**DRAFT**

# Truck Traffic Analysis using Weigh-In-Motion (WIM) Data in California

by

**Q. Lu, J. Harvey, T. Le, J. Lea, R. Quinley, D. Redo, J. Avis**

**June 2002**

**University of California, Berkeley**
**Institute of Transportation Studies**
**Pavement Research Center**

## TABLE OF CONTENTS

## LIST OF FIGURES

## LIST OF TABLES

## EXECUTIVE SUMMARY

This report is based on truck traffic data collected during 1991 to early 2001 from all the data Weight in Motion (WIM) stations on the California State highway network. The entire set of data was obtained, sampled, and cleaned before subsequent analysis.

The objectives of the studies reported herein were as follows:

- develop axle load spectra for various axle groups of each truck type and compare these load spectra among various locations and time periods;
- determine truck traffic volume and load growth trends using regression methods;
- characterize past truck traffic loading patterns, including truck speeds, gross weights, and side wheel load differences;
- check the possibility of extrapolation of available truck traffic data to sites where WIM stations are not installed.

Chapter 2 provides a summary of data preparation and analysis techniques. Chapter 2 also includes a brief introduction to WIM systems, description of the WIM data structure, data sampling and cleaning methods, and assumptions used in the analysis.

The data were sampled and cleaned in such a way that all the data used in the analysis were those that passed the Caltrans routine validation checks and did not include identifiable erroneous records.

Chapter 3 reports the results of analysis of combined data from all the WIM stations across the entire analysis period. It shows that the generalized load spectra of all four axle groups became heavier at night than in the daytime, but had little seasonal variation. It also shows that the axle load spectra in Central Valley were heavier than those in the Bay Area and

Southern California, and that the axle load spectra in rural areas were heavier than those in urban areas.

Chapter 4 contains the results of analysis of data from six representative WIM sites. It includes the comparison of axle load spectra for various directions, lanes, years, and day versus night. Chapter 4 also contains the comparison of truck traffic volume for day versus night, among seasons, and among lanes. The growth trends of truck traffic volumes were estimated using linear and non-linear regression methods. Side wheel load variation, truck speed distribution, truck gross weight distribution, and yearly variation also included in this chapter.

The results show that the axle load spectra were similar for both directions of travel, but varied among lanes. The load spectra at night were generally heavier than those in the daytime. The load spectra didn't show much yearly variation, but the load spectra coefficients changed with time, especially for tandem and tridem axle groups. An increasing trend of truck volumes was observed from each WIM station, and can be fitted with linear regression modeling. The load difference between wheels on each end of the same axle(s) was very small and can possibly be ignored in pavement design. The speed of each truck type had a narrow distribution, ranging mainly from 80 km/h to 112 km/h. The gross weight of each truck type did not show appreciable yearly change.

Chapter 5 includes the comparison of axle load spectra and truck traffic volume among some WIM stations grouped by their close proximity to each other. The results show that it is possible to extend axle load spectra at available WIM stations to adjacent sites, if the extrapolation is made judiciously. The truck traffic volume, however, usually changes significantly from site to site, and can not be extrapolated.

Chapter 6 includes the conclusions and recommendations of the study. It is recommended that adequate resources be provided to perform regular quality assurance checks at all WIM stations. This is essential if the tremendously valuable WIM data will continue to be accurately collected in the future.

# 1.0 INTRODUCTION

## 1.1 Background

Pavements are damaged by the environment and by traffic, and by the interaction of the two. Highway pavements sustain nearly all the traffic-related damage from trucks and nearly none from automobiles. Until relatively recently, truck traffic data have typically been aggregated into equivalent repetitions of a standard axle load (ESAL) for pavement design for two reasons:

- Pavement design methods required relatively simple computations in order to be widely implemented in the absence of high-speed computers, axle load database storage capacity, and low-cost methods of collecting detailed truck traffic load data, and
- Empirical pavement design methods did not analyze pavement damage in terms of specific distress models, therefore, it was not necessary to calculate the different damage rates for each distress mode caused by a given axle load.

The increasing sophistication of pavement distress models used in mechanistic pavement design methods requires more detailed truck traffic information in order to take full advantage of their increased predictive capability. At the same time, computing speed, database storage, and access to databases have improved to the point that highly detailed truck traffic information can be easily stored, organized, and readily used for pavement design.

The Portland Cement Association (PCA) method of rigid pavement design recognized the need for detailed data early, and has used detailed axle load spectrum data since 1966.(*1*) The AASHTO 2002 methods for rigid and flexible design use axle load spectra.(*2*) Mechanistic pavement design procedures being developed for the California Department of Transportation

(Caltrans) by the University of California Pavement Research Center (UCPRC) (which will make use of some AASHTO 2002 models) will also make use of axle load spectra in cases for which that level of detail is required.

With its data Weigh-In-Motion (WIM) systems, Caltrans collects all the data needed for axle load spectra, but currently only uses it to calculate the Traffic Index (TI) used in the current Caltrans pavement design procedures. This quick and readily understood number provides a good general indication of traffic loading. The Traffic Index is calculated using the following formula:

$$TI = 9.0 \times (ESAL/10^{6})^{0.119} \quad \textbf{(1)}$$

where:

| | | |
|---|---|---|
| T | = | Traffic Index, |
| *ESAL* | = | Equivalent 80-kN Single Axle Loads, calculated by: |

$$ESAL = \sum \left( n \times \left( \frac{axle\_group\_load\,(KN)}{n \times 80(KN)} \right)^{4.2} \right) \quad \textbf{(2)}$$

where:

| | | |
|---|---|---|
| n | = | 1 for steering and single axle group, 2 for tandem axle group, 3 for tridem axle group. |
| $\sum$ | = | summation on all axle group loads expected in the design life of the pavement. |

An axle load spectrum is the load distribution of an axle group during a period of time. The equation for converting spectra into ESALs is based on an average across all pavement types, (i.e., rigid and flexible), and all distress mechanisms, (i.e., faulting and cracking in rigid pavements and cracking and rutting in flexible pavements), and ride quality across all pavements. It is well known that different pavement types and different distress mechanisms are affected at different rates by the same axle load, information that is lost by converting to ESALs.

For example, transverse cracking in rigid pavements is mostly determined by the few heaviest single axle loads, and is little damaged by other loads. Therefore, the 4.2 exponent in Equation 2 underestimates the damage caused by those loads, particularly during the day when curling stresses compound the damage caused by the trucks at the edge of the slab.

For another example, consider base and subgrade rutting in flexible pavements. The 4.2 exponent greatly overestimates the damage caused by heavy loads for thick flexible pavements. This is particularly true at night, when the asphalt concrete is stiff and protects the underlying layers.

These two examples also illustrate the extra information obtained from examining data showing how axle load spectra may vary from day to night and season to season.

WIM systems can continuously measure and store loads and axle spacing data for each truck that passes through the WIM station. Additionally, they also record supplementary data such as the date, time, speed, lane of travel, vehicle type, and station identification. With the information provided by WIM systems, it is possible to get detailed truck traffic data, such as axle load spectra, required in modern pavement design methods.

In the late 1980s, Caltrans began to install data WIM systems on its highways to record truck traffic information. Currently, over 100 data WIM stations are installed on the California highway system. These data WIM stations are producing massive amounts of traffic data every day. Figure 1 and Table 1 show data WIM station locations throughout California as of March 2001.

## 1.2 Objectives of This Study

The objectives of this study are:

1. Take the binary database of available Caltrans WIM data, clean it, and convert it into a relational database to provide easy access to facilitate pavement design and management.
2. Examine the axle load spectra for the total data set by:
    a. axle type (steering single, single, tandem, tridem)
    b. day versus night, and across the three typical California seasons (wet, spring, dry)
    c. by region (Bay Area, Central Valley, Southern California)
    d. by rural versus urban locations, and
    e. the distribution of truck types
3. Examine the axle load spectra and axle load spectra coefficients for six WIM sites representative of the three regions and rural versus urban by:
    a. day versus night
    b. direction (Northbound versus Southbound)
    c. axle type
    d. lane
    e. year (growth rates)
4. Examine truck traffic volume and ESALs for the 6 stations by:
    a. truck type
    b. day versus night
    c. direction
    d. season
    e. lane

    f. year (growth rate)
    g. differential load between axle ends
5. Examine truck speeds for the 6 stations by truck type and location
6. Examine gross vehicle weights (GVW) by truck type, location, and year (growth rate)
7. Evaluate the feasibility of estimating truck traffic information for adjacent locations from a given WIM station, including:
    a. Average Annual Daily Truck Traffic (AADTT), equivalent single axle loads (ESALs)

### 1.3 Scope of This Report

This report analyzes the data collected from all data WIM stations in California from January 1991 to March 2001, explores axle load frequency distributions for the various axle groups within all truck types, and compares frequency distributions among sites, years, seasons, day/night, and various regions. Also reported are analyses of truck volume distributions among lanes, directions, years, and truck types, right/left side wheel load difference distribution, and truck speed distribution.

