show peaks in June, September and November.

Figure 9-2 shows graphically the trend in terms of the averages of the maximum overloads since 1996. The increases in 2000 are largely due to the increase in the tolerance from 5% to 10% for a period of eight months. The increase from 2004 to 2005 can possibly be ascribed to the reduction in weighing activities during 2003 and 2004 as a result of the installation of a new weighing system at all the weighbridges in KwaZulu-Natal. The sharp increases in 2008, ranging from 68% for the 100 maximum overloads to 37% for the 1 000 maximum overloads, correlate with the sharp increase in fuel prices during the middle part of 2008 and could indicate that operators were trying to maximise payload to compensate for a loss of profit due to the rise in fuel costs.

Since 2009, the annual averages of the 100, 250, 500 and 1 000 maximum overloads returned to a downward trend and in 2011 decreases in the annual averages ranging from 11% for the 100maximum to 13% for the 500 maximum overloads were recorded, compared

with 2010.

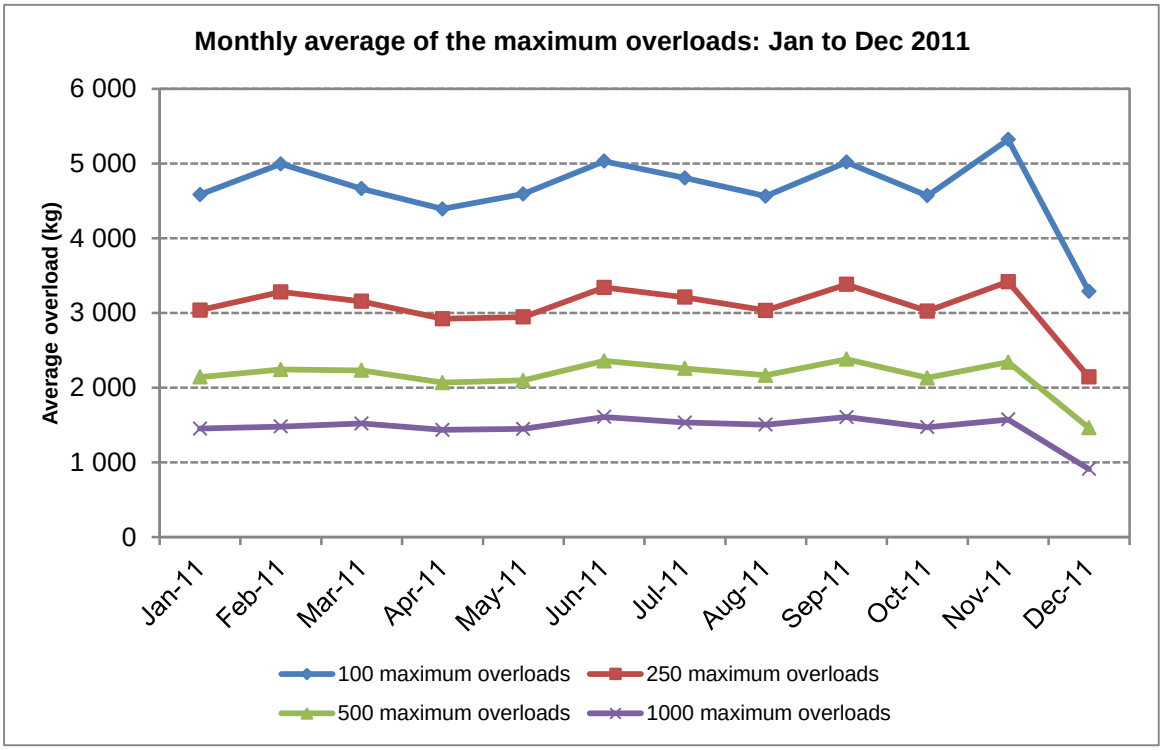


Figure 9-1: Monthly average of the maximum overloads: January to December 2011

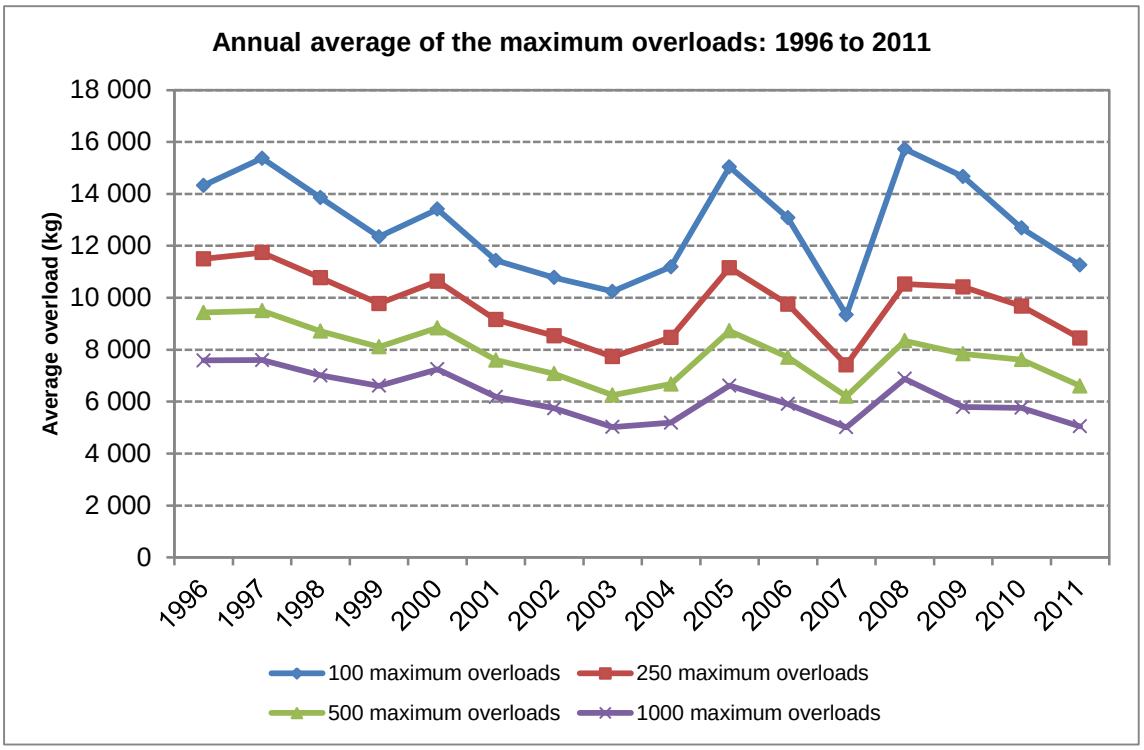


Figure 9-2: Annual average of the maximum overloads: 1996 to 2011

10. COMPANY STATISTICS

Vehicles from 11 368 different companies were weighed during 2011. 3 793 companies had only one vehicle weighed each while a further 5 169 had less than 10 vehicles weighed each. Thirteen companies had more than 1 000 vehicles weighed, with the highest number weighed for a single company being 3 846. The company name was not recorded for 10 103 vehicles (6% of the vehicles weighed).

In terms of overloaded vehicles, 6 212 companies had no overloaded vehicles weighed. This is 55% of all the companies. 1 779 vehicles for which the company name was not recorded, were overloaded.

In terms of vehicles overloaded by more than the prosecution tolerances, 8 496 companies (74.7%) had no vehicles in this category, while a further 2 797 companies (24.6%) had less than 10 overloaded vehicles in this category. 135 vehicles, for which the company name was not recorded, were overloaded by more than the prosecution tolerances.

In order to identify the worst offending companies, a Company Overload Number (CON) is calculated for each company, based on the degree and extent of overloading by the company and the impact of the company in terms of overloading. Companies should be encouraged to load their vehicles optimally, i.e. as close to the legal limit as possible, as this should reduce the number of vehicles required to transport the total annual payload. A company aiming to load optimally would occasionally exceed the legal limits and could therefore be classified as a frequent overloader, especially if it is an operator with a large number of vehicles on the road. The CON is therefore calculated in such a manner as not to penalise the companies aiming to optimise the loading of their vehicles, but rather to identify those companies that overload their vehicles in excess of the tolerance limits on a regular basis.

The Company Overload Number is calculated using the following formula:

$$CON = (DxE)^{I}$$

where D = ***D****egree of overloading;*
Expressed as the overloaded mass on the overloaded vehicles as a percentage of the legal mass of the overloaded vehicles.

E = ***E****xtent of overloading;*
Expressed as the number of vehicles overloaded in excess of the tolerance limits as a percentage of the total number of vehicles weighed.

I = ***I****mpact of company;*
Expressed as the log of the number of vehicles overloaded in excess of the tolerance limits.

The twenty companies with the highest CON are presented in Table 10-1.

Table 10-1: Twenty worst offenders: 2011 (in terms of Company Overload Number)

Company name	Vehicles weighed	Vehicles overloaded	Percentage overloaded	Vehicles chargeable	Percentage chargeable	Company Overload Number
Aqua Transport	169	75	44.4	46	27.2	**5 044**
Private Trucking	1 364	229	16.8	134	9.8	**2 196**
Khans Transport	52	37	71.2	21	40.4	**1 676**
Ally's Sands	21	12	57.1	11	52.4	**961**
TC and Sons	26	15	57.7	13	50	**825**
Crossmoor Transport	379	158	41.7	57	15	**622**
Umfolozi Hardware	11	11	100	9	81.8	**509**
Private	65	11	16.9	11	16.9	**353**
Quintelles Transport	33	10	30.3	10	30.3	**321**
Kwezi Khulu Trucking	23	11	47.8	10	43.5	**313**
Kulu Crete	21	8	38.1	8	38.1	**296**
Key Truck Hire	204	34	16.7	22	10.8	**276**
Kesh Transport	31	10	32.3	9	29	**245**
Siyasebenza Logistics	61	12	19.7	10	16.4	**216**
Webtrans	29	13	44.8	10	34.5	**210**
Build It	61	17	27.9	10	16.4	**179**
Timber 24	631	187	29.6	59	9.4	**165**
DS Preen	11	8	72.7	7	63.6	**148**
STS Logistics	121	24	19.8	14	11.6	**144**
Verulam Sands	65	24	36.9	14	21.5	**137**

Four of the companies listed in Table 10-1 appeared in the equivalent table in the 2010 report. These companies are highlighted in Table 10-1.

It is once again recommended that the CEOs of the companies listed in Table 10-1 be approached with a view to request improved compliance in future.

11. VEHICLE CLASS STATISTICS

In this section, the weighing statistics are presented in terms of the vehicles classes weighed. Table 11-1 presents the ten most common vehicle classes for 2011, which are:

- the 7-axle interlink with three tandem axle units (class 1222);
- the 6-axle articulated vehicle with a rear tridem axle unit (class 123);
- the 2-axle rigid truck (class 11);
- the 3-axle rigid truck (class 12);
- the 5-axle articulated vehicle with a rear tandem axle unit (class 122);
- the 4-axle articulated vehicle, with a single drive axle and tandem axle unit on the semi-trailer (class 112);
- the 3-axle articulated vehicle, with a single drive axle and a single axle on the semi-trailer (class 111);
- the 8-axle interlink with two tandem axle units and a tridem axle unit (class 1232);
- the 5-axle articulated vehicle, with a single drive axle and a tridem axle unit on the semi-trailer (class 113);
- the 5-axle articulated truck, with a single drive axle and tandem axle unit on the semi-trailer pulling a single axle trailer (class 1121).

These ten vehicle classes represent 97.4% of all heavy vehicles weighed and 97.1% of all overloaded vehicles.

Table 11-1 shows that the extent of overloading of class 1222 was the highest at 22%. The average overload per vehicle in this class was however the lowest at 658 kg, representing an average degree of overloading of 1.2%, well below the 2% prosecution tolerance applicable to total combination mass. The vehicle class with the highest average degree of overloading is class 11 at 4.8%, almost two and a half times the prosecution tolerance of 2%. The other vehicle classes with a high average degree of overloading are mostly the classes with single drive axles. One of the reasons for this could be load distribution problems relating to the “five times the mass on the drive axle” requirement.

Table 11-1: Top ten vehicle classes weighed: 2011

Vehicle Class	Number of Vehicles Weighed	Number of Vehicles Overloaded	Percentage Overloaded	Average Overload (kg)	Maximum Vehicle/ Combination Mass (kg)	Average Degree of Overloading (%)
1222	73 322	16 298	22	658	80 960	1.2
123	42 055	7 789	19	760	63 500	1.5
11	23 147	2 387	10	806	22 360	4.8
12	8 536	1 635	19	941	37 660	3.7
122	5 783	497	9	1 261	55 260	2.9
112	4 240	314	7	772	36 920	2.2

Vehicle Class	Number of Vehicles Weighed	Number of Vehicles Overloaded	Percentage Overloaded	Average Overload (kg)	Maximum Vehicle/ Combination Mass (kg)	Average Degree of Overloading (%)
111	1 795	133	7	820	28 260	3.2
1232	1 625	310	19	981	77 680	1.9
113	1 358	218	16	1 142	45 520	2.8
1121	972	41	4	1 124	41 040	2.6

Table 11-2 shows the long term trend for five selected vehicles classes, in terms of number of vehicles weighed.

Table 11-2: Annual number of vehicles weighed per selected vehicle class: 2005 - 2011

Year	11	12	122	123	1222
2005	29 414	7 995	8 179	42 272	74 163
2006	29 165	8 708	8 107	45 087	74 119
2007	29 779	9 129	8 513	50 003	79 024
2008	31 531	9 736	8 273	49 513	81 234
2009	30 259	9 813	6 560	39 874	73 363
2010	35 049	11 378	7 100	47 124	85 513
2011	23 147	8 536	5 783	42 059	73 325

Figure 11-1 shows the average E80s (i.e. road pavement wear) of the six most common vehicle classes (overloaded vehicles only) per month for 2011, while Figure 11-2 shows the long-term trends in terms of the average E80s of these six most common vehicle classes since 1996. The E80s were calculated using the 4th Power Law and a damage exponent of 4.0 was assumed.

The long term trend in the average E80s per overloaded vehicle for the articulated vehicles (class 122 and class 123) and interlinks (class 1222 and class 1232) is downward, while for the rigid vehicles (class 11 and class 12) the trend over the last three years is slightly upwards.