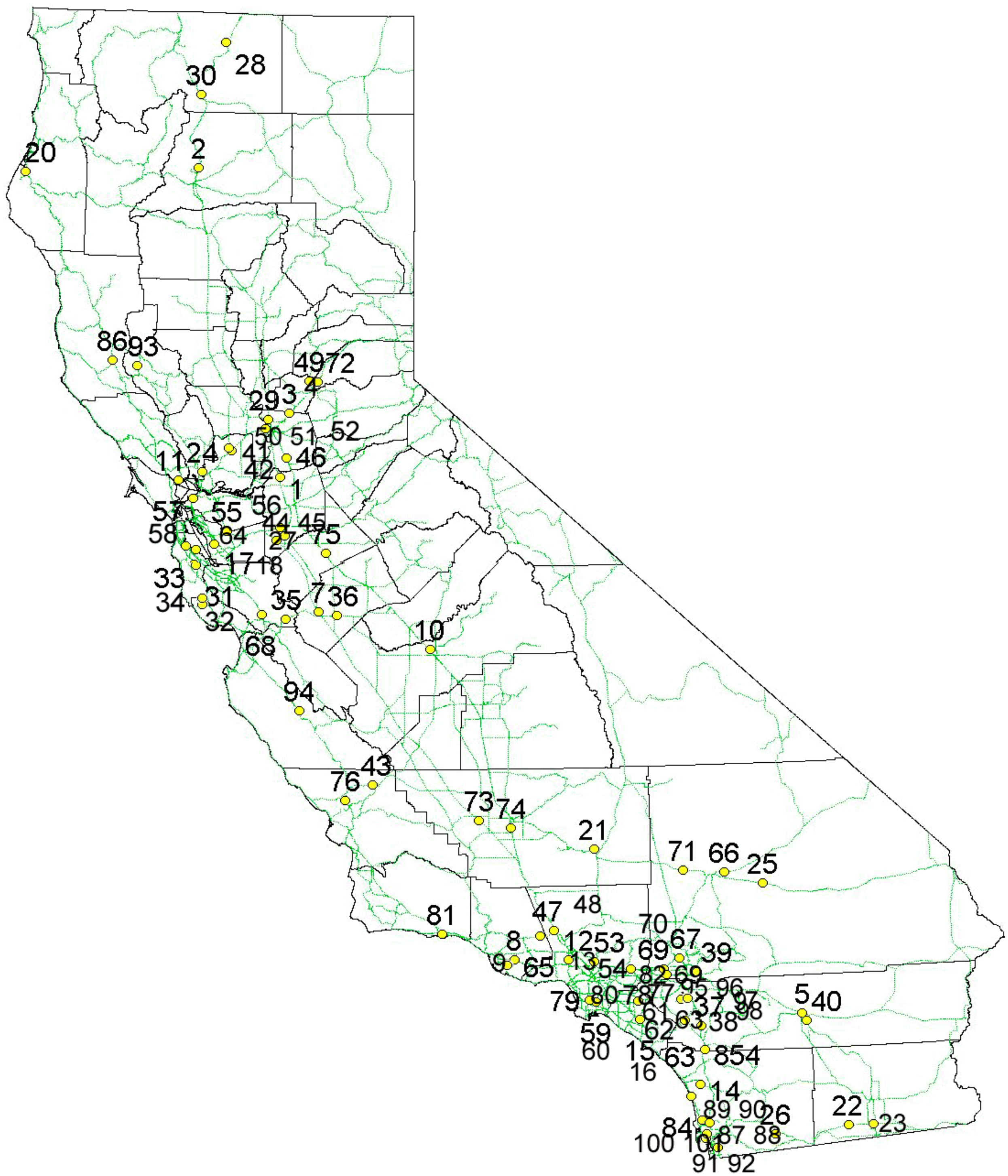



**Figure 1. Distribution of WIM stations on California state highway network in March 2001.**

**Table 1 Summary of Basic Information for Each WIM Station in California**

| Station No. | Location Information | | | | | Data System (Vendor) | Lane Configuration | |
|---|---|---|---|---|---|---|---|---|
| | Name | District | County | Route | Postmile | | No. of Lanes | Direction[1] |
| 1 | Lodi | 10 | San Joaquin | 5 | 43.7 | DAW 200 | 4 | 1234(N2N1S1S2) |
| 2 | Redding | 2 | Shasta | 5 | R24.9 | DAW 200 (7/99) | 4 | 1234(S2S1N1N2) |
| | | | | | | IRD (7/99-Pres) | 4 | 1234(N2N1S1S2) |
| 3 | Antelope | 3 | Sacramento | 80 | 15 | DAW 200 (8/95) | 4 | 1234(W4W3W2W1) |
| | Antelope (EB)-After 95 | | | | | IRD (8/95-Pres) | 4 | 1234(E4E3E2E1) |
| 4 | Antelope (WB)-After 98 | 3 | Sacramento | 80 | 17.2 | IRD | 4 | 1234(W4W3W2W1) |
| 5 | Indio | 8 | Riverside | 10 | R59.4 | DAW 200 (4/00) | 4 | 1234(E2E1W1W2) |
| | | | | | | IRD (4/00-Pres) | 4 | 1234(W2W1E1E2) |
| 6 | Newhall-Before 98 | 7 | Los Angeles | 5 | 44.6 | DAW 200 | 2 | 14(N1N2) |
| | Palmdale | 7 | Los Angeles | 14 | R57.8 | *SITE INSTALLATION PENDING | | |
| 7 | Santa Nella | 10 | Merced | 5 | 20.2 | DAW 200 | 4 | 1234(S2S1N1N2) |
| 8 | Ventura(SB) | 7 | Los Angeles | 101 | 37.8 | DAW 200 (8/99) | 5 | 12345(S4S3S5S1S2) |
| | Conejo (SB) | | Ventura | | 12 | DAW 190 (8/99-Pres) | 5 | 12345(S4S3S5S1S2) |
| 9 | Ventura(NB) | 7 | Los Angeles | 101 | 37.8 | DAW 200 (8/99) | 5 | 12345(N4N3N5N1N2) |
| | Conejo (NB) | | Ventura | | 7.7 | DAW 190 (8/99-Pres) | 5 | 12345(N4N3N5N1N2) |
| 10 | Fresno | 6 | Fresno | 99 | 25 | DAW 200 | 6 | 123456(S3S2S1N1N2N3) |
| 11 | Sonoma | 4 | Sonoma | 37 | 2.7 | DAW 200 | 4 | 1234(W2W1E1E2) |
| 12 | Van Nuys (SB) | 7 | Los Angeles | 405 | 42.9 | DAW 200 (6/94) | 4 | 1235(S4S3S1S2) |
| | | | | | | DAW 190 (6/94-Pres) | 4 | 1235(S4S3S1S2) |
| 13 | Van Nuys (NB) | 7 | Los Angeles | 405 | 42.9 | DAW 200 (6/94) | 4 | 1235(N4N3N1N2) |
| | | | | | | DAW 190 (6/94-Pres) | 4 | 1235(N4N3N1N2) |
| 14 | San Marcos | 11 | San Diego | 78 | 10.7 | DAW 200 | 6 | 123456(E3E2E1W1W2W3) |
| 15 | Irvine (SB) | 12 | Orange | 5 | 25.8 | DAW 200 (1/98) | 6 | 123456(S6S5S2S1S4S3) |
| | | | | | | DAW 190 (1/98-Pres) | 6 | 123456(S6S5S4S3S2S1) |
| 16 | Irvine (NB) | 12 | Orange | 5 | 25.8 | DAW 200 (1/98) | 6 | 123456(N6N5N2N1N4N3) |
| | | | | | | DAW 190 (1/98-Pres) | 6 | 123456(N6N5N4N3N2N1) |
| 17 | Hayward (SB) | 4 | Alameda | 880 | 14.7 | DAW 200 | 4 | 1235(S4S3S1S2) |
| 18 | Hayward (NB) | 4 | Alameda | 880 | 14.7 | DAW 200 | 4 | 1235(N4N3N1N2) |
| 19 | Martinez | 4 | Contra Costa | 4 | 11.2 | *SITE INSTALLATION PENDING | | |
| 20 | Loleta | 1 | Humboldt | 101 | 65.6 | DAW 200 | 4 | 1234(N2N1S1S2) |
| 21 | Mojave | 6 | Kern | 58 | 108.1 | DAW 200 | 4 | 1234(E2E1W1W2) |

| Station No. | Location Information | | | | | Data System (Vendor) | Lane Configuration | |
|---|---|---|---|---|---|---|---|---|
| | Name | District | County | Route | Postmile | | No. of Lanes | Direction[1] |
| 22 | Jeffrey | 11 | Imperial | 8 | 25.8 | DAW 200 | 4 | 1234(E2E1W1W2) |
| 23 | El Centro | 11 | Imperial | 8 | 40 | DAW 200 | 4 | 1234(E2E1W1W2) |
| 24 | Napa | 4 | Napa | 12 | 2.3 | DAW 200 | 2 | 14(W1E1) |
| 25 | Newberry | 8 | San Bernardino | 40 | 28.9 | DAW 200 | 4 | 1234(E2E1W1W2) |
| 26 | Cameron | 11 | San Diego | 8 | 51.5 | DAW 200 | 4 | 1234(E2E1W1W2) |
| 27 | Tracy | 10 | San Joaquin | 5 | 7.4 | DAW 200 | 4 | 1234(S2S1N1N2) |
| 28 | Macdoel | 2 | Siskiyou | 97 | 34.5 | IRD | 2 | 12(S1N1) |
| 29 | Arco (SB) | 3 | Sacramento | 5 | 28.9 | IRD | 3 | 123(S1S2S3) |
| 30 | Mt Shasta | 2 | Siskiyou | 5 | 11.4 | DAW 200 | 4 | 1234(S2S1N1N2) |
| 31 | Woodside (SB) | 4 | San Mateo | 280 | 5.6 | DAW 200 | 4 | 1235(S4S3S1S2) |
| 32 | Woodside (NB) | 4 | San Mateo | 280 | 5.6 | DAW 200 | 4 | 1235(N4N3N1N2) |
| 33 | Burlingame (SB) | 4 | San Mateo | 101 | 17.5 | DAW 200 | 4 | 1235(S4S3S1S2) |
| 34 | Burlingame (NB) | 4 | San Mateo | 101 | 17.5 | DAW 200 | 4 | 1235(N4N3N1N2) |
| 35 | Pacheco | 4 | Santa Clara | 152 | 26.9 | DAW 200 | 4 | 1234(W2W1E1E2) |
| 36 | Los Banos | 10 | Merced | 152 | 23 | DAW 200 | 4 | 1234(W2W1E1E2) |
| 37 | Elsinore (SB) | 8 | Riverside | 15 | 21.6 | DAW 200(11/99) | 4 | 1235(S4S3S1S2) |
| | | | | | | DAW 190(11/99-Pres) | 4 | 1235(S4S3S1S2) |
| 38 | Elsinore (NB) | 8 | Riverside | 15 | 21.6 | DAW 200(11/99) | 4 | 1235(N4N3N1N2) |
| | | | | | | DAW 190(11/99-Pres) | 4 | 1235(N4N3N1N2) |
| 39 | Redlands | 8 | San Bernardino | 30 | 31.7 | DAW 200 | 4 | 1234(E2E1W1W2) |
| 40 | Coachella | 8 | Riverside | 86 | R16 | DAW 200 | 4 | 1234(N2N1S1S2) |
| 41 | Vacaville (EB) | 4 | Solano | 80 | 30.6 | IRD | 4 | 1234(E4E3E2E1) |
| 42 | Vacaville (WB) | 4 | Solano | 80 | 30.6 | IRD | 4 | 1234(W4W3W2W1) |
| 43 | Cholame | 5 | San Luis Obispo | 46 | 44.7 | IRD | 2 | 12(E1W1) |
| 44 | Banta | 10 | San Joaquin | 205 | R9.5 | DAW 200 (8/00) | 4 | 1234(W2W1E1E2) |
| | | | | | | DAW 190 (8/00-Pres) | 4 | 1234(W2W1E1E2) |
| 45 | Carbona | 10 | San Joaquin | 580 | 6.4 | DAW 200 | 4 | 1234(E2E1W1W2) |
| 46 | Galt | 3 | Sacramento | 99 | 6.9 | IRD | 4 | 1234(S2S1N1N2) |
| 47 | Castaic (SB) | 7 | Los Angeles | 5 | R56.1 | DAW 200 | 4 | 1235(S4S3S1S2) |
| 48 | Castaic (NB) | 7 | Los Angeles | 5 | R56.1 | DAW 200 | 4 | 1235(N4N3N1N2) |
| 49 | Auburn | 3 | Placer | 49 | 9 | DAW 200 | 4 | 1234(N2N1S1S2) |
| 50 | Elmira | 4 | Solano | 505 | 2.2 | IRD | 4 | 1234(N2N1S1S2) |
| 51 | West Sac (EB) | 3 | Yolo | 50 | 0.6 | IRD | 4 | 1234(E4E3E2E1) |