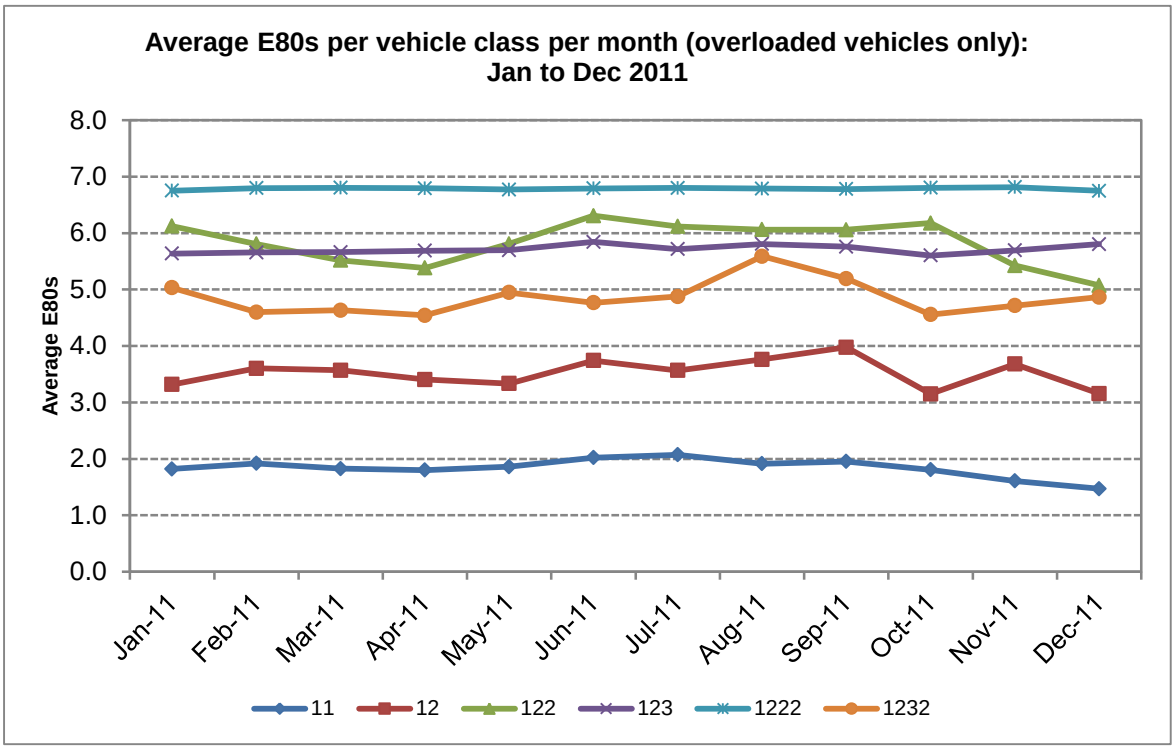


Figure 11-1: Average E80s per vehicle class per month (overloaded vehicles only): January to December 2011

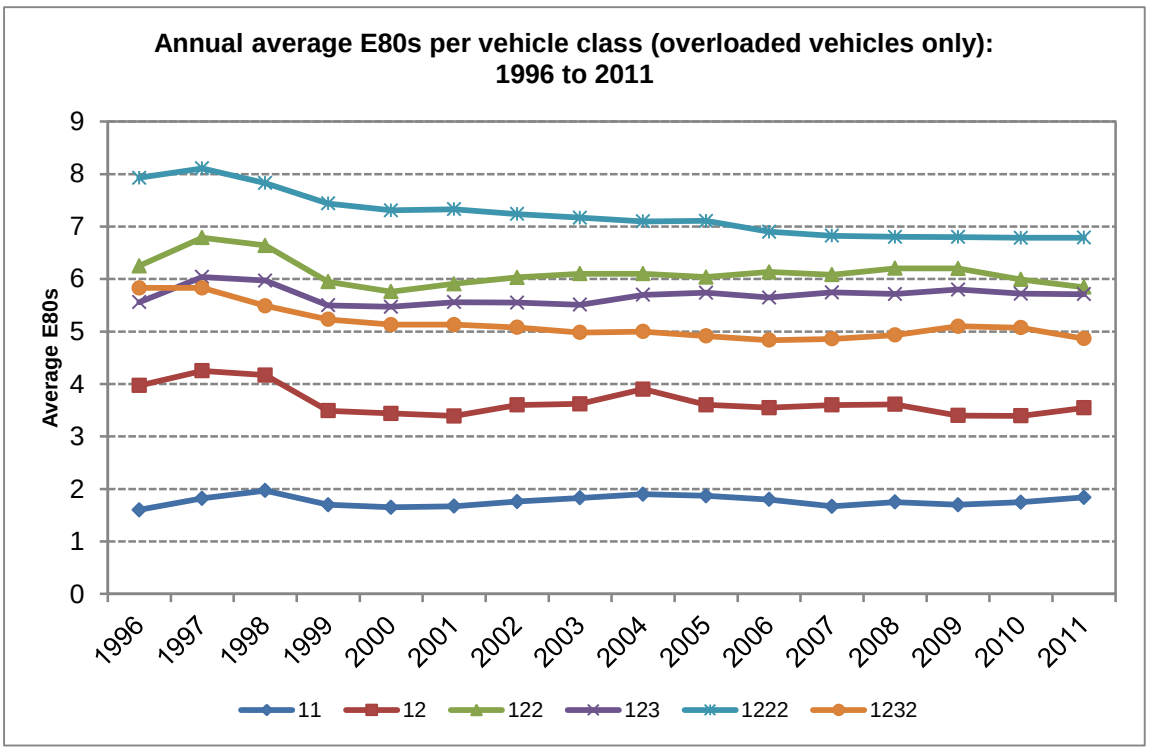


Figure 11-2: Annual average E80s per vehicle class (overloaded vehicles only): 1996 to 2011

12. CARGO STATISTICS

The top ten commodities for the period January to December 2011, in terms of number of vehicles weighed are presented in Table 12-1 and in terms of percentage of vehicles overloaded in Table 12-2.

Table 12-1: Top ten commodities weighed: 2011

Cargo	Number of Vehicles Weighed	Number of Vehicles Overloaded	Percentage Overloaded	Average Overload (kg)	Number of Vehicles Chargeable	Percentage Chargeable
Goods	**34 801**	4 845	13.9	538	579	1.7
Containers	**17 851**	1 359	7.6	1 365	508	2.8
Mixed Load	**16 525**	1 923	11.6	505	171	1
Unknown Cargo	**12 768**	2 117	16.6	466	153	1.2
Steel	**2 858**	441	15.4	844	138	4.8
Fuel	**2 763**	828	30	407	57	2.1
Chrome	**2 478**	1 066	43	553	135	5.4
Logs	**2 470**	897	36.3	1 287	317	12.8
Maize	**2 358**	1 197	50.8	622	157	6.7
Coal	**2 343**	837	35.7	801	143	6.1

The top four commodities were classified as “goods”; “containers”; “mixed load”; and “unknown cargo”. This once again highlights the need to improve the correct recording of the cargo during the weighing procedure and this should be communicated to the staff at the weighbridges.

The information presented in Table 12-2 shows that the “problem” commodities are the bulk commodities. The average overloads in most cases are however below 750 kg per vehicle, while the construction related bulk commodities, such as tar, stones and sand and blocks all have average overloads of more than 1 200 kg, with tar having the highest average overload of 1 654 kg per vehicle. Commodities with less than 100 vehicles weighed were not included in this analysis.

Table 12-2: Top ten commodities in terms of percentage of vehicles overloaded: 2011

Cargo	Number of Vehicles Weighed	Number of Vehicles Overloaded	Percentage Overloaded	Average Overload (kg)	Number of Vehicles Chargeable	Percentage Chargeable
Tar	398	210	**52.8**	1 654	119	29.9
Manganese	2 054	1 071	**52.1**	717	223	10.9

Cargo	Number of Vehicles Weighed	Number of Vehicles Overloaded	Percentage Overloaded	Average Overload (kg)	Number of Vehicles Chargeable	Percentage Chargeable
Maize	2 358	1 197	**50.8**	622	157	6.7
Grain	329	165	**50.2**	659	14	4.3
Cement	1 452	697	**48**	670	142	9.8
Blocks	228	109	**47.8**	1 319	67	29.4
Diesel	497	237	**47.7**	613	43	8.7
Wheat	578	270	**46.7**	686	49	8.5
Stones	686	313	**45.6**	1 206	165	24.1
Sand	1 728	776	**44.9**	1 436	397	23

13. CONCLUSIONS

Through the continuous efforts of the KwaZulu-Natal Department of Transport, the heavy vehicle overload situation in KwaZulu-Natal in terms of the extent and degree of overloading has stabilised since 2006, with indications that an increased effort would be required to reduce it further.

Following the sharp reduction in the number of vehicles weighed in 2003 and 2004, weighing activities increased from 2005 to 2008. In 2009, however, the number of vehicles weighed decreased by 12% compared with 2008, but increased by 15.8% in 2010, with the number of vehicles weighed in 2010 as the highest since 1988. In 2011 the number of vehicles weighed decreased by 18.3% compared with 2010.

Some of the reasons for the reduction in the number of vehicles weighed in 2011 are the restricted weighing at the Midway and Groutville weighbridges due to the repeated theft of the Telkom cables serving these weighbridges and the closure of the Ladysmith weighbridge in 2011 due to the reconstruction of the road past the weighbridge by SANRAL.

The theft of Telkom cables serving the various weighbridges could increase in future. Without the Telkom cables, no network connectivity is available and without a network connection no weighing can take place. Alternative solutions should therefore be investigated.

The extent of overloading showed a peak in 1998, when 43% of all vehicles weighed were overloaded, and then decreased steadily to 18.1% in 2006. In 2007 it increased slightly to 18.5%, but decreased again to 17.8% in 2010 and again increased slightly to 18.3% in 2011. This is again an indication that the extent of overloading has stabilised at approximately 18% with the current level of weighing activities and that an increased effort would be required to reduce it further.

The extent of overloading on the N3 corridor is slightly less than that for the rest of the province, with 17.7% of the vehicles weighed on the N3 being overloaded compared with the 19.5% for the rest of the province (primarily the N2 corridor).

Weigh data from permanent weigh-in-motion sites and from sites monitored using portable weigh-in-motion equipment on key provincial routes show an average extent of overloading on these routes of 17.2% in 2011, with an extent of overloading as high as 34% recorded in the Newcastle area.

In terms of the degree of overloading, there are a number of indicators showing that this is also stabilising. The percentage of vehicles chargeable decreased steadily from a peak of 24% in 1998 to 5.5% in 2002. It then increased slightly to 6.2% in 2003 and 5.8% in 2004 and since 2005 has remained at a level of approximately 5%. This could also be an indication that an increased effort in terms of weighing activities would also be required to further reduce the degree of overloading.

Another indication of the stabilisation in the degree of overloading is the percentage of overloaded vehicles that are overloaded within the tolerance limit as opposed to the percentage overloaded by more than the tolerance limit. Prior to 1990, less than 10% of the overloaded vehicles were overloaded within the tolerance. This percentage increased to 78% in 2005, but then decreased to a level of approximately 73% from 2006 to 2009. In 2010 the percentage of vehicles overloaded within the tolerance increased to 76% and remained the same in 2011.

The various annual average overload statistics also indicate a stabilisation in the degree of overloading. There was a steady downward trend in the average overload per overloaded vehicle from 1997 to 2007. From 2007 to 2009 the average overload per overloaded vehicle remained at approximately 780 kg, but further decreased to approximately 740 kg in 2010 and remained at this level in 2011. The annual average overloads in contravention of Regulation 234/5 (permissible maximum axle and axle unit masses) have decreased from 2 420 kg in 1988 to 722 kg in 2006. Since 2007 it has been varying between 725 kg and 769 kg, with a value of 742 kg in 2011. The annual average overload in contravention of Regulation 236/237 (permissible maximum vehicle/combination mass) has decreased from 2 920 kg in 1996 to 1 053 kg in 2006 and then to 827 kg in 2008, which represents a reduction of 21.5% from 2006 to 2008. In 2011 it was 758 kg, which is a decrease of 5% from 2010 to 2011. The downward trend of the average overload in contravention of Regulations 236 and 237 can be ascribed to the continuous impact of the introduction of the 2% tolerance (previously 5%) for maximum vehicle/combination mass on 15 June 2006.

Considering the average overload of single axles (non-steering with dual tyres), tandem axle units (dual tyres) and tridem axle units, the average overload of tandem axle units and tridem axle units has remained relatively constant since 2002, while the average overload for single axles with dual tyres have been varying between 700 kg and 900 kg during the same period, with a value of 855 kg in 2011.

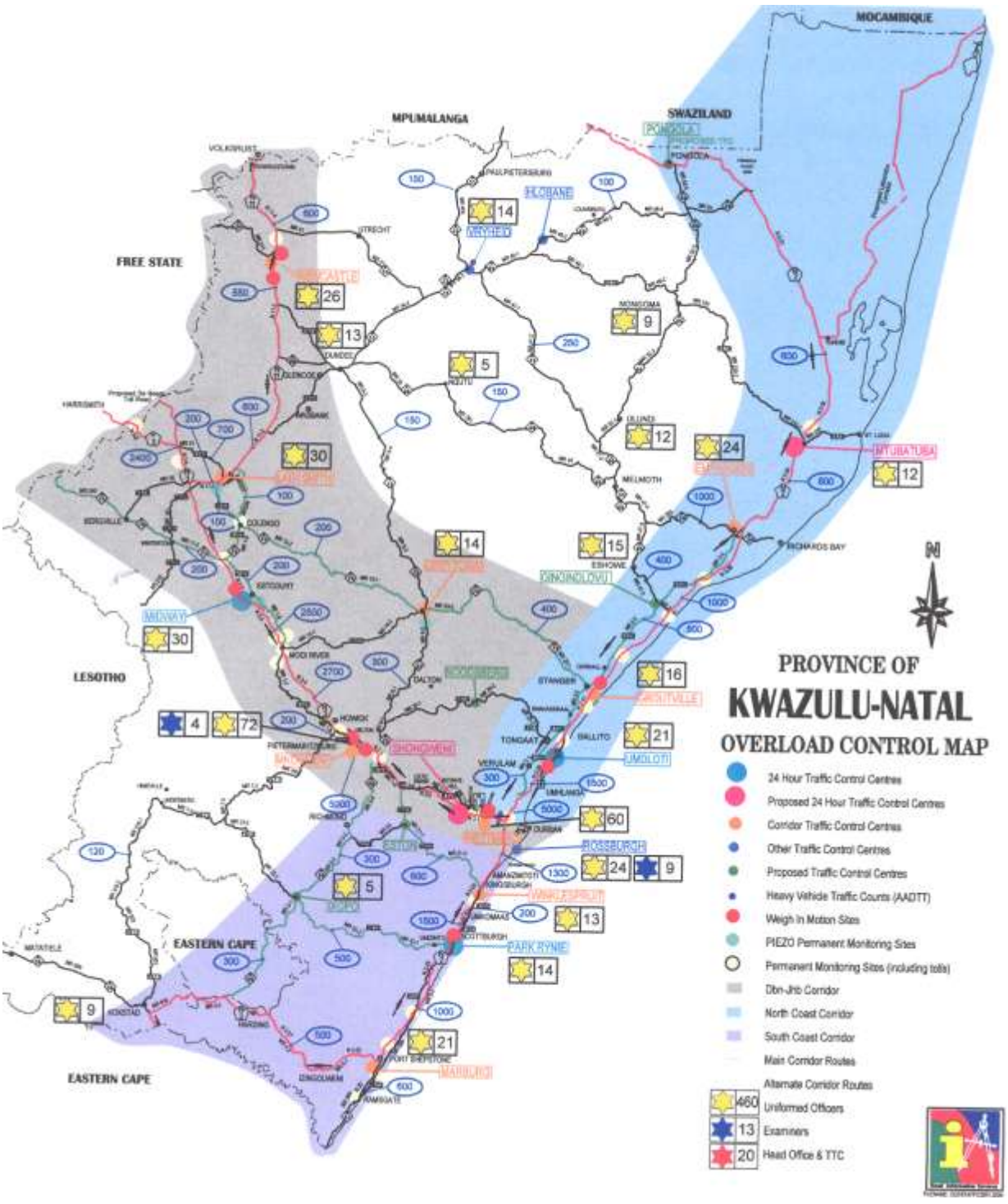
The four maximum overloads in 2011 were all higher than 20 t, while in 2010 the six highest overloads were more than 20 t. The annual averages of the 100, 250, 500 and 1 000 maximum overloads have all decreased significantly since 2005 with the values recorded for 2007 being the lowest since 1996. This trend was however reversed in 2008, with the annual averages of the 100, 250, 500 and 1 000 maximum overloads showing sharp increases ranging from 68% for the 100 maximum overloads to 37% for the 1 000 maximum overloads. These increases correlate with the sharp increase in fuel prices during the middle part of 2008 and could indicate that operators were trying to maximise payload to compensate for a loss of profit due to the rise in fuel costs. Since 2009, the annual averages of the 100, 250, 500 and 1 000 maximum overloads returned to a downward trend and in 2011, decreases in the annual averages ranging from 11% for the 100 maximum to 13% for the 500 maximum overloads were recorded, compared with 2010.

The last indicator in terms of the stabilisation in the degree of overloading is the distribution of vehicle overloads. Since 1998, the number of overloaded vehicles in the 0 to 1 000 kg

range has increased significantly, while the number of overloaded vehicles in the greater than 2 000 kg range has shown a marked decrease. This correlates with the increase in the number of overloaded vehicles within the prosecuting tolerance. Since 2007, the percentage of overloaded vehicles in the various overload bands have remained more or less constant, with the percentage of vehicles overloaded by less than 1 t remaining at approximately 80% and the percentage overloaded by less than 2 t, remaining at approximately 93%.

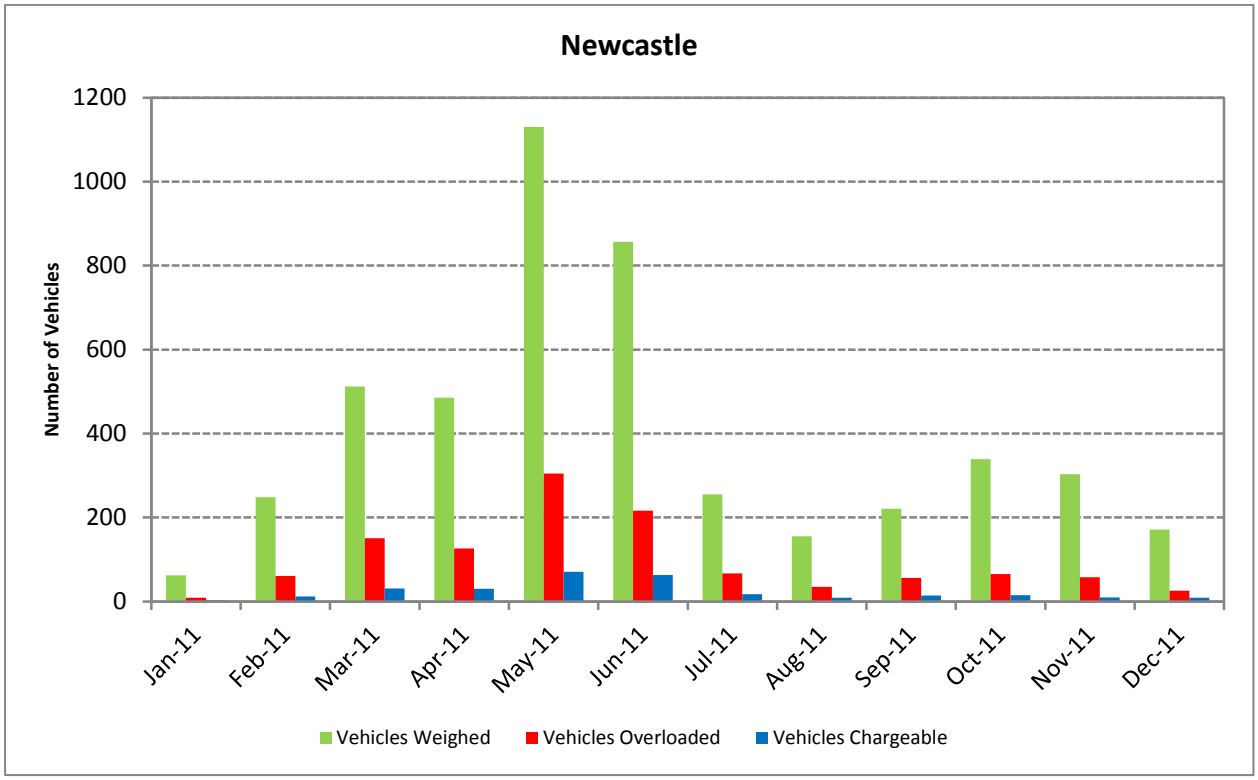
An analysis of the weigh data per company (operator) confirmed that there are still companies clearly disregarding the Road Traffic Act with respect to the mass regulations by continuing to implement policies of deliberate overloading. As in previous years, it is recommended that the CEOs of these companies be approached by the Department with a view to taking serious actions if their overloading practices continue. The correct recording of company names remains a problem and should be addressed with the staff at the weighbridges.

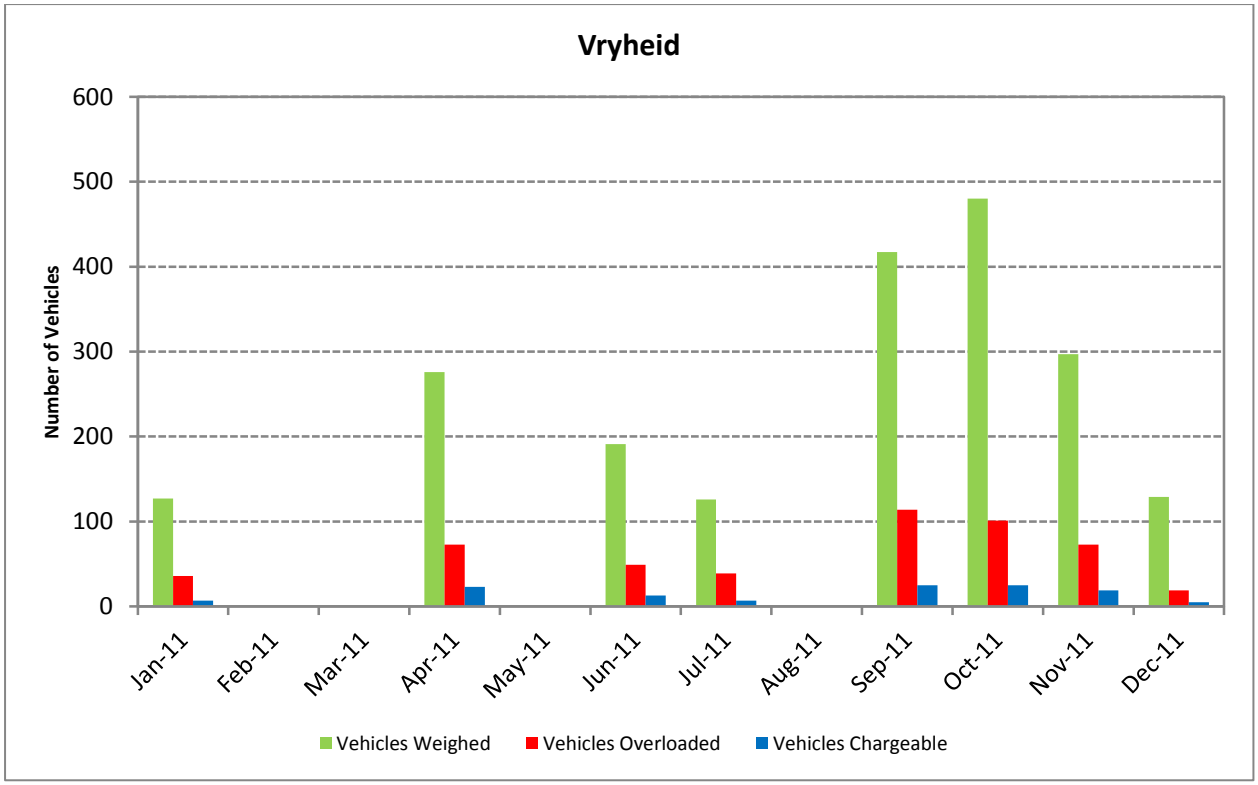
Appendix A. Map showing weighbridge sites in KwaZulu-Natal


MOCAMBIQUE
MPUMALANGA
SWAZILAND
FREE STATE
LESOTHO
EASTERN CAPE
EASTERN CAPE
PROVINCE OF
KWAZULU-NATAL
OVERLOAD CONTROL MAP
24 Hour Traffic Control Centres
Proposed 24 Hour Traffic Control Centres
Corridor Traffic Control Centres
Other Traffic Control Centres
Proposed Traffic Control Centres
Heavy Vehicle Traffic Counts (AADTT)
Weigh In Motion Sites
PIEZO Permanent Monitoring Sites
Permanent Monitoring Sites (including tolls)
Dbn-Jhb Corridor
North Coast Corridor
South Coast Corridor
Main Corridor Routes
Alternate Corridor Routes
460 Uniformed Officers
13 Examiners
20 Head Office & TTC

Appendix B. Monthly weighing statistics - Individual weighbridges: 2011

Figure B1: Weighbridge statistics 2011: Northern KwaZulu-Natal Region





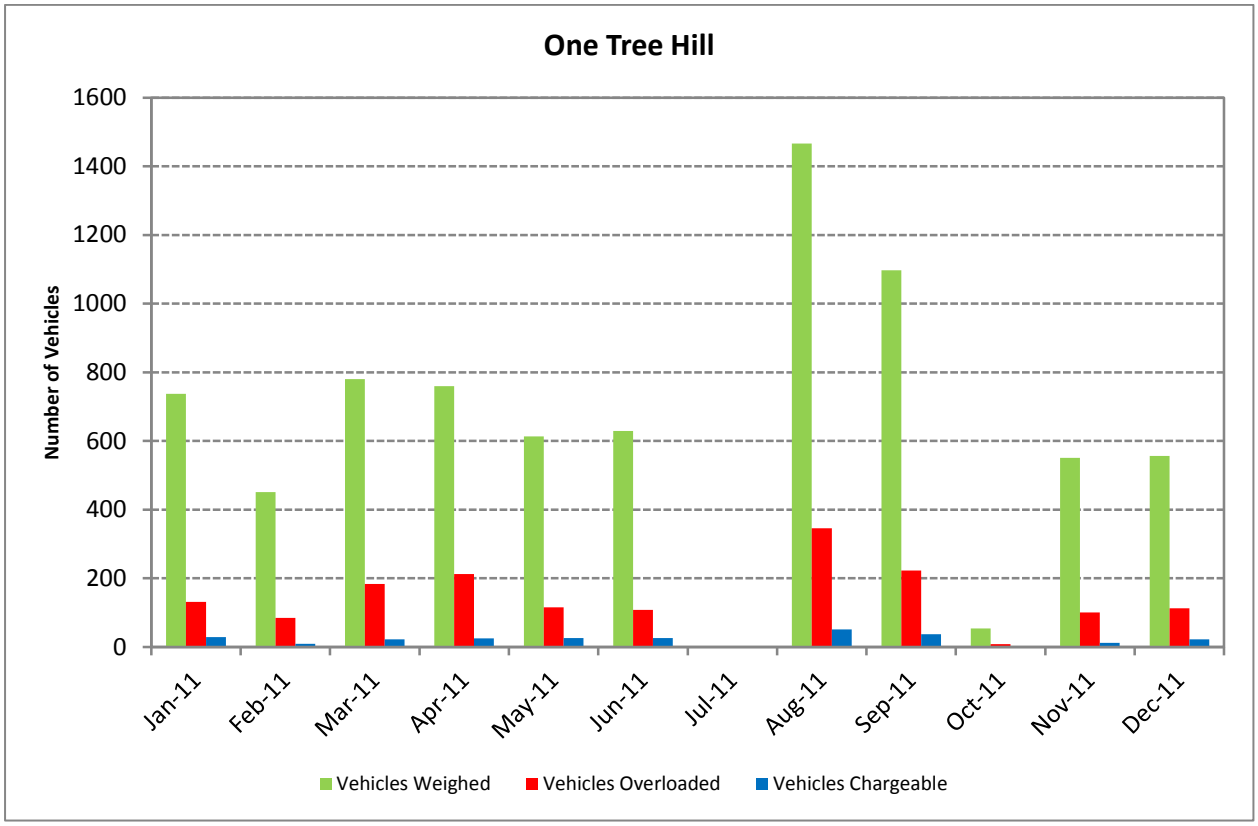
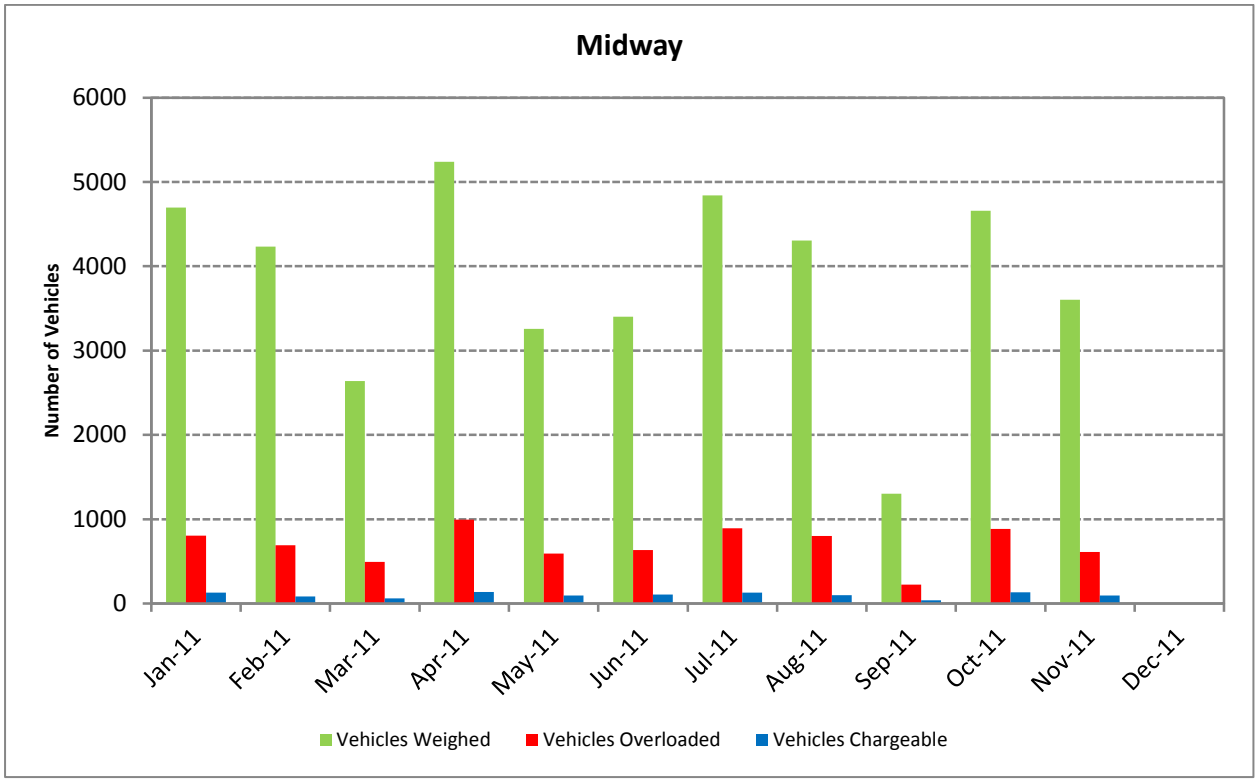
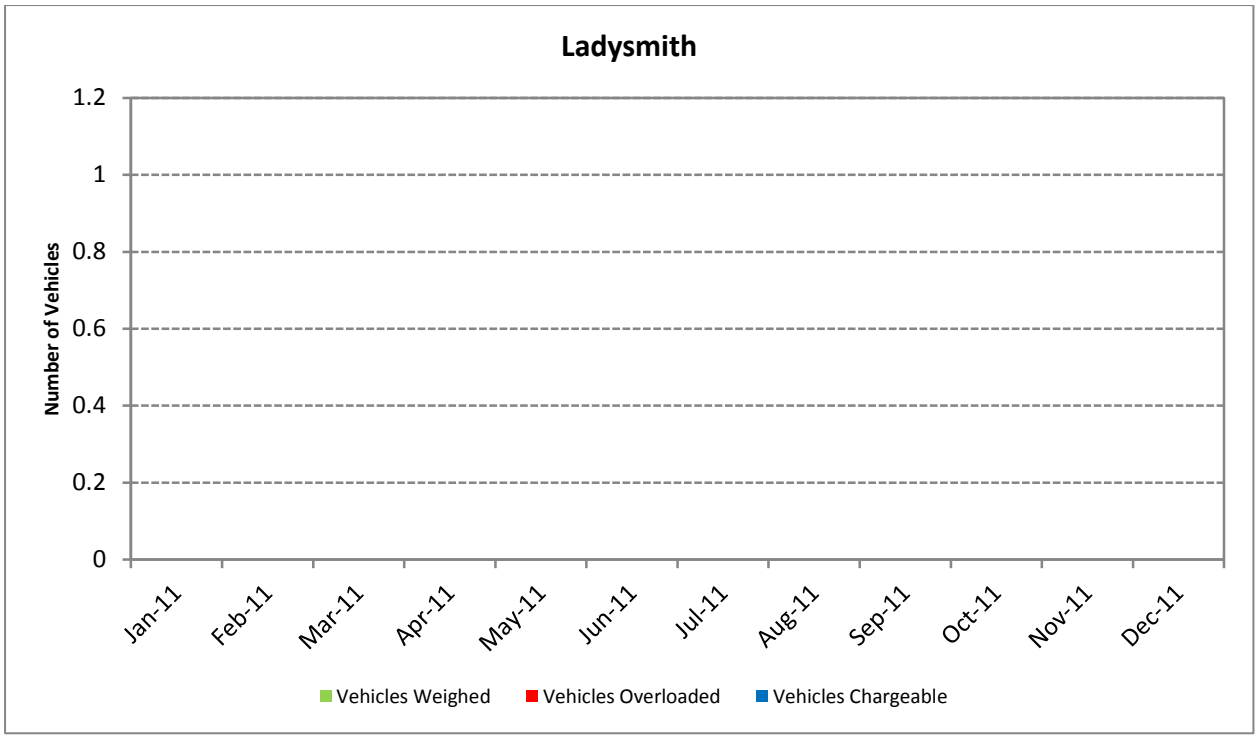
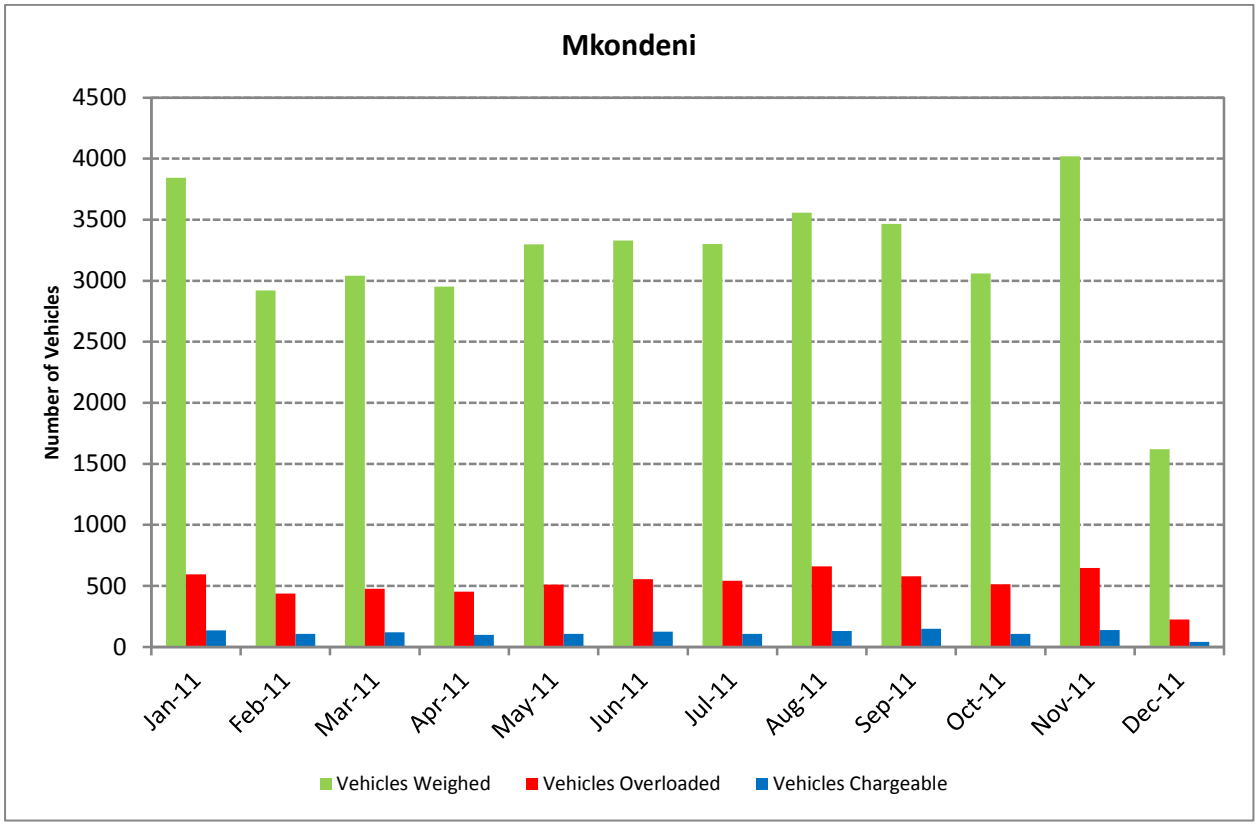