| Station No. | Location Information | | | | | Data System (Vendor) | Lane Configuration | |
|---|---|---|---|---|---|---|---|---|
| | Name | District | County | Route | Postmile | | No. of Lanes | Direction[1] |
| 52 | West Sac (WB) | 3 | Yolo | 50 | 0.6 | IRD | 4 | 1234(W4W3W2W1) |
| 53 | Montrose (EB) | 7 | Los Angeles | 2 | 21.9 | *SITE ABANDONED | | |
| 54 | Montrose (WB) | 7 | Los Angeles | 2 | 21.9 | *SITE ABANDONED | | |
| 55 | Dublin (SB) | 4 | Contra Costa | 680 | R0.1 | DAW 100 | 4 | 1234(S4S3S2S1) |
| 56 | Dublin (NB) | 4 | Contra Costa | 680 | R0.1 | DAW 100 | 4 | 1234(N4N3N2N1) |
| 57 | Pinole (EB) | 4 | Contra Costa | 80 | 7.5 | DAW 200 | 4 | 1235(E4E3E1E2) |
| 58 | Pinole (WB) | 4 | Contra Costa | 80 | 7.5 | DAW 200 | 4 | 1235(W4W3W1W2) |
| 59 | LA - 710 (SB) | 7 | Los Angeles | 710 | 11.5 | IRD | 4 | 1234(S4S3S2S1) |
| 60 | LA - 710 (NB) | 7 | Los Angeles | 710 | 11.5 | IRD | 4 | 1234(N4N3N2N1) |
| 61 | Peralta (EB) | 12 | Orange | 91 | 11.9 | IRD | 4 | 1234(E4E3E2E1) |
| 62 | Peralta (WB) | 12 | Orange | 91 | 11.9 | IRD | 4 | 1234(W4W3W2W1) |
| 63 | Murrieta | 8 | Riverside | 215 | R15 | DAW 100 | 4 | 1234(N2N1S1S2) |
| 64 | Foster City | 4 | San Mateo | 92 | 14.1 | IRD | 6 | 123456(W3W2W1E1E2E3) |
| 65 | Piru | 7 | Ventura | 126 | 30.8 | DAW 100 | 4 | 1234(W2W1E1E2) |
| 66 | Calico | 8 | San Bernardino | 15 | R81.4 | IRD | 4 | 1234(N2N1S1S2) |
| 67 | Devore | 8 | San Bernardino | 215 | 14.8 | DAW 100 | 4 | 1234(N2N1S1S2) |
| 68 | Gilroy | 4 | Santa Clara | 101 | R9.8 | IRD | 6 | 123456(S3S2S1N1N2N3) |
| 69 | Fontana (SB) | 8 | San Bernardino | 15 | 6.1 | DAW 100 | 4 | 1234(S4S3S2S1) |
| 70 | Fontana (NB) | 8 | San Bernardino | 15 | 6.1 | DAW 100 | 4 | 1234(N4N3N2N1) |
| 71 | Hinkley | 8 | San Bernardino | 58 | 19.7 | DAW 100 | 4 | 1234(W2W1E1E2) |
| 72 | Bowman | 3 | Placer | 80 | 23.4 | IRD | 6 | 123456(W3W2W1E1E2E3) |
| 73 | Stockdale | 6 | Kern | 5 | 48.7 | IRD | 4 | 1234(N2N1S1S2) |
| 74 | Bakersfield | 6 | Kern | 99 | 20.2 | IRD | 6 | 123456(N3N2N1S1S2S3) |
| 75 | Keyes | 10 | Stanislaus | 99 | R8.4 | IRD | 6 | 123456(N3N2N1S1S2S3) |
| 76 | Templeton | 5 | San Luis Obispo | 101 | 49.5 | IRD | 4 | 1234(S2S1N1N2) |
| 77 | Colton (EB) | 8 | San Bernardino | 10 | 12.4 | IRD | 4 | 1234(E4E3E2E1) |
| 78 | Colton (WB) | 8 | San Bernardino | 10 | 12.4 | IRD | 4 | 1234(W4W3W2W1) |
| 79 | Artesia (EB) | 7 | Los Angeles | 91 | 7.5 | IRD | 5 | 12345(E4E3E2E1,E(HOV)) |
| 80 | Artesia (WB) | 7 | Los Angeles | 91 | 7.5 | IRD | 5 | 12345(W4W3W2W1,W(HOV)) |
| 81 | Positas | 5 | San Benito | 101 | 16.2 | IRD | 6 | 123456(N3N2N1S1S2S3) |
| 82 | Glendora (EB) | 7 | Los Angeles | 210 | 42.6 | IRD | 5 | 12345(E4E3E2E1,E(HOV)) |
| 83 | Glendora (WB) | 7 | Los Angeles | 210 | 42.6 | IRD | 5 | 12345(W4W3W2W1,W(HOV)) |
| 84 | Leucadia (SB) | 11 | San Diego | 5 | 42.2 | IRD | 4 | 1234(S4S3S2S1) |

| Station No. | Location Information | | | | | Data System (Vendor) | Lane Configuration | |
|---|---|---|---|---|---|---|---|---|
| | Name | District | County | Route | Postmile | | No. of Lanes | Direction[1] |
| 85 | Leucadia (NB) | 11 | San Diego | 5 | 42.2 | IRD | 4 | 1234(N4N3N2N1) |
| 86 | Ukiah | 1 | Mendocino | 101 | 21.9 | DAW 190 | 4 | 1234(S2S1N1N2) |
| 87 | Balboa (SB) | 11 | San Diego | 15 | 10 | IRD | 4 | 1234(S4S3S2S1) |
| 88 | Balboa (NB) | 11 | San Diego | 15 | 10 | IRD | 4 | 1234(N4N3N2N1) |
| 89 | Dekema (SB) | 11 | San Diego | 805 | 24.5 | IRD | 4 | 1234(S4S3S2S1) |
| 90 | Dekema (NB) | 11 | San Diego | 805 | 24.5 | IRD | 4 | 1234(N4N3N2N1) |
| 91 | Poggi (SB) | 11 | San Diego | 805 | 5.6 | IRD | 4 | 1234(S4S3S2S1) |
| 92 | Poggi (NB) | 11 | San Diego | 805 | 5.6 | IRD | 4 | 1234(N4N3N2N1) |
| 93 | Lakeport | 1 | Lake | 29 | 44.4 | IRD | 4 | 1234(N2N1S1S2) |
| 94 | Greenfield | 5 | Monterey | 101 | 47.9 | IRD | 4 | 1234(S2S1N1N2) |
| 95 | Ontario (EB) | 8 | San Bernardino | 60 | R7.9 | IRD | 3 | 123(E3E2E1) |
| 96 | Ontario (WB) | 8 | San Bernardino | 60 | R7.9 | IRD | 3 | 123(W3W2W1) |
| 97 | Chino | 8 | San Bernardino | 83 | 5.7 | IRD | 4 | 1234(N2N1S1S2) |
| 98 | Prado | 8 | San Bernardino | 71 | R5.8 | IRD | 4 | 1256(S3S2N2N3) |
| 99 | Tulloch | 10 | Tuolumne | 120 | 6.4 | IRD | 4 | 1234(E2E1W1W2) |
| 100 | Miramar (SB) | 11 | San Diego | 163 | 10.4 | DAW 190 | 5 | 12345(S5S4S3S2S1) |
| 101 | Miramar (NB) | 11 | San Diego | 163 | 10.4 | DAW 190 | 4 | 1235(N4N3N2N1) |

[1] The lane numbers in the parentheses are Caltrans lane number designation. (e.g.,W2 represents westbound second lane from the centerline )

## 2.0 DISCUSSION OF DATA HANDLING

The methods used in the analysis to process the traffic data are presented in this chapter.

### 2.1 WIM systems

Weigh-in-Motion (WIM) is a state-of-the-art system to collect, store, process and transmit vehicular data from key locations on California State highways. Currently two categories of WIM systems are used in California: data collection and weigh station bypass. The former is used to collect traffic data in California while the latter is used in the PrePass$^{TM}$ operation to enable registered heavy vehicles to legally bypass open weigh stations after electronic verification. In the bypass WIM system, no data is stored except for the purpose of performance check on the WIM, therefore, all the data analyzed in this report came from the data WIM system.