One Tree Hill
Number of Vehicles
1600
1400
1200
1000
800
600
400
200
0
Jan-11
Feb-11
Mar-11
Apr-11
May-11
Jun-11
Jul-11
Aug-11
Sep-11
Oct-11
Nov-11
Dec-11
Vehicles Weighed
Vehicles Overloaded
Vehicles Chargeable

Figure B2: Weighbridge statistics 2011: Midlands Region






Mkondeni
Number of Vehicles
4500
4000
3500
3000
2500
2000
1500
1000
500
0
Jan-11
Feb-11
Mar-11
Apr-11
May-11
Jun-11
Jul-11
Aug-11
Sep-11
Oct-11
Nov-11
Dec-11
Vehicles Weighed
Vehicles Overloaded
Vehicles Chargeable

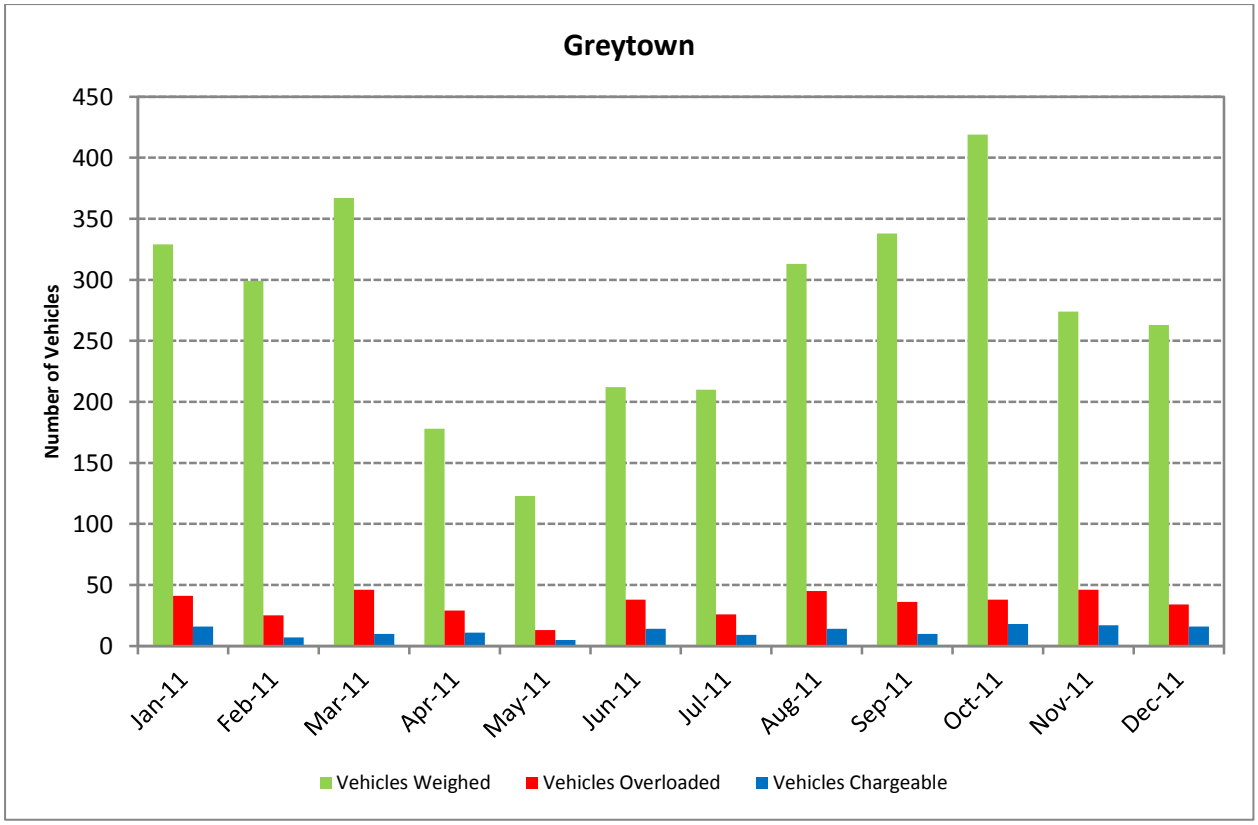
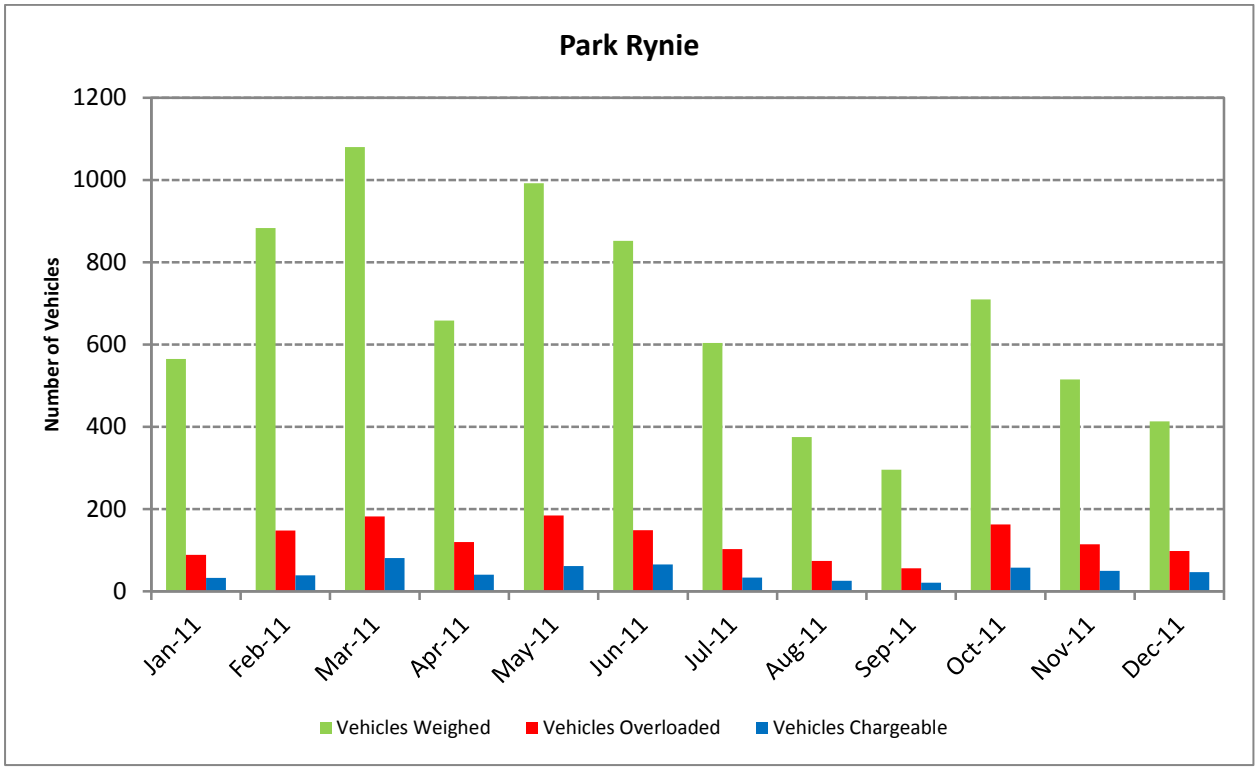

Greytown
Number of Vehicles
450
400
350
300
250
200
150
100
50
0
Jan-11
Feb-11
Mar-11
Apr-11
May-11
Jun-11
Jul-11
Aug-11
Sep-11
Oct-11
Nov-11
Dec-11
Vehicles Weighed
Vehicles Overloaded
Vehicles Chargeable