The typical vehicle presence sensors employed in the data WIM system are bending plate scales and inductive loop detectors. Bending plates are steel plates, typically 2 inches by 6 inches, which are secured in frames anchored and epoxy bonded into the pavement. Two bending plates are installed side by side in each lane, one bending plate for each wheeltrack, as shown in Figure 2. WIM systems record instantaneous dynamic axle loads and spacings, number of axles, speed of vehicle, lane and direction of travel, and the date and time as a vehicle is passing over the sensors. The accuracy of these systems is primarily dependent on the vehicle dynamics and the inherent variance of the technology used within the WIM system. The data WIM station systems used by Caltrans were provided by two different vendors: PAT Traffic Control Corporation and International Road Dynamics Inc.. PAT Traffic Control Corporation provided three slightly different systems: DAW 100, DAW 190 and DAW 200, while International Road Dynamics Inc. provided one system called the IRD system. These two companies have different data handling software and data format. The ASCII truck information files used in this analysis also differ slightly from one another.

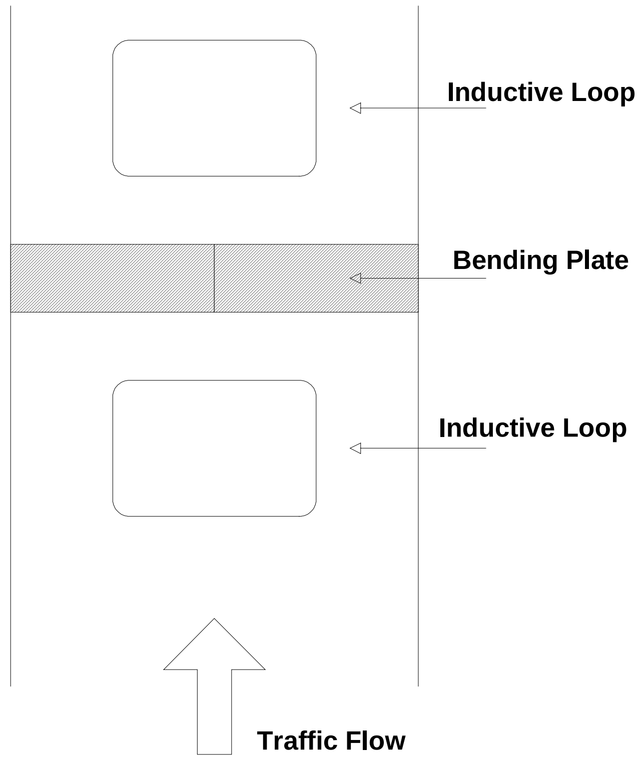



**Figure 2. Common configuration of WIM system.**

## 2.2 Data Sampling Method

Ideally, the Caltrans WIM stations collected and stored truck traffic information continuously once they were installed. Only on abnormal occasions would the data collection action be interrupted. These occasions included power failures, communication interruptions, pavement maintenance and rehabilitation activities, etc. Typically, a huge amount of data has been collected for each WIM station and included in the database developed by UCPRC. However, because traffic patterns generally do not change much over short periods such as a few days, it is not necessary to analyze the whole data set, and the results for the full set would be too difficult to report.

Based on the results of preliminary analysis of traffic data from six Caltrans WIM stations, which show a significant difference in traffic from weekdays to weekends and less significant differences across months, it was decided that the data in one week out of each month be used in the analysis. In this way, the variation in traffic patterns from weekdays to weekends and across months can be included in the sampled data set.

The data to be sampled were primarily determined according to the WIM File Download Record maintained by the WIM office of Caltrans. The WIM office of Caltrans has checked one to two weeks' WIM data in each month for validity and has kept the results in the WIM File Download Record. Two kinds of data were chosen to be candidates for sampling: *D* and *M*. *D* denotes data collected from a system that was working well and the provided good data; *M* denotes data collected from a system that had some minor errors but was generally considered acceptable.

As the data checked by Caltrans were continuous for one- to two-week periods, most of the data sampled for this research also came from continuous one-week periods. When a continuous week of good data was not available, two sampling strategies were used. First, if good data on the same day of the week in the same month was available, that day's data was selected (e.g., if the data from the first Monday of the month was bad but was good for the second Monday, then the data from the second Monday of the month was selected to combine with good data from the rest of the first week.) The second strategy was as follows: if less than 7 days of good data were available for a given month, then the data from three weekdays and one weekend were selected to keep the ratio of weekdays to weekends in the sampled data set close to 2.5:1.

Due to breakdown of WIM stations, system errors lasting several months, communication interruptions between WIM station and the WIM office, and other reasons, a complete one-week-out-of-one-month data set sample for the entire analysis period (up to 10 years) was not obtained for a few WIM stations. This may have introduced some errors in the analysis results, but they were believed to be small because of the large sample size of the remaining data sets analyzed.

## 2.3 Computer Programs

The raw data obtained from the WIM office of Caltrans were compressed and in a binary format that couldn't be analyzed directly. After sampling and extraction, these data files were converted into ASCII files using software provided by the two WIM vendors.

The program used to convert PAT system data files is called REPORTER, which uses different switches to convert DAW 100/190 and DAW 200 data files. This program obtains lane and direction information from a file called RESTAT.LST, which also contained other basic information from each WIM station.

The program used to convert IRD system data files is called OFFICE. This program provides the lane, direction, and other basic information of each station.

Both programs can also provide detailed truck weight, truck traffic volume, speed distribution analysis, summaries, and other analyses for each day's traffic data.

## 2.4 ASCII format

The ASCII truck information files created by REPORTER and OFFICE have similar format. They are both text files, in which each line of record represents one truck that has passed through the WIM systems. Each record is composed of a certain number of fields, which are delimited with commas.

The name of the PAT system ASCII file has the format of "A###MMDD.YY", where ### is the WIM station number, MM is month, DD is day in a month, and YY is year. For example, A0100112.98 means the data in the file was collected from WIM Station 10 on January 12, 1998.

Each record in the PAT system ASCII file has 41 fields, as shown in Table 2.

The filename of the IRD system ASCII file has the format of "YYMMDDTR.###", where ### is the WIM station number, MM is month, DD is day in a month, and YY is year.

Each record in the IRD system ASCII file has 40 fields, as shown in Table 2. The first 39 fields are identical to those of the PAT system ASCII files except for Field No. 13. PAT's Field No. 13 code designates weight violations as well as "warnings" (such as right/left wheel "imbalance"). IRD's Field No. 13 code designates only weight violations. IRD's Field No. 40 code designates "warnings" and "system errors".

The lane number used in the ASCII files is determined by the order in which the WIM storage hardware is installed, not by the Caltrans lane number designation system.

Because the WIM storage hardware was installed in arbitrary order, the lane number designation varies from station to station. In this report, however, the lane number has been converted into the Caltrans designation, which starts with the innermost lane as lane 1 and increases sequentially outward. The relationship between WIM lane numbers and Caltrans lane numbers is shown in Table 1.

**Table 2 Fields in ASCII Data Files**

| Field | PAT Data Type by Field | IRD Data Type by Field |
|---|---|---|
| 1 | Lane | Lane |
| 2 | Month | Month |
| 3 | Day | Day |
| 4 | Year | Year |
| 5 | Hour | Hour |
| 6 | Minute | Minute |
| 7 | Second | Second |
| 8 | Vehicle Number | Vehicle Number |
| 9 | Type | Type |
| 10 | Gross weight (kips) | Gross weight (kips) |
| 11 | Overall length (feet) | Overall length (feet) |
| 12 | Speed (mph) | Speed (mph) |
| 13 | Weight violation and warning code | Weight violation code |
| 14 | Axle 1 Right Side weight (kips) | Axle 1 Right Side weight (kips) |
| 15 | Axle 1 Left Side weight (kips) | Axle 1 Left Side weight (kips) |
| 16 | Axle 2 Right Side weight (kips) | Axle 2 Right Side weight (kips) |
| 17 | Axle 2 Left Side weight (kips) | Axle 2 Left Side weight (kips) |
| 18 | Spacing between Axles 1 & 2 (feet) | Spacing between Axles 1 & 2 (feet) |
| 19 | Axle 3 Right Side weight (kips) | Axle 3 Right Side weight (kips) |
| 20 | Axle 3 Left Side weight (kips) | Axle 3 Left Side weight (kips) |
| 21 | Spacing between Axles 2 & 3 (feet) | Spacing between Axles 2 & 3 (feet) |
| 22 | Axle 4 Right Side weight (kips) | Axle 4 Right Side weight (kips) |
| 23 | Axle 4 Left Side weight (kips) | Axle 4 Left Side weight (kips) |
| 24 | Spacing between Axles 3 & 4 (feet) | Spacing between Axles 3 & 4 (feet) |
| 25 | Axle 5 Right Side weight (kips) | Axle 5 Right Side weight (kips) |
| 26 | Axle 5 Left Side weight (kips) | Axle 5 Left Side weight (kips) |
| 27 | Spacing between Axles 4 & 5 (feet) | Spacing between Axles 4 & 5 (feet) |
| 28 | Axle 6 Right Side weight (kips) | Axle 6 Right Side weight (kips) |
| 29 | Axle 6 Left Side weight (kips) | Axle 6 Left Side weight (kips) |
| 30 | Spacing between Axles 5 & 6 (feet) | Spacing between Axles 5 & 6 (feet) |
| 31 | Axle 7 Right Side weight (kips) | Axle 7 Right Side weight (kips) |
| 32 | Axle 7 Left Side weight (kips) | Axle 7 Left Side weight (kips) |
| 33 | Spacing between Axles 6 & 7 (feet) | Spacing between Axles 6 & 7 (feet) |
| 34 | Axle 8 Right Side weight (kips) | Axle 8 Right Side weight (kips) |
| 35 | Axle 8 Left Side weight (kips) | Axle 8 Left Side weight (kips) |
| 36 | Spacing between Axles 7 & 8 (feet) | Spacing between Axles 7 & 8 (feet) |
| 37 | Axle 9 Right Side weight (kips) | Axle 9 Right Side weight (kips) |
| 38 | Axle 9 Left Side weight (kips) | Axle 9 Left Side weight (kips) |
| 39 | Spacing between Axles 8 & 9 (feet) | Spacing between Axles 8 &9(feet) |
| 40 | Direction | Warning and system error code |
| 41 | Number of axles | <does not exist> |

The vehicle classification method used by Caltrans was primarily based on axle spacing and vehicle weight, as shown in Table 3. The typical profiles for each truck type are sketched in Figure 3.