Figure B3: Weighbridge statistics 2011: South Coast Region



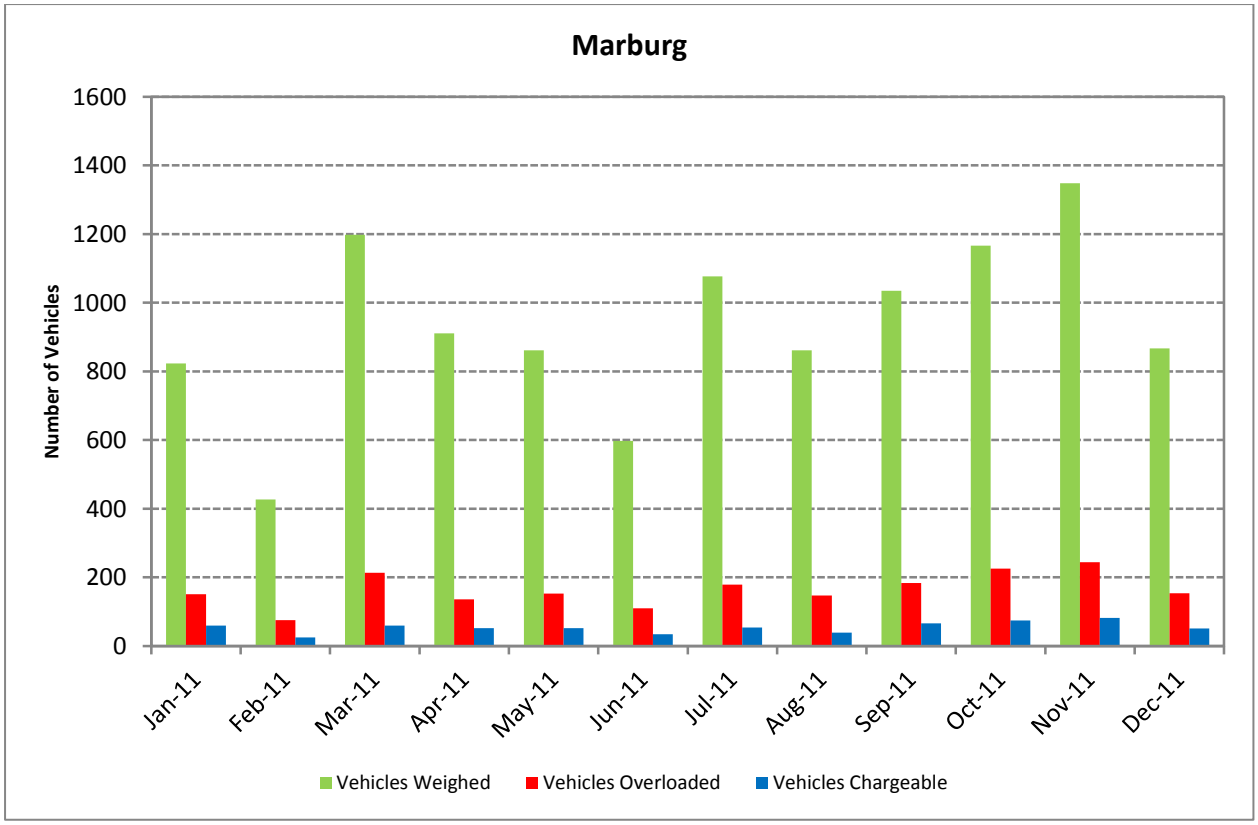
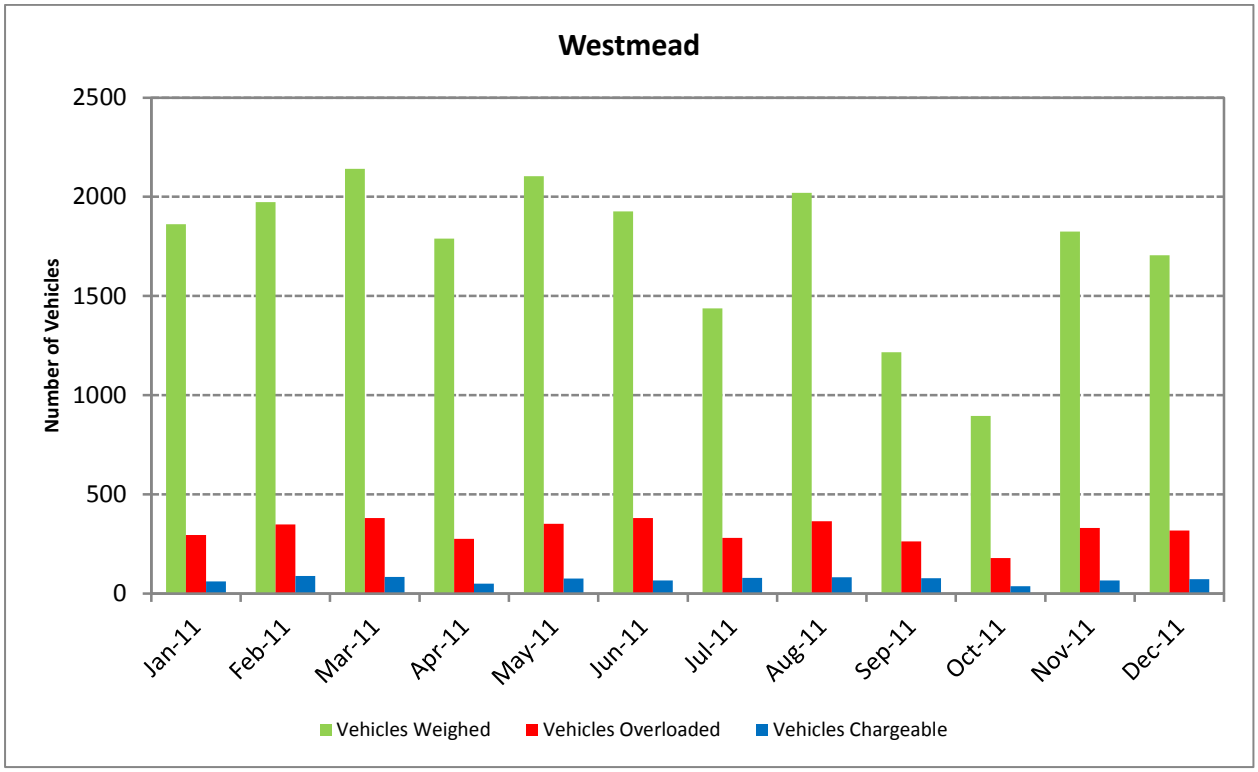
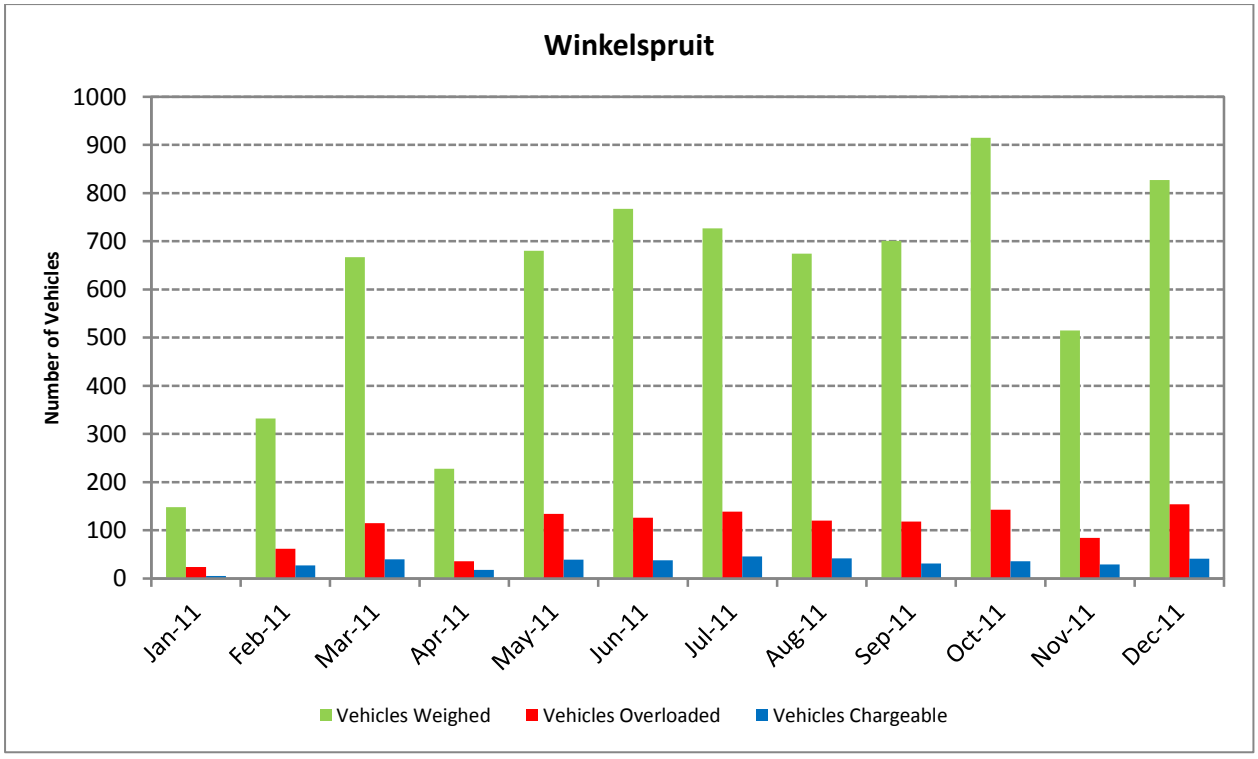
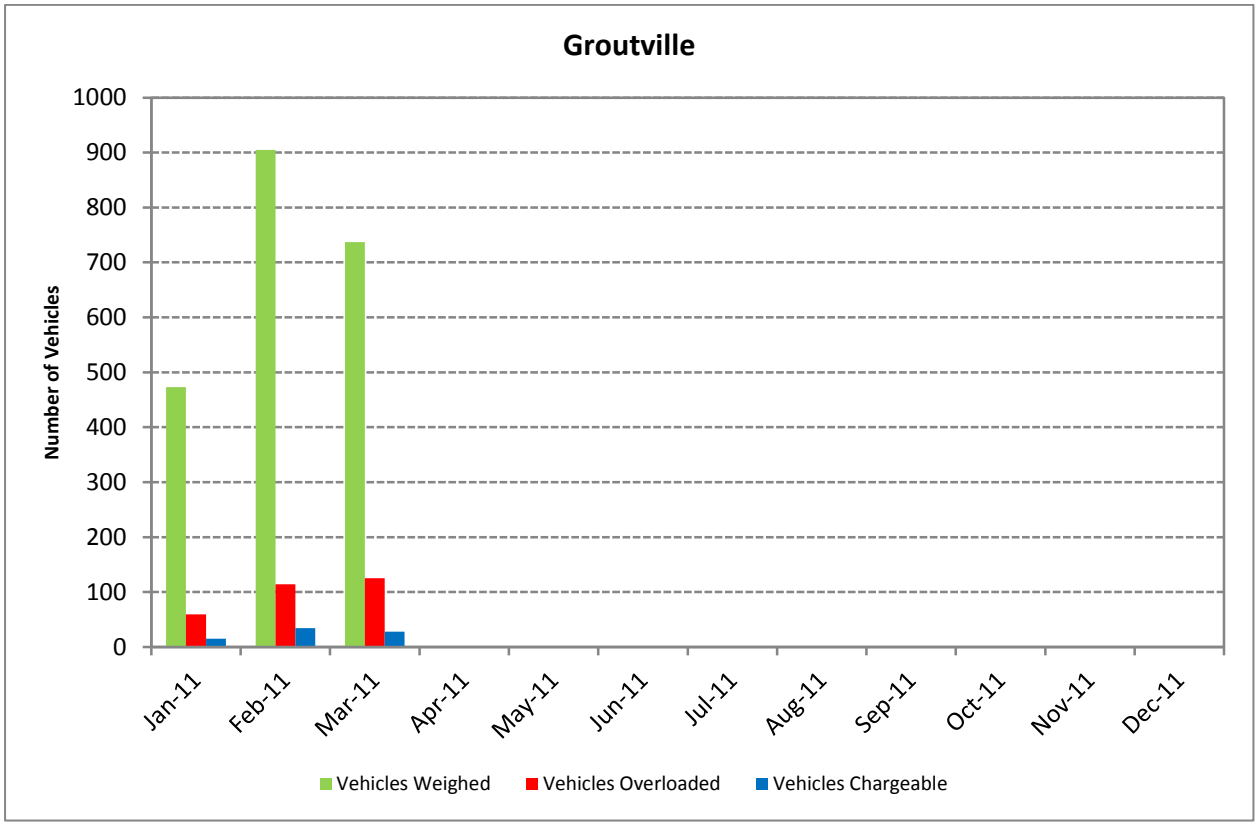


Figure B4: Weighbridge statistics 2011: Durban Metro Region






Groutville
Number of Vehicles
1000
900
800
700
600
500
400
300
200
100
0
Jan-11
Feb-11
Mar-11
Apr-11
May-11
Jun-11
Jul-11
Aug-11
Sep-11
Oct-11
Nov-11
Dec-11
Vehicles Weighed
Vehicles Overloaded
Vehicles Chargeable

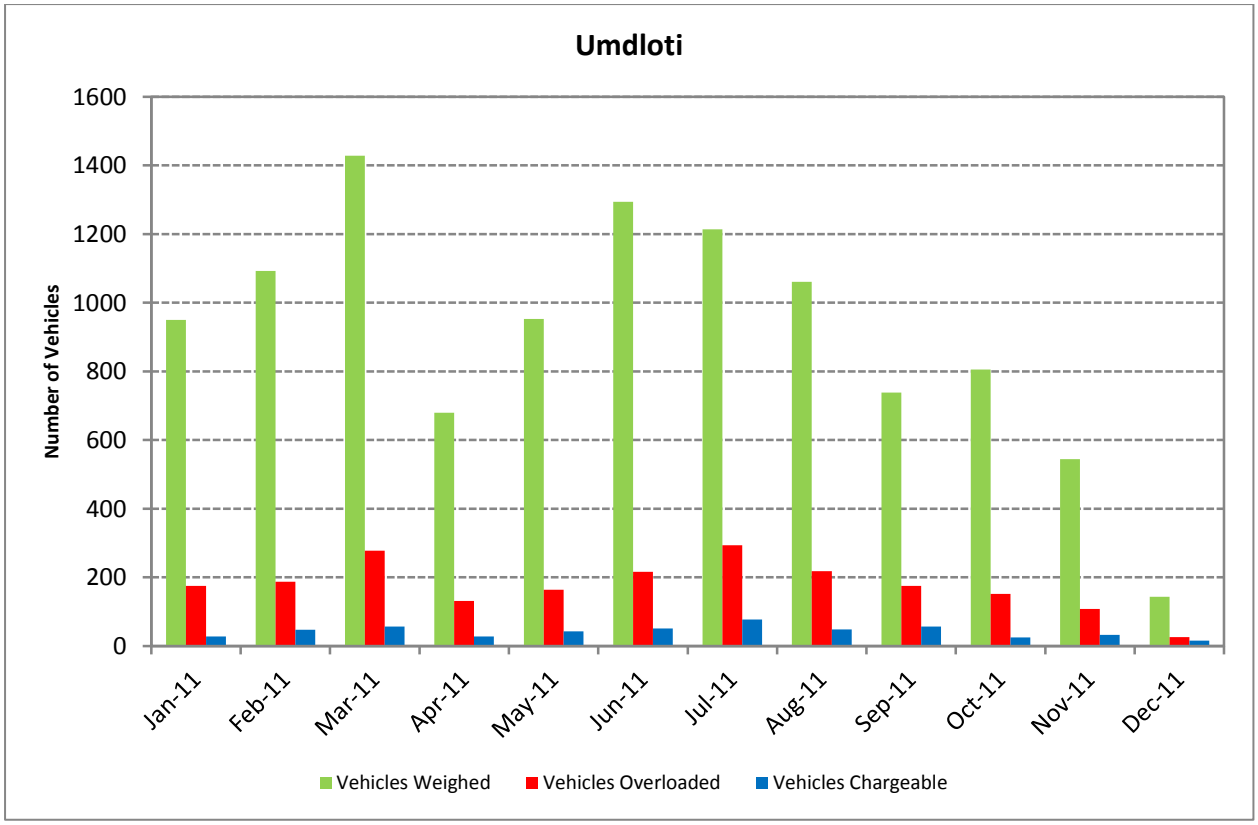
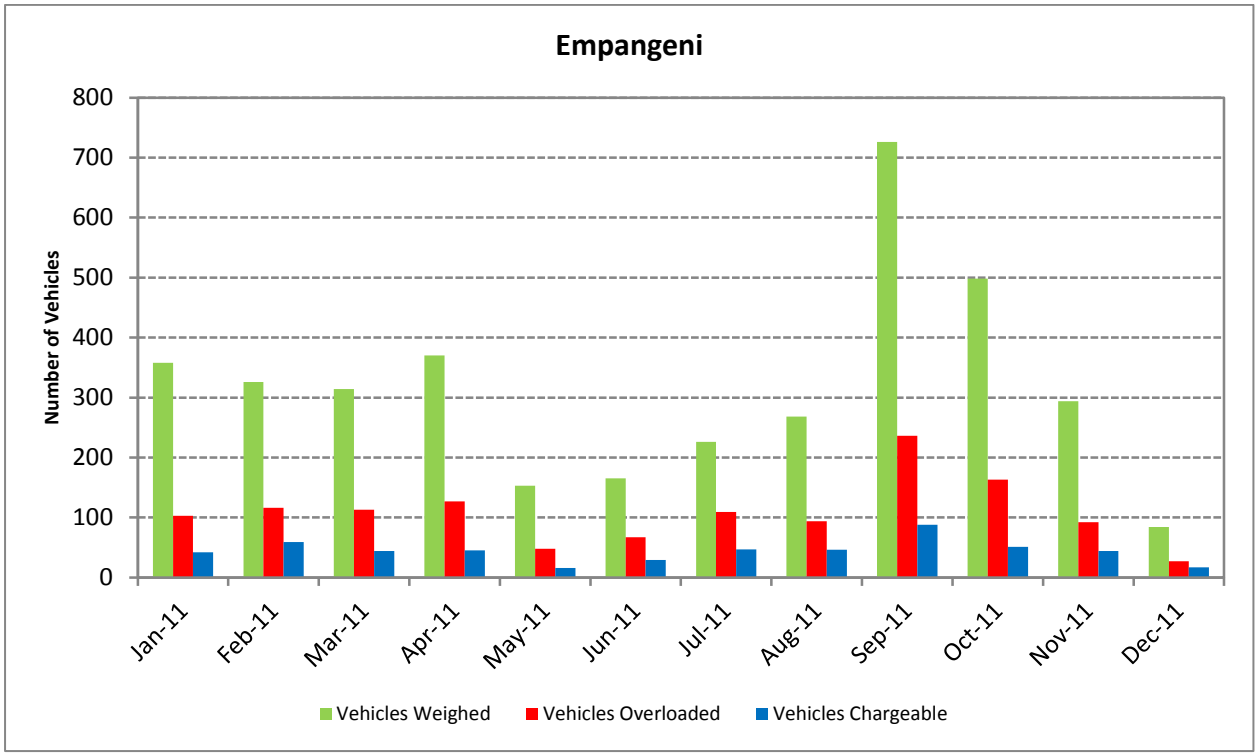
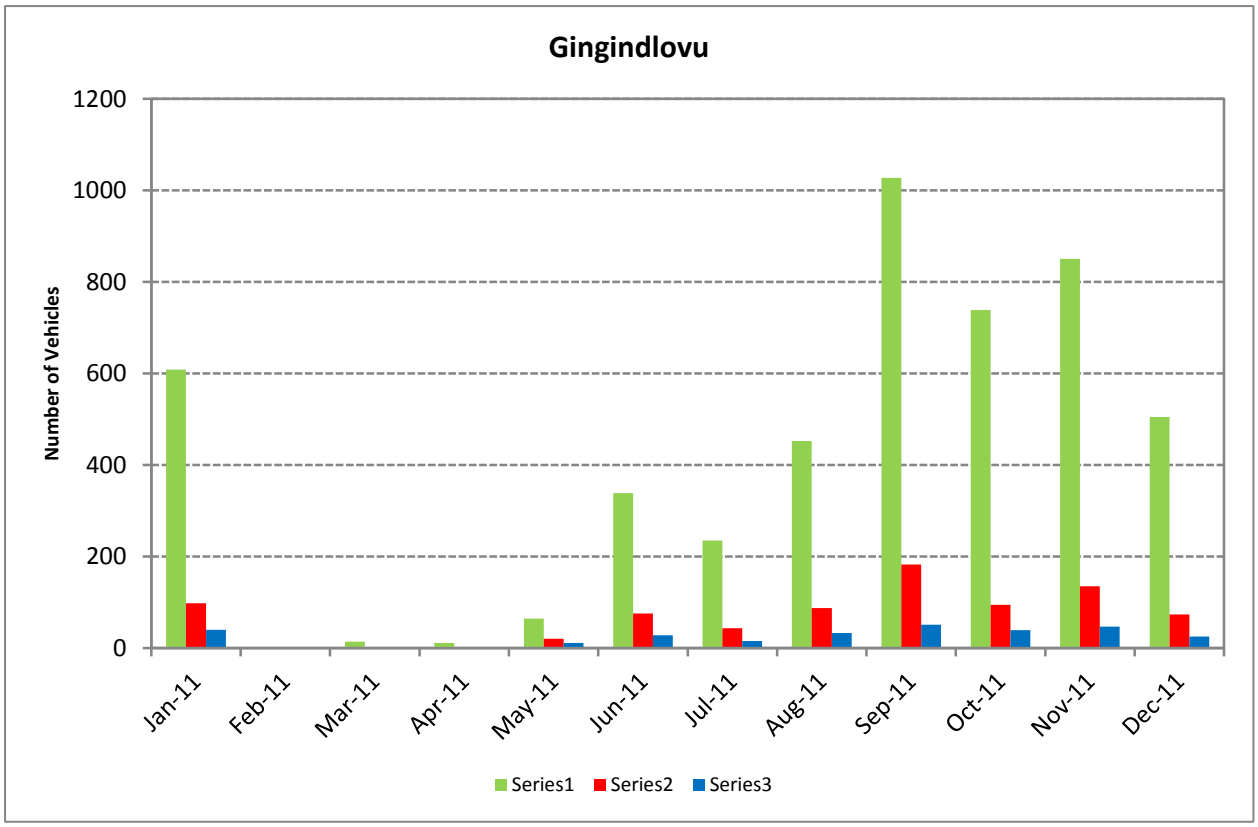

Umdloti
Number of Vehicles
1600
1400
1200
1000
800
600
400
200
0
Jan-11
Feb-11
Mar-11
Apr-11
May-11
Jun-11
Jul-11
Aug-11
Sep-11
Oct-11
Nov-11
Dec-11
Vehicles Weighed
Vehicles Overloaded
Vehicles Chargeable

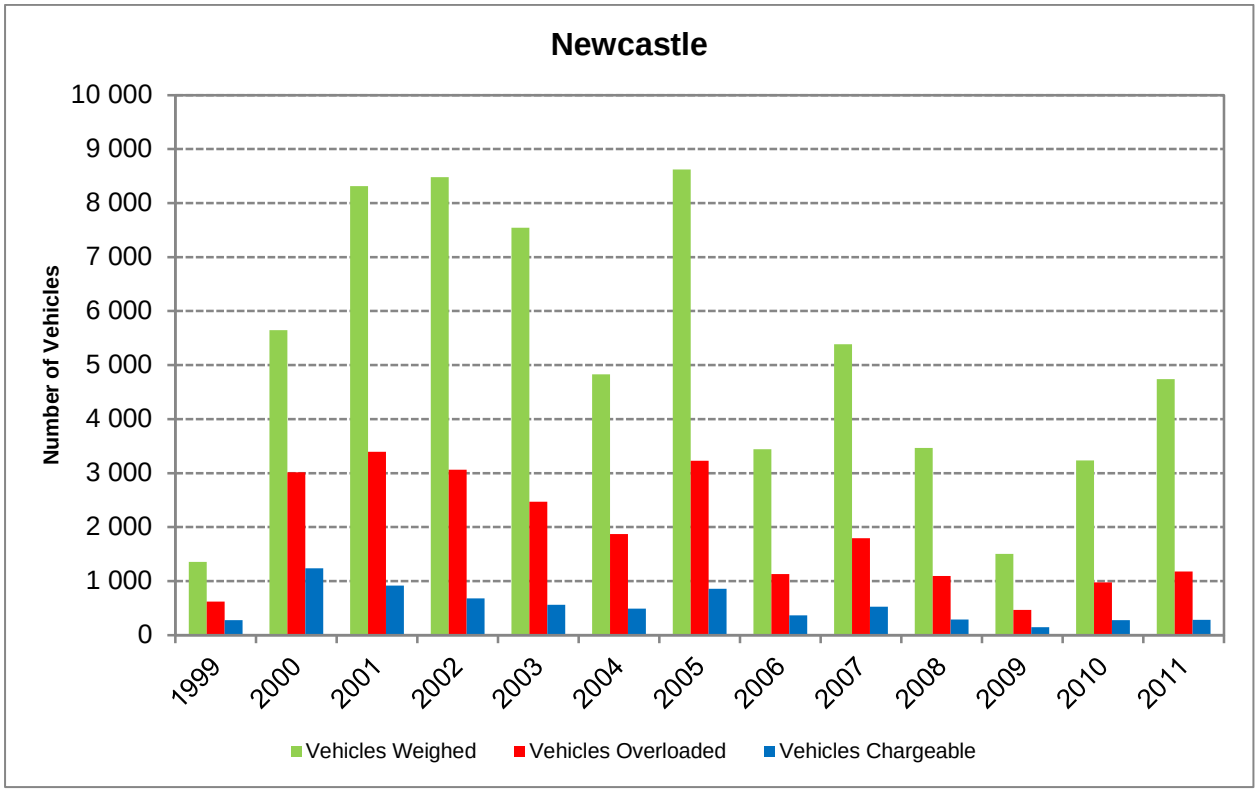
Figure B5: Weighbridge statistics 2011: Zululand Region