As Caltrans WIM stations are programmed to collect individual vehicle records for only the heavy vehicles, vehicle Types 1 to 3 are not included in the ASCII truck information file. Vehicle Type 4 (Bus) is regarded as a truck and is included in the WIM ASCII truck information file.

## 2.5 Erroneous Data

Although all the data to be analyzed were sampled from the data set that had passed the Caltrans routine validation checks, there still remained a variety of erroneous records in the sampled data set. The following sections explain these errors.

### 2.5.1 Records with Non-zero Violation, Warning, and System Error Codes

Each truck record in the data set has one or two codes used to denote weight violation, warning or system error. Such codes with non-zero values represent some kind of system errors or violations, such as axle weight violation, tandem weight violation, bridge weight violation, speed violation, off scale violation, imbalance, etc. The meanings of these codes differ for the PAT and IRD systems.

After discussion with the WIM office of Caltrans, the following methods were used to deal with those truck records with non-zero violation and warning codes: For PAT stations, codes 1-15 are weight violations and do not require any special treatment. Records with codes larger than 15 were exempted from analysis. For IRD stations, all violation and warning codes had already been taken into account and the corresponding records were kept in the analysis.

However, in the analysis of annual average daily truck traffic, all truck records were included.

### 2.5.2 Records with Zero Violation Codes

During the analysis, a small percentage of truck records with zero violation codes from the PAT system were found to contain other types of erroneous data, such as negative load values or lane numbers, erroneous (impossibly large) spacing between two axles, or zero or extremely large axle load values. Because these records only account for a very small percentage of the data sample size, they were deleted from the analysis.

## Table 3 WIM Vehicle Classification Parameters

| Type | Vehicle Description | # of Axles | Spacing (ft.) | | | | | | | | Weight (kips) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 1-2 | 2-3 | 3-4 | 4-5 | 5-6 | 6-7 | 7-8 | 8-9 | Min.-Max. |
| 1 | Motorcycle | 2 | 0.10-5.99 | | | | | | | | 0.10-3.00 |
| 2 | Auto, Pickup | 2 | 6.00-9.99 | | | | | | | | 1.00-7.99 |
| 3 | Other (Limo, Van, RV) | 2 | 10.00-22.99 | | | | | | | | 1.00-7.99 |
| 4 | Bus | 2 | 23.00-40.00 | | | | | | | | 12.00-> |
| 5 | 2D | 2 | 6.00-22.99 | | | | | | | | 8.00-> |
| 2 | Auto W/ 1 Axle trailer | 3 | 6.00-9.99 | 6.00-25.00 | | | | | | | 1.00-11.99 |
| 3 | Other W/ 1 Axle trailer | 3 | 10.00-16.00 | 6.00-25.00 | | | | | | | 1.00-11.99 |
| 4 | Bus | 3 | 23.10-40.00 | 3.00-5.99 | | | | | | | 20.00-> |
| 5 | 2D W/ 1 Axle trailer | 3 | 6.00-23.09 | 6.00-25.00 | | | | | | | 12.00-19.99 |
| 6 | 3 Axle | 3 | 6.00-23.09 | 3.00-5.99 | | | | | | | 12.00-> |
| 8 | 2S1,21 | 3 | 6.00-23.00 | 11.00-40.00 | | | | | | | 20.00-> |
| 2 | Auto W/ 2 Axle trailer | 4 | 6.00-9.99 | 6.00-25.00 | 1.00-11.99 | | | | | | 1.00-11.99 |
| 3 | Other W/ 2 Axle trailer | 4 | 10.00-16.00 | 6.00-25.00 | 1.00-11.99 | | | | | | 1.00-11.99 |
| 5 | 2D W/ 2 Axle trailer | 4 | 6.00-23.09 | 6.00-25.00 | 1.00-11.99 | | | | | | 12.00-19.99 |
| 7 | 4 Axle | 4 | 6.00-23.09 | 3.00-5.99 | 3.00-12.99 | | | | | | 12.00-> |
| 8 | 3S1, 31 | 4 | 6.00-23.00 | 3.00-5.99 | 13.00-44.00 | | | | | | 12.00-> |
| 8 | 2S2 | 4 | 6.00-23.00 | 11.00-44.00 | 3.00-11.99 | | | | | | 20.00-> |
| 3 | Other W/ 3 Axle trailer | 5 | 10.00-16.00 | 6.00-25.00 | 1.00-3.49 | 1.00-3.49 | | | | | 1.00-11.99 |
| 9 | 3S2 | 5 | 6.00-26.00 | 3.00-5.99 | 6.00-46.00 | 3.00-10.99 | | | | | 12.00-> |
| 11 | 2S12 | 5 | 6.00-26.00 | 11.00-26.00 | 6.00-20.00 | 11.00-26.00 | | | | | 12.00-> |
| 14 | 32 | 5 | 6.00-26.00 | 3.00-5.99 | 6.00-23.00 | 11.00-27.00 | | | | | 12.00-> |
| 10 | 3S2, 33 | 6 | 6.00-26.00 | 3.00-5.99 | 6.00-46.00 | 3.00-11.99 | 3.00-10.99 | | | | 12.00-> |
| 12 | 3S12 | 6 | 6.00-26.00 | 3.00-5.99 | 11.00-26.00 | 6.00-24.00 | 11.00-26.00 | | | | 12.00-> |
| 13 | 2S23, 3S22, 3S13 | 7 | 6.00-45.00 | 3.00-45.00 | 3.00-45.00 | 3.00-45.00 | 3.00-45.00 | 3.00-45.00 | | | 12.00-> |
| 13 | 3S23 | 8 | 6.00-45.00 | 3.00-45.00 | 3.00-45.00 | 3.00-45.00 | 3.00-45.00 | 3.00-45.00 | 3.00-45.00 | | 12.00-> |
| 13 | Permit | 9 | 6.00-45.00 | 3.00-45.00 | 3.00-45.00 | 3.00-45.00 | 3.00-45.00 | 3.00-45.00 | 3.00-45.00 | 3.00-45.00 | 12.00-> |
| 15 | Error and/or unclassified vehicles not meeting axle configurations set for classifications 1 through 14 | | | | | | | | | | |

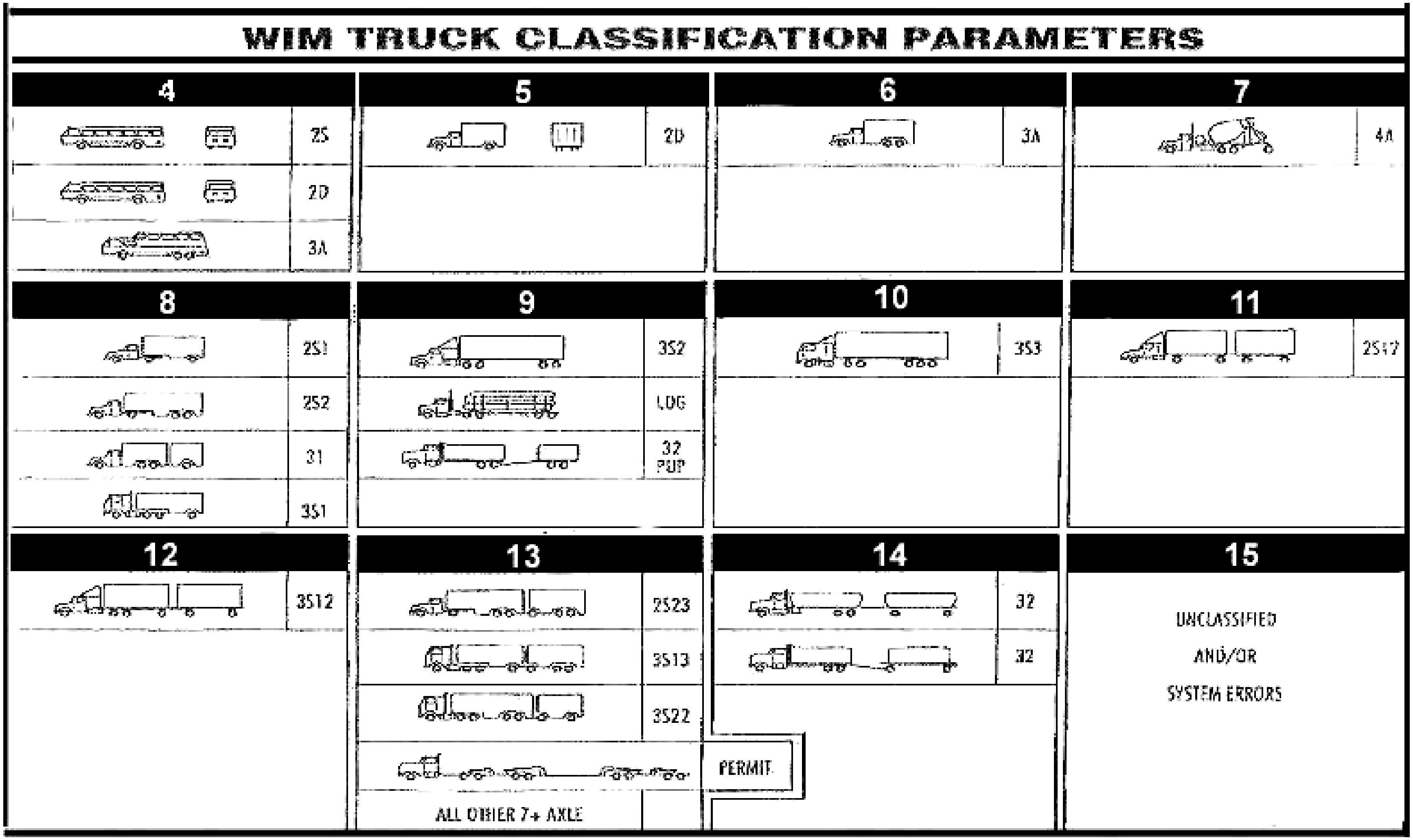



**Figure 3. Typical vehicle profiles for Caltrans truck type.**

## 2.6 Assumptions Used in Analysis

Several assumptions have been used in the analysis. These assumptions include:

- Axle grouping assumption. The first axle of each truck type was regarded as a steering axle. The spacing used to distinguish between single axles, tandem axles and tridem axles is 1.8 m (6 ft.). That is, if the spacing between one axle and its adjacent axles is larger than 1.8 m (6 ft.), this axle is regarded as a single axle; if the spacing between two adjacent axles is less than 1.8 m (6 ft.) and the spacing between these two axles and their adjacent axles is larger than 1.8 m (6 ft.), these two axles were regarded as a tandem; if the spacing between three adjacent axles is both less than 1.8 m (6 ft.)and the spacing between these three axles and their adjacent axles is larger than 1.8 m (6 ft.), these three axles were regarded as a tridem.
- Daytime assumption. Daytime was assumed to be between 6 AM and 6 PM. Night was assumed to be between 6 PM and 6 AM.
- Season assumption. Three seasons were used to characterize the weather in California: wet season (from November to February), spring season (from March to June) and dry season (from July to October).
- Axle load ranges assumption. The load interval for steering axles and single axles is in 5-kN increments from 0 to 220 kN. The load interval for tandem axles is in 10-kN increments from 0 to 440 kN. The load interval for tridem axles is in 10-kN increments from 0 to 500 kN. Analysis showed that almost all the axle weights were in the load ranges above. The very few exceptions were believed to be erroneous data that had not been deleted from the sample data set.

## 2.7 Data Analysis

After sampling and conversion of the binary data files, the cleaned ASCII files were run by a FORTRAN program (WIMANA.FOR developed by the UC Pavement Research Center) to compute the load spectra of the four axle groups (steering, single, tandem, and tridem) of different truck types at different times (day/night, season, year) and different locations (site, direction, and lane), and to compute the traffic volume distribution among different locations (site, direction, and lane) and at different times (day/night, season, and year). Truck traffic growth trends, side wheel load differences, and truck speed distributions were also analyzed.

The comparison and evaluation of axle load spectra are necessary in the analysis of truck traffic data. Several comparison and evaluation methods have been proposed, such as plotting the load distributions and using non-parametric statistical tests (e.g., Kruskal-Wallis test, Kolmogorov-Smirnov test).

Because the effect of traffic loads on pavement damage increases exponentially with the size of the load, statistical tests are not appropriate to evaluate axle load spectra, as they do not reflect the influence of axle load on pavement damage.

According to the discussion in FHWA-RD-00-054 report,(*3*) Load Spectrum Coefficient (LSC) is a better statistical measure that is related to the concept of pavement damage and is independent of pavement-related variables. The LSC for normalized load spectra was defined by Equation (3):

$$LSC = \sum_{i=1}^{l} \left( \frac{\left( \dfrac{mid-load\_range_i}{L} \right)}{80} \right)^m \times \frac{load-range\_count_i}{total\_count} \times L \qquad \textbf{(3)}$$

where:

LSC = Load spectrum coefficient used to compare normalized load spectra
$l$ = Number of load ranges
*mid-load_range* = Average load range (kN) for load range $i$
$Load\_range\_count_i$ = Number of axles in load range $i$
$L$ = 1 for steering axle and single axle, 2 for tandem, and 3 for tridem
$m$ = exponent, 3.8

As Equation (3) is similar to Equation (2) used by Caltrans to compute ESALs, with the difference being the exponent, the exponent 4.2 was used instead of 3.8 to compute the LSC in this report. With this change, ESALs as defined by Caltrans can be easily calculated from LSCs for different axle groups and truck types.

In this report, different load spectra were compared using load spectra diagrams as well as LSCs.

## 3.0 ANALYSIS OF OBSERVED DATA

### 3.1 Generalized Axle Load Spectra and Truck Composition in California

In this section, the data files sampled from all the WIM sites across the entire analysis period were combined to give the general load spectra of steering axle, single axle, tandem axles and tridem axles, and general truck traffic composition. Furthermore, these load spectra and truck traffic compositions were examined for day/night and seasonal variation. Load spectra are shown in Figures 4 through 11. Truck traffic compositions are shown in Figures 12 and 13. (Refer to Figure 3 for the truck type designations referred to in this section.) The legal load limit for single axles in California is 89 kN; for tandem axles it is 151 kN.

Figure 4 shows that the majority of steering axles come from Truck Types 5 and 9, and most of the steering axle loads are less than 90 kN.

Figure 5 shows that the majority of single axles come from Truck Types 5, 8, and 11, and most of the single axle loads are less than 110 kN.

Figure 6 shows that the majority of tandem axles come from Truck Type 9, and most of the tandem axle loads are less than 210 kN.

Figure 7 shows that the majority of tridem axles come from Truck Types 10 and 15, and most of the tridem axle loads are less than 260 kN.

Figures 8-11 show that at night, the load spectra of all four axle groups shift to the right of corresponding load spectra in the daytime, meaning that trucks running at night generally carry heavier loads than those running in the daytime. On the other hand, there is little seasonal variation in all load spectra.