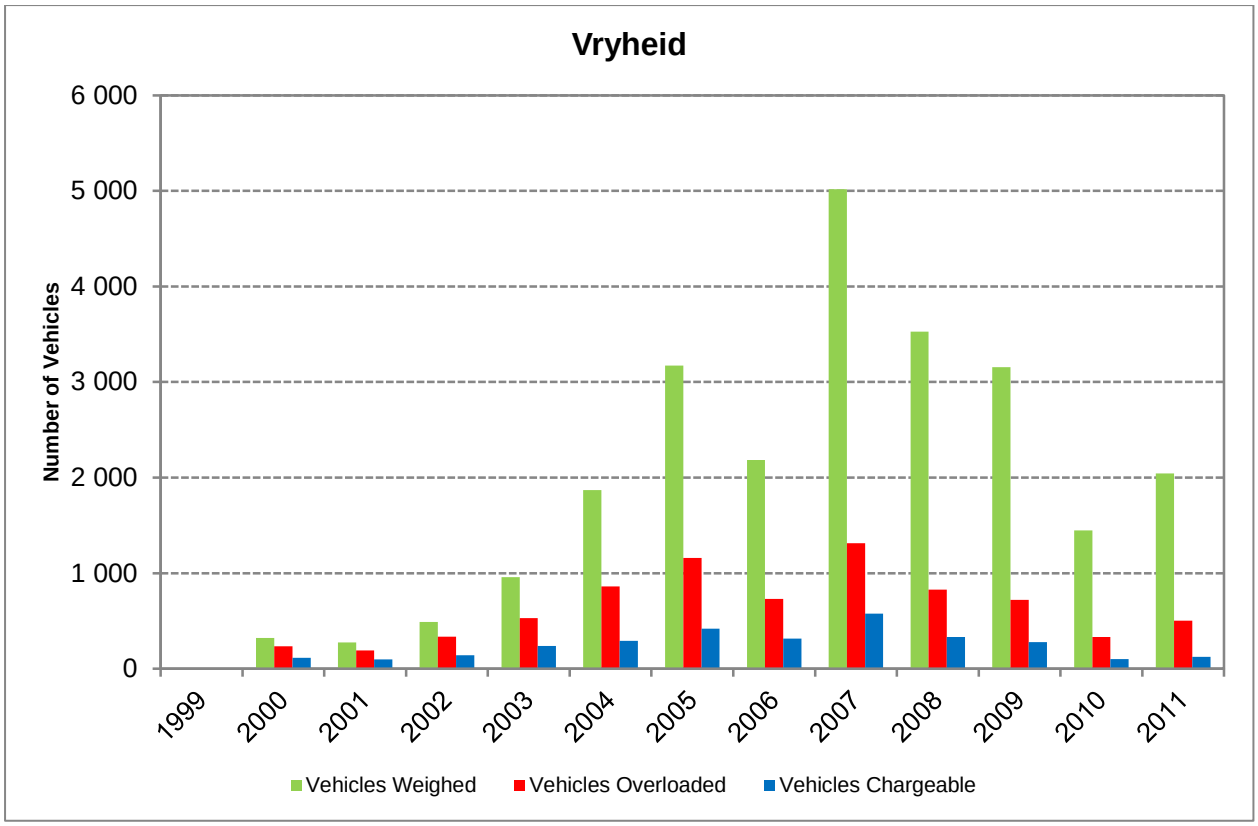




Appendix C. Annual weighing statistics - Individual weighbridges: 1999 to 2011

Figure C1: Weighbridge statistics 1999 to 2011: Northern KwaZulu-Natal Region





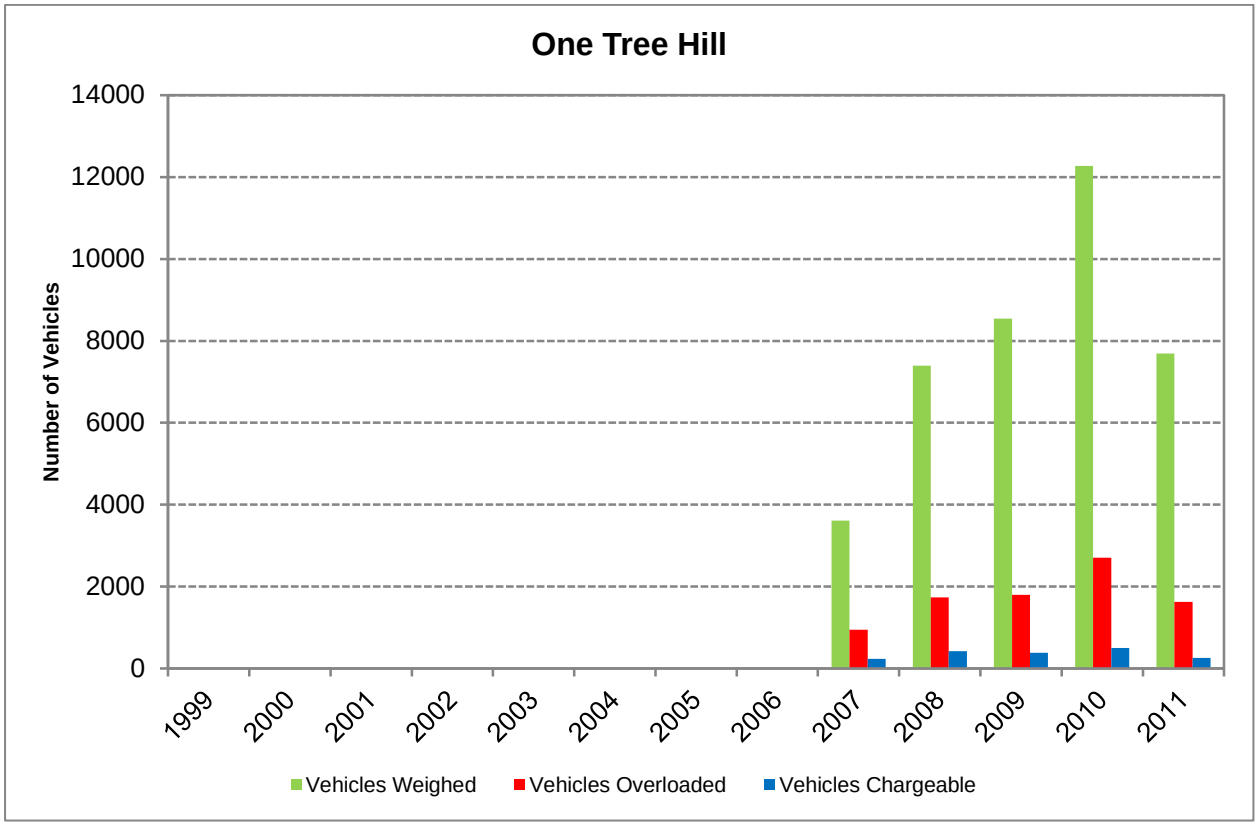
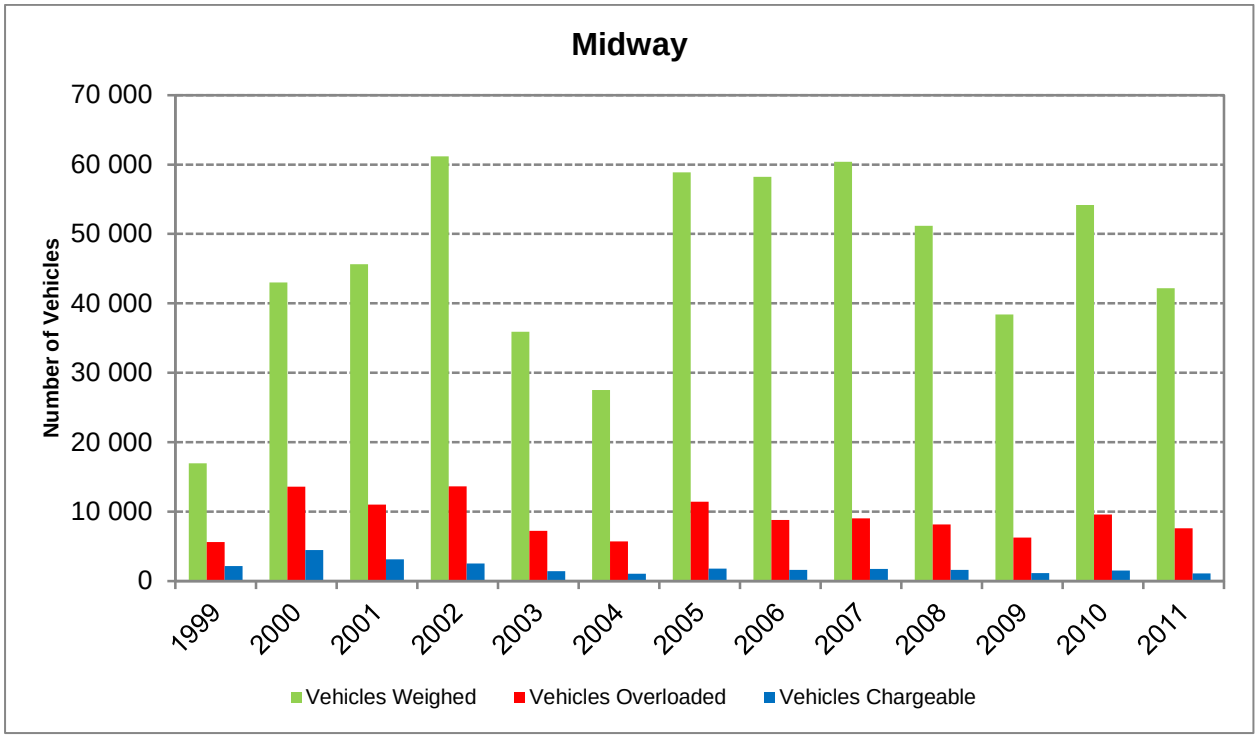
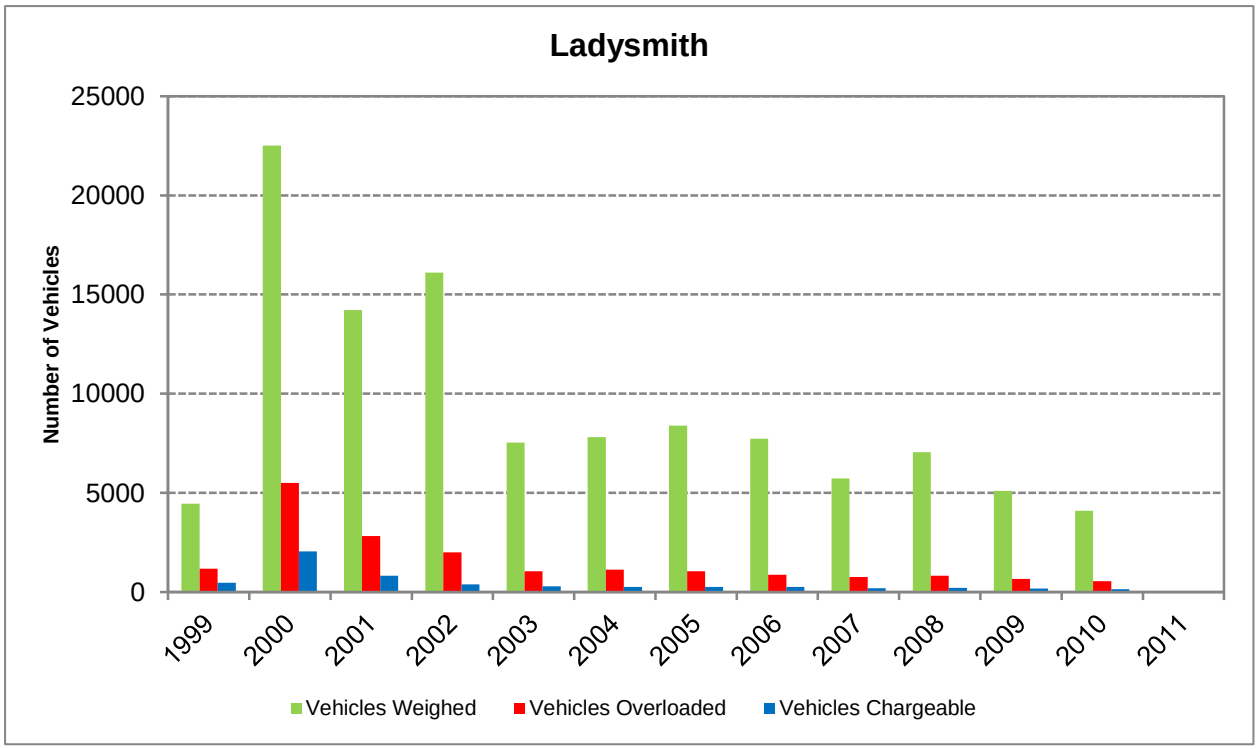
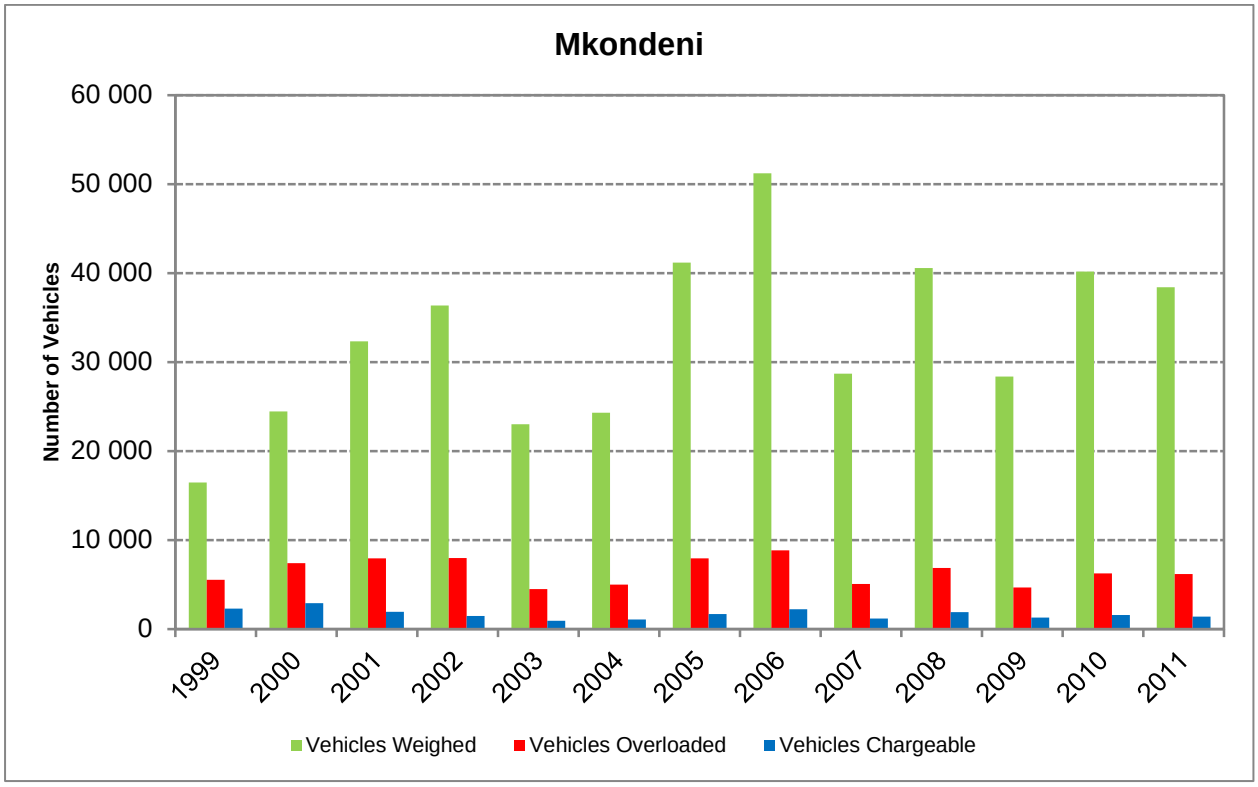

One Tree Hill
Number of Vehicles
14000
12000
10000
8000
6000
4000
2000
0
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
Vehicles Weighed
Vehicles Overloaded
Vehicles Chargeable

Figure C2: Weighbridge statistics 1999 to 2011: Midlands Region






Mkondeni
60 000
50 000
40 000
30 000
20 000
10 000
0
Number of Vehicles
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
Vehicles Weighed
Vehicles Overloaded
Vehicles Chargeable

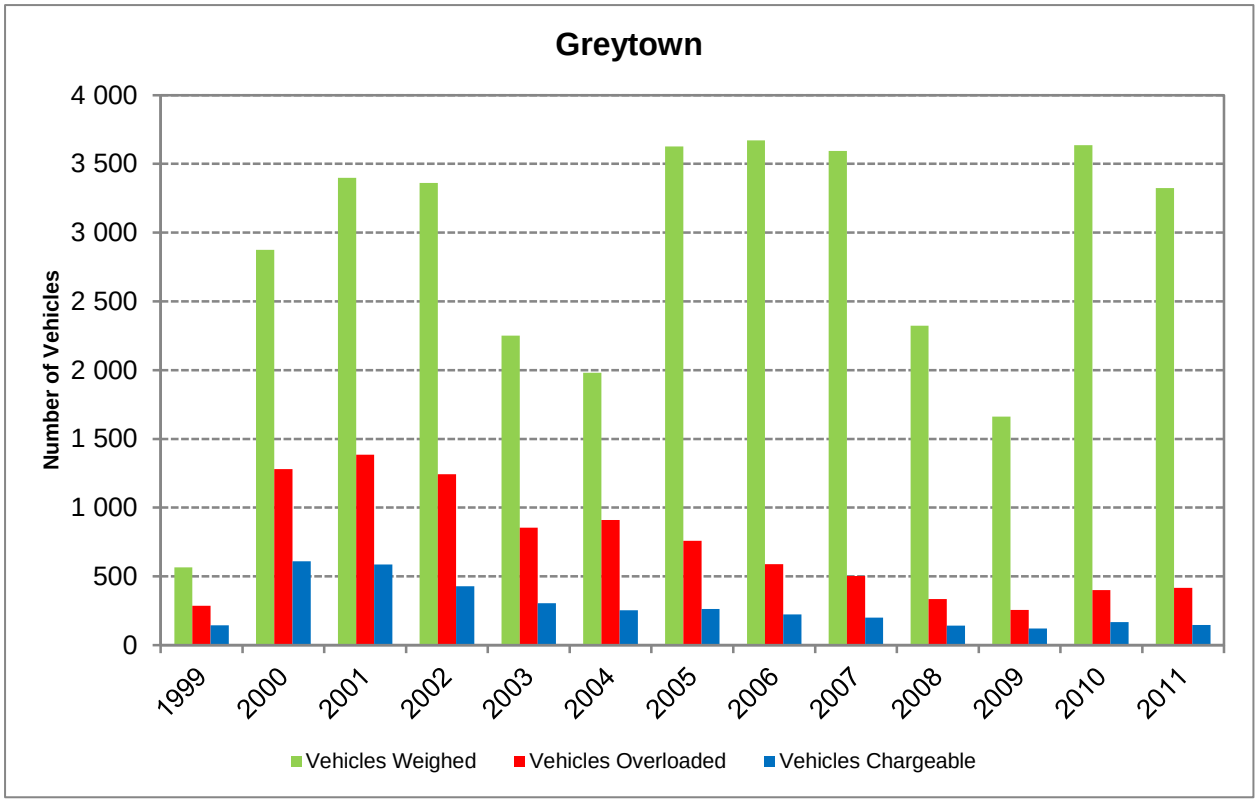
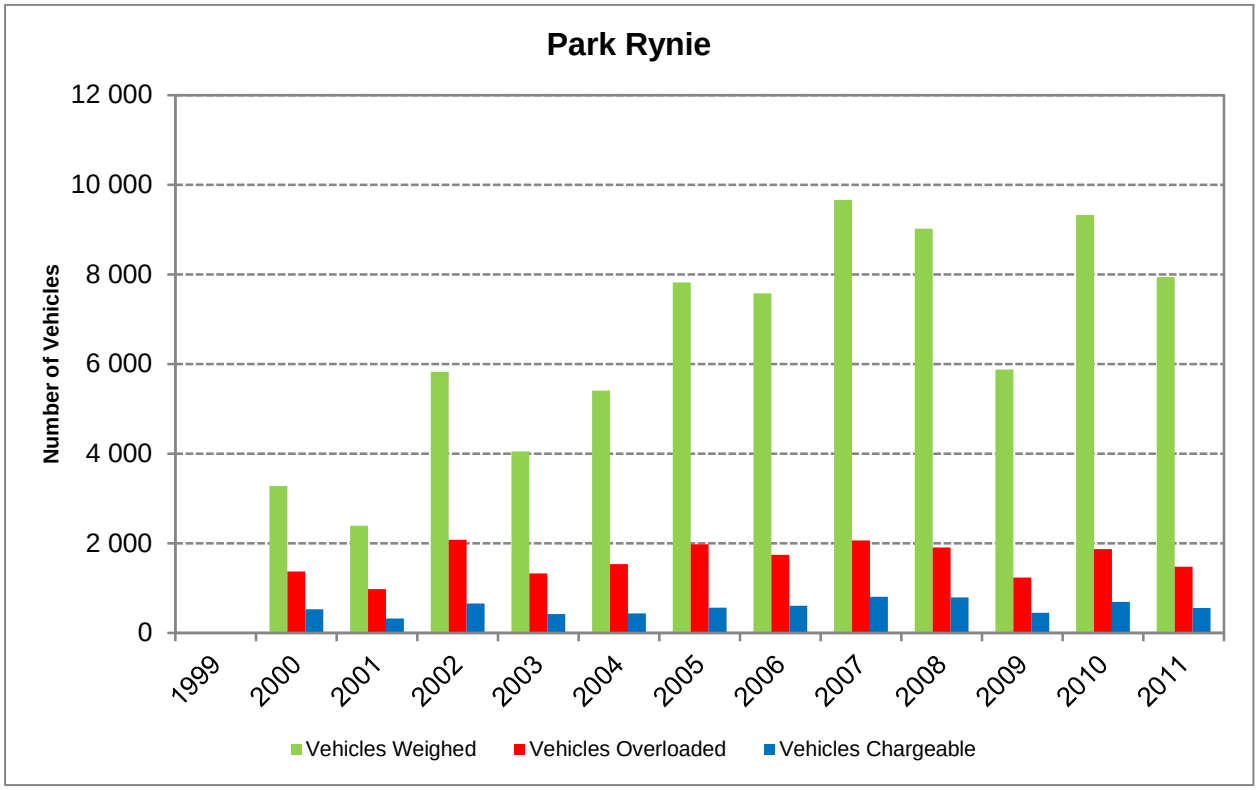

Greytown
4 000
3 500
3 000
2 500
2 000
1 500
1 000
500
0
Number of Vehicles
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
Vehicles Weighed
Vehicles Overloaded
Vehicles Chargeable

Figure C3: Weighbridge statistics 1999 to 2011: South Coast Region



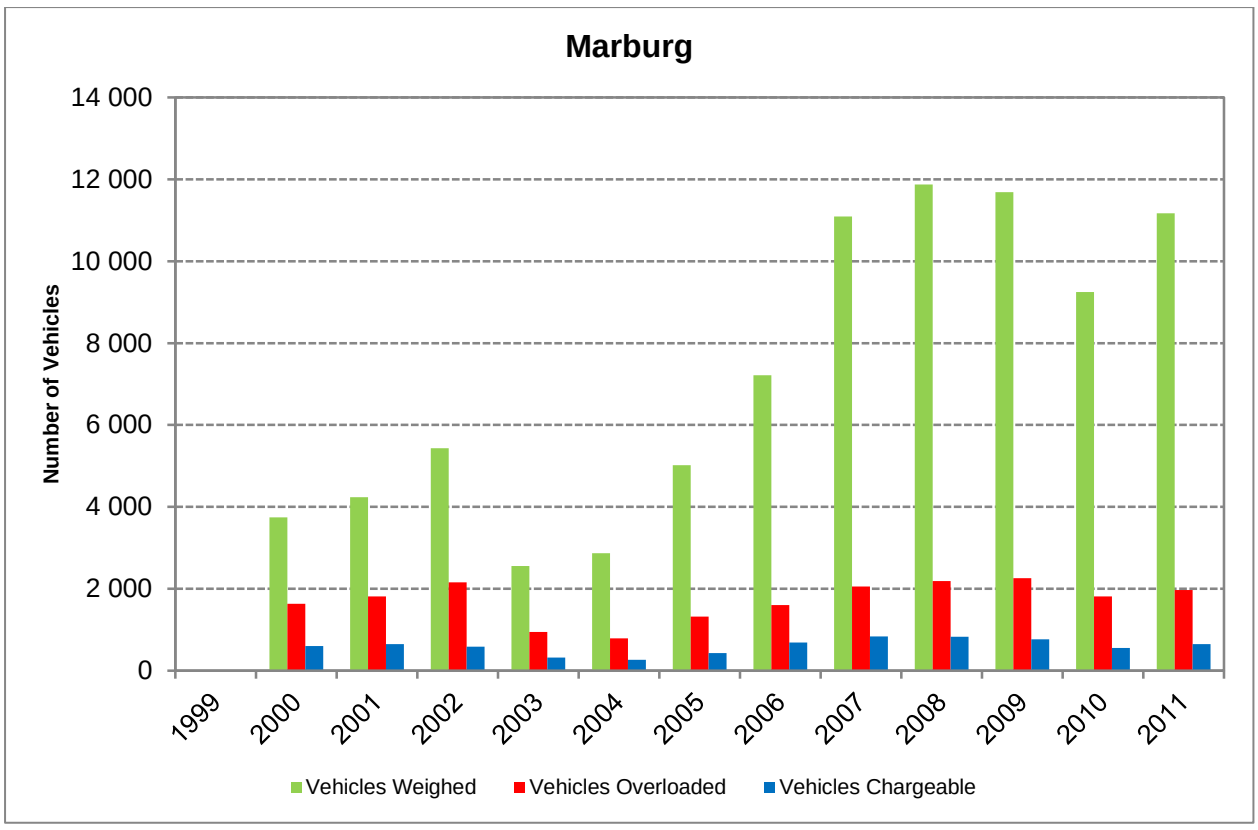
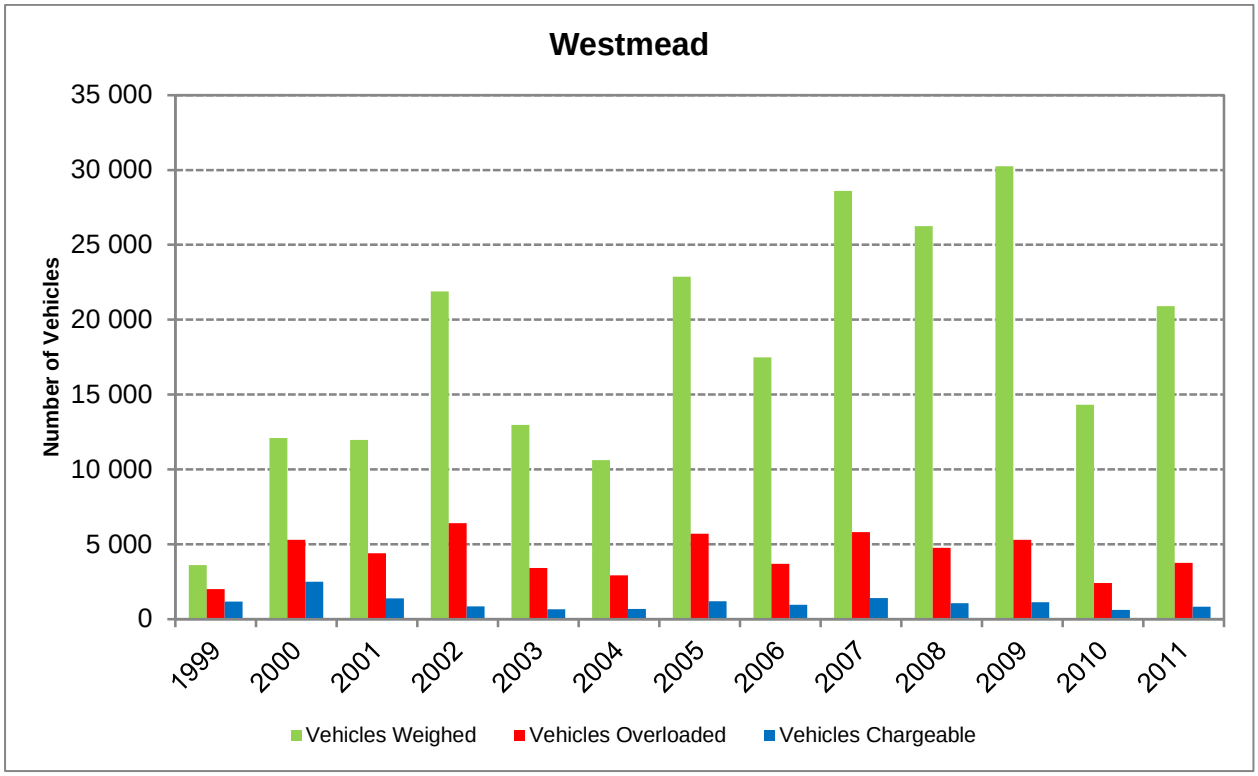
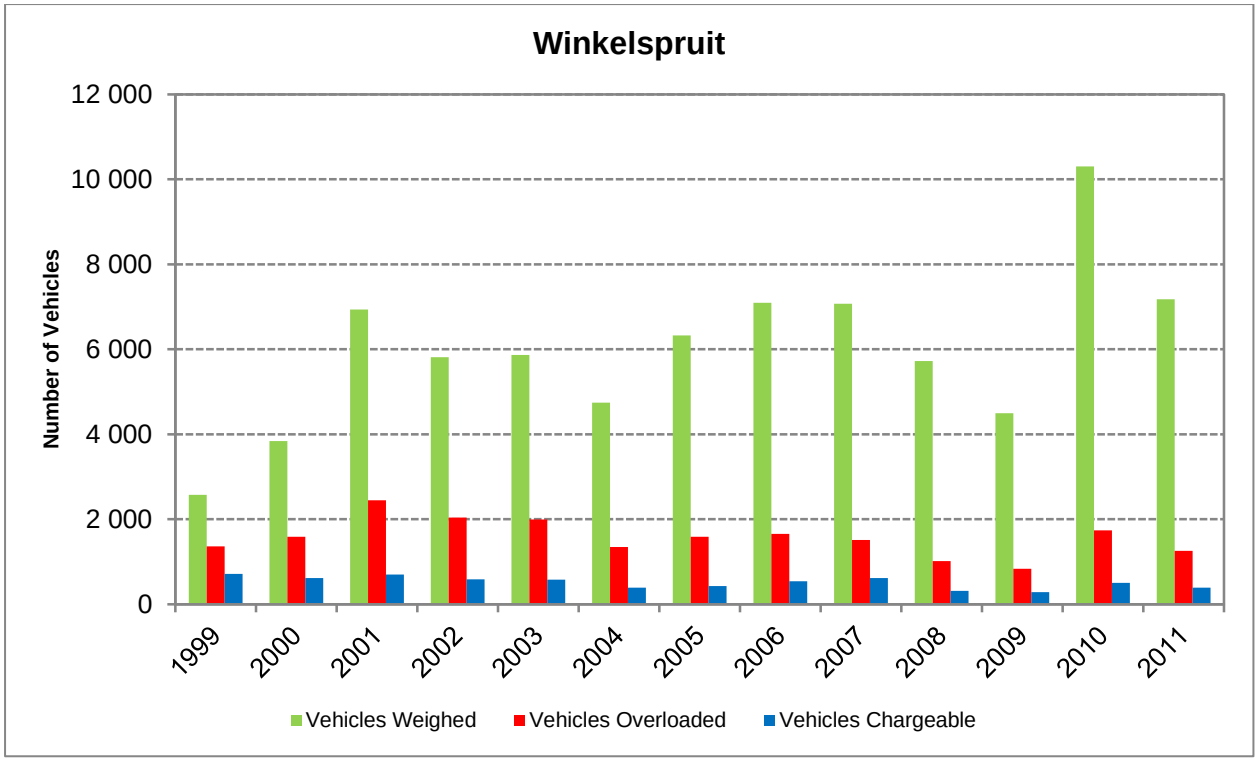
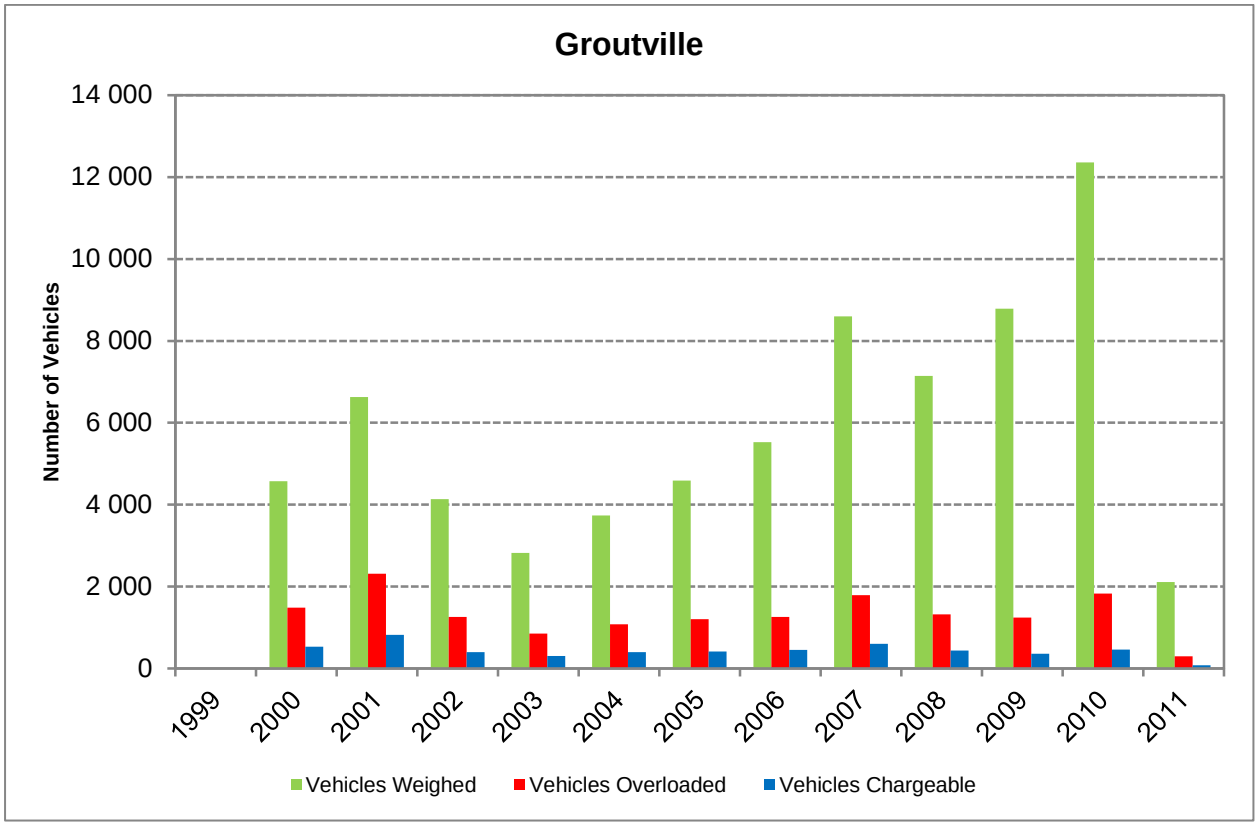


Figure C4: Weighbridge statistics 1999 to 2011: Durban Metro Region






Groutville
Number of Vehicles
14 000
12 000
10 000
8 000
6 000
4 000
2 000
0
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
Vehicles Weighed
Vehicles Overloaded
Vehicles Chargeable

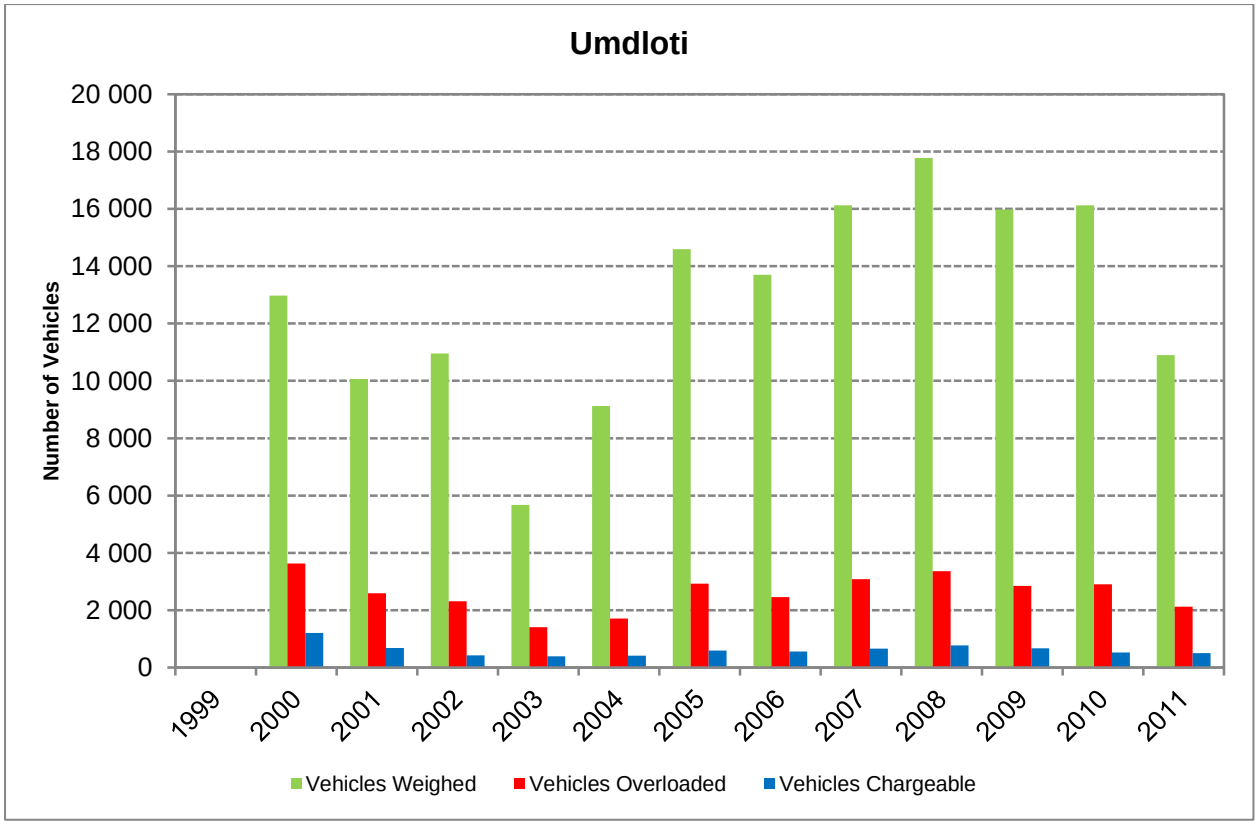

Umdloti
Number of Vehicles
20 000
18 000
16 000
14 000
12 000
10 000
8 000
6 000
4 000
2 000
0
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
Vehicles Weighed
Vehicles Overloaded
Vehicles Chargeable

Figure C5: Weighbridge statistics 1999 to 2011: Zululand Region