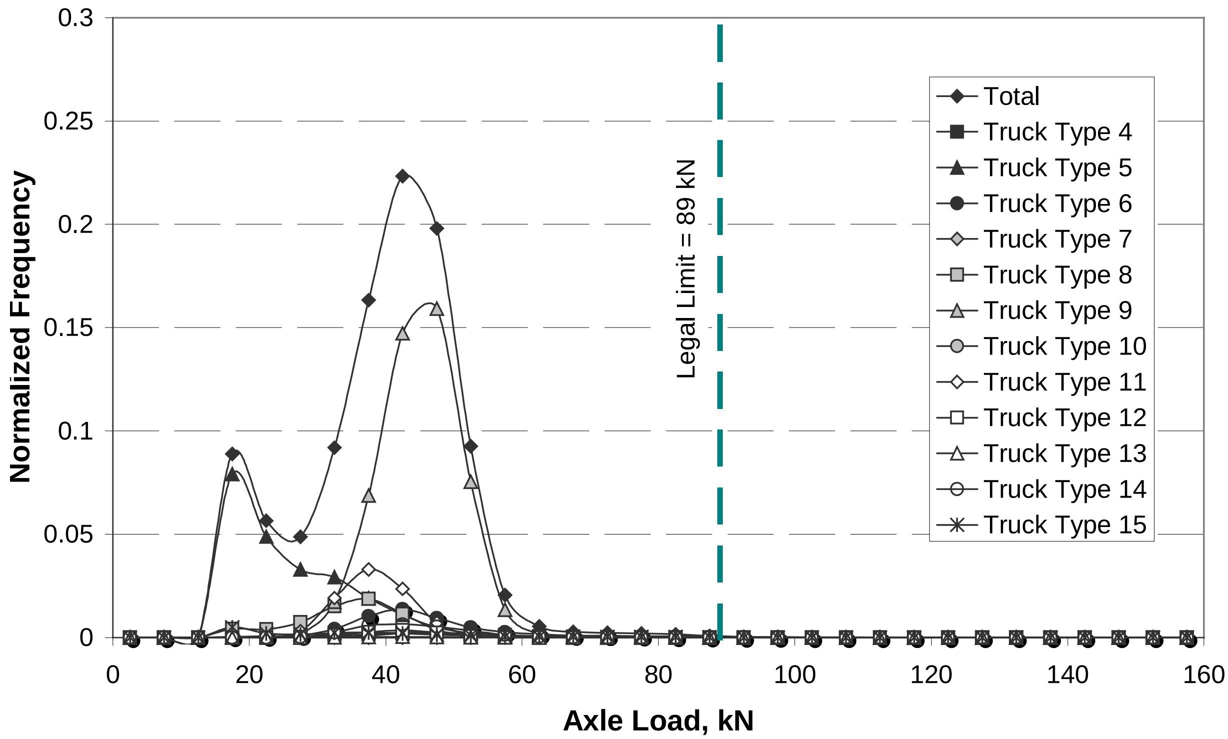



**Figure 4. General steering axle load spectra across all dates and locations.**

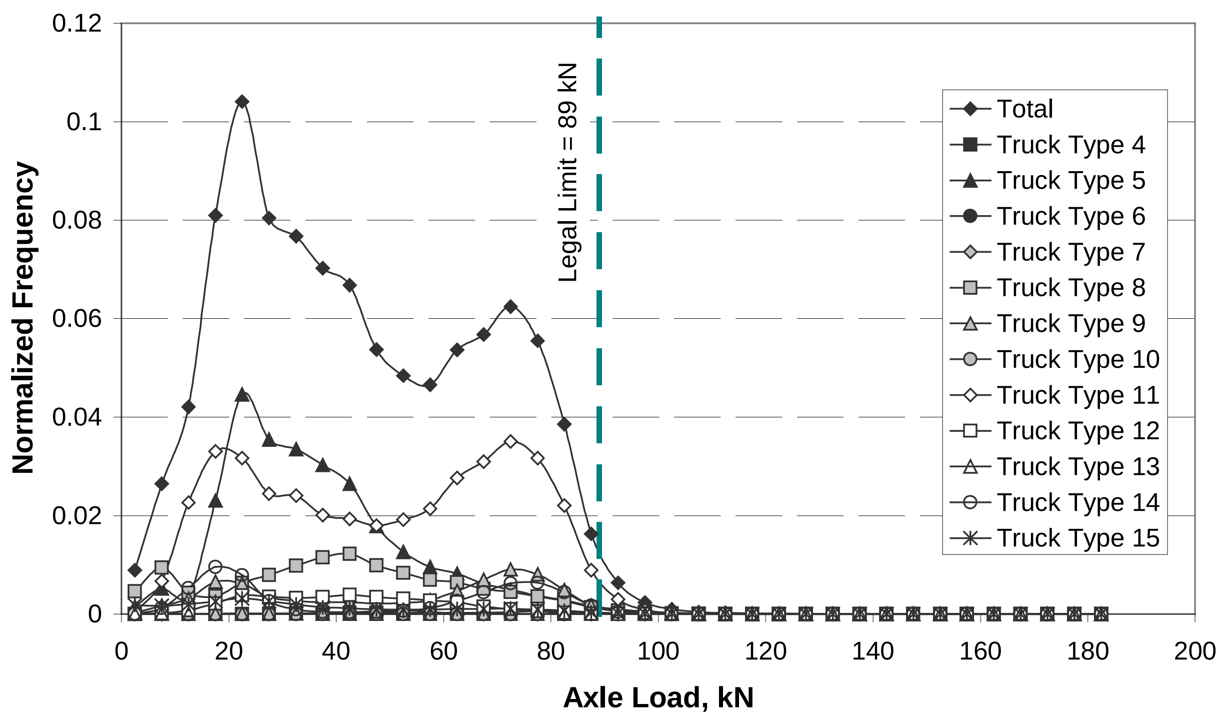



**Figure 5. General single axle load spectra across all dates and locations.**

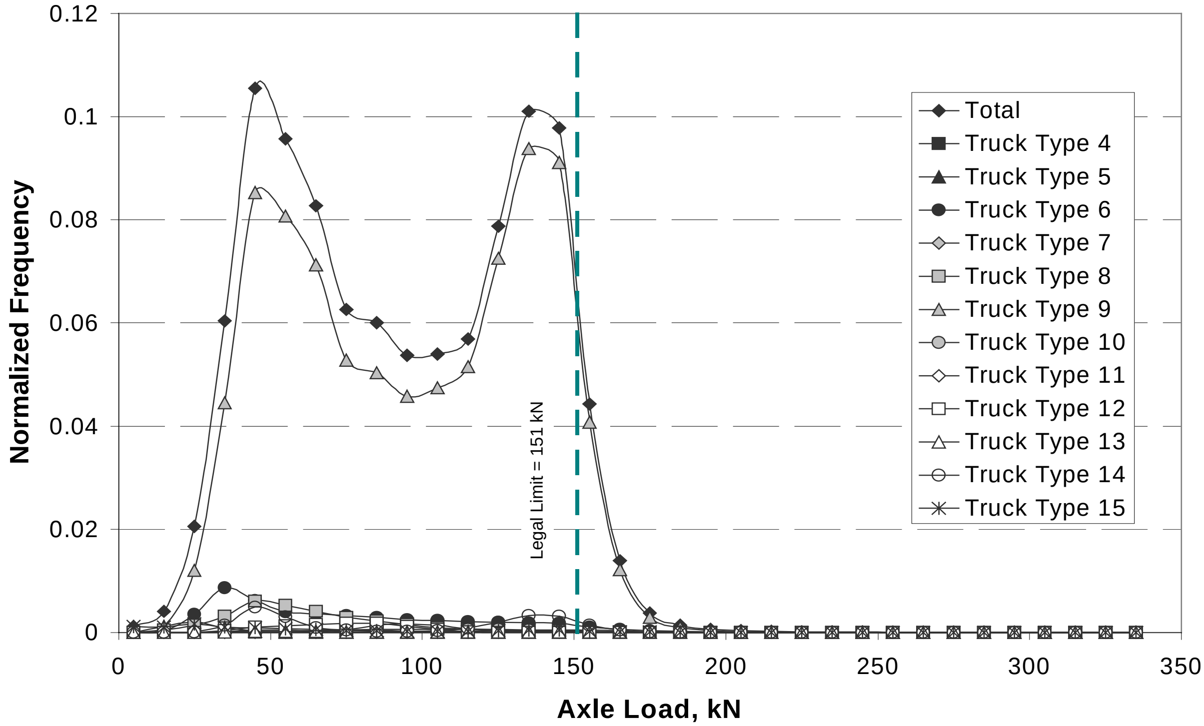



**Figure 6. General tandem axle load spectra across all dates and locations.**

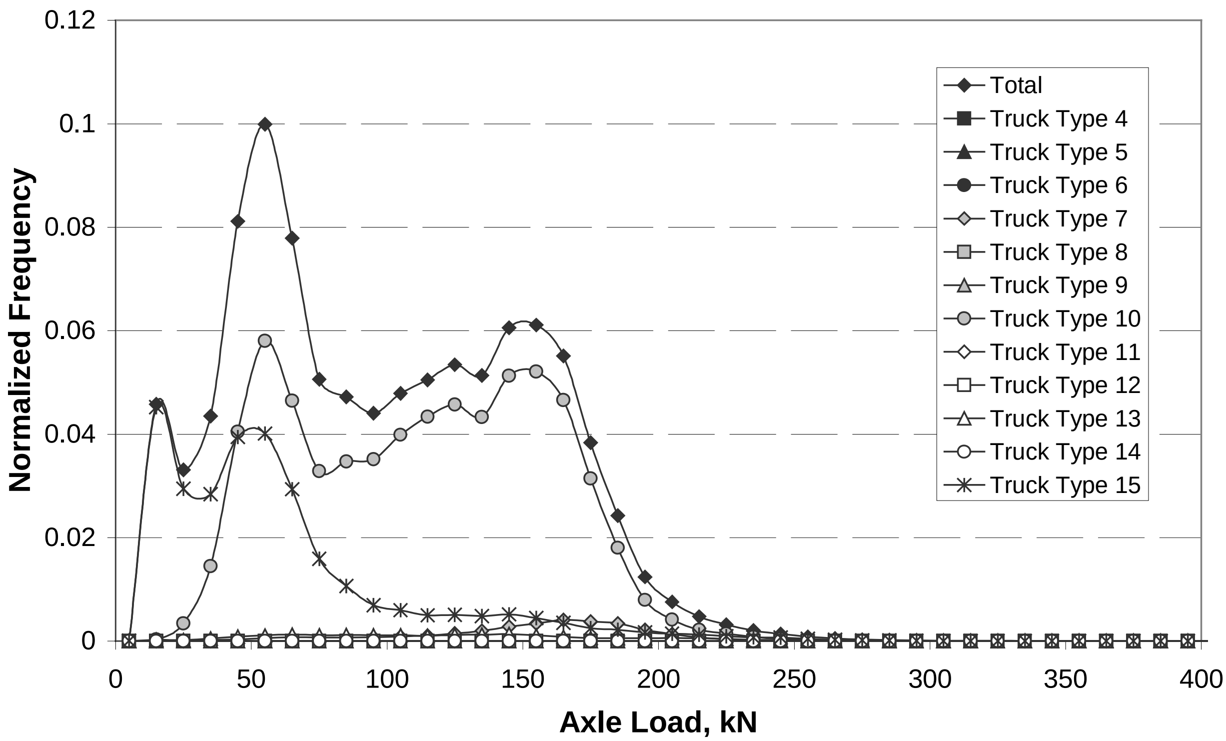



**Figure 7. General tridem axle load spectra across all dates and locations.**

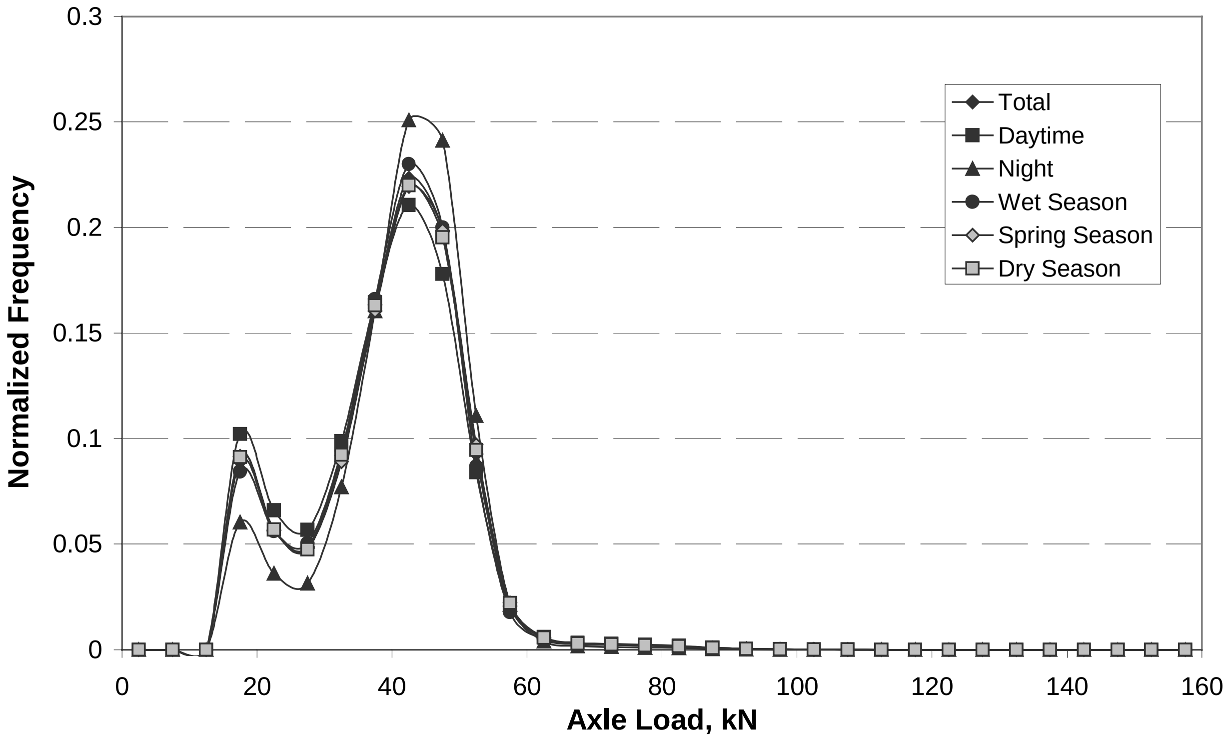



**Figure 8. General steering axle load spectra at different times.**

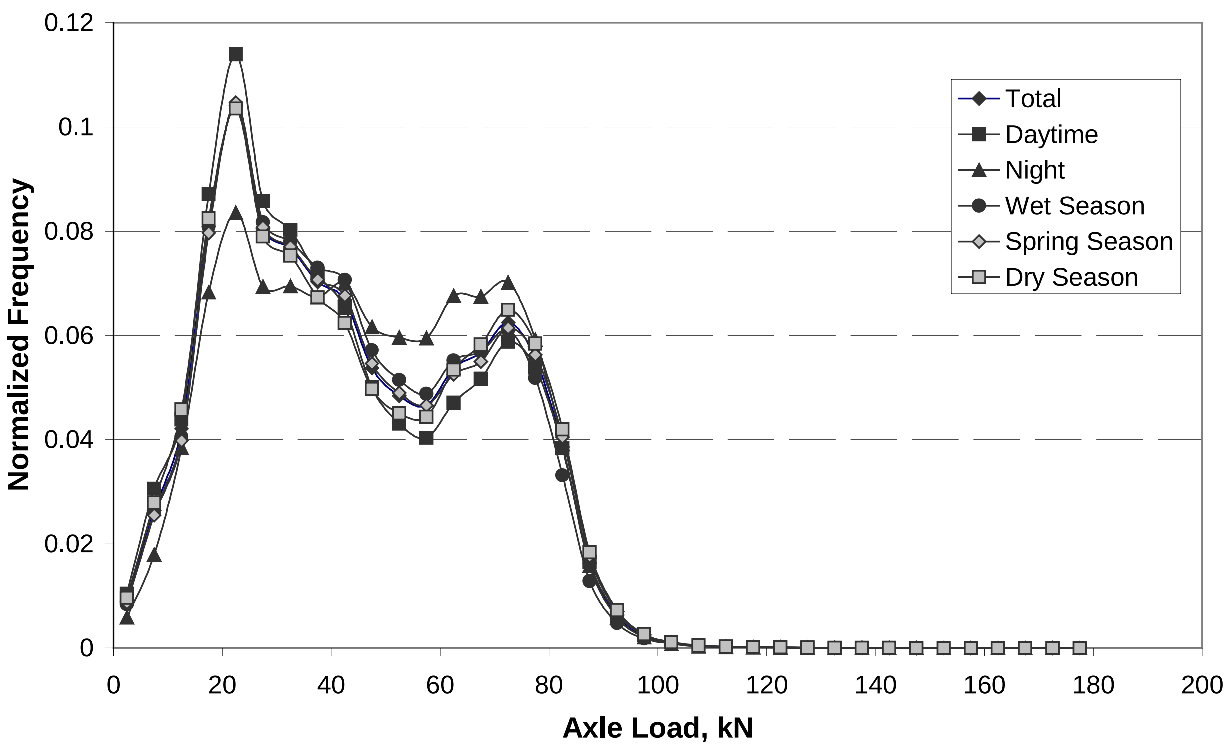



**Figure 9. General single axle load spectra at different times.**

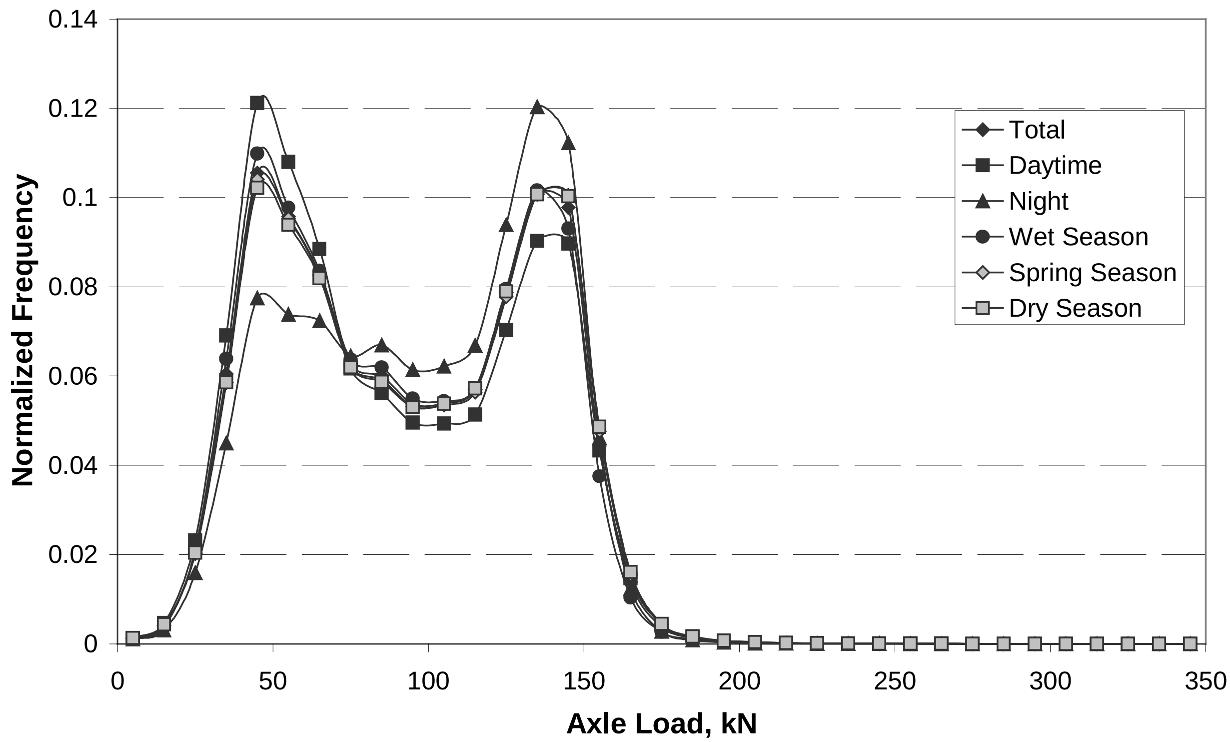



**Figure 10. General tandem axle load spectra at different times.**

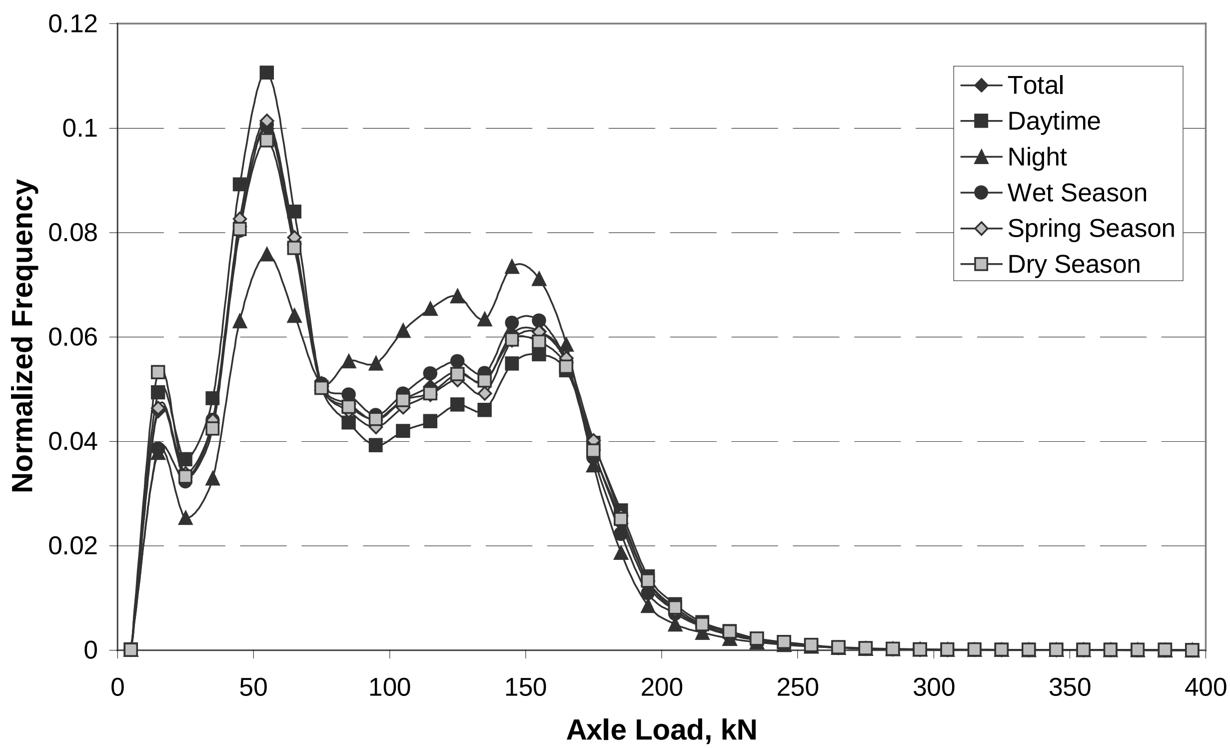


Figure 11. General tridem axle load spectra at different times. Figures 12 and 13 show that Truck Types 5, 6, 8, 9, and 11 account for an average of 90 percent of all the truck traffic. Their frequency in decreasing order is Type 9, Type 5, Type 11, Type 8, and Type 6.

The percentages of Types 9 and 11 (semi tractor trailers typically used for long-hauls) increase and those of Type 5, 6 and 8 (typically used for local hauls) decrease at night. Moreover, the truck traffic composition shows little seasonal variation.

### 3.2 Generalized Axle Load Spectra in Different Regions

Because pavements in a specific region are designed according to the specific environmental and traffic conditions in that region, it is useful to perform regional comparisons of the axle load spectra. In this report the WIM stations are grouped in two ways. The first is to group them by geographical region: Central Valley, Bay Area and Southern California. The second way is to group them by type of area: Rural and Urban. Table 4 shows both groupings of stations by both criteria.

The load spectra of the four axle groups (steering, single, tandem, and tridem) are shown by geographical region in Figures 14 through 17. The load spectra of the four axle groups by type of area are shown in Figures 18 through 21.

Figures 14-17 show that the load spectra in Central Valley shift to the right (heavier) of those in the Southern California, while the load spectra in the Southern California shift to the right (heavier) of those in the Bay Area.

Figures 18-21 show that the load spectra in rural areas shift to the right (heavier) of those in urban areas. A few urban links that likely carry very heavy short-haul traffic do not have WIM stations. These include the link between the Port of Oakland and the Richmond container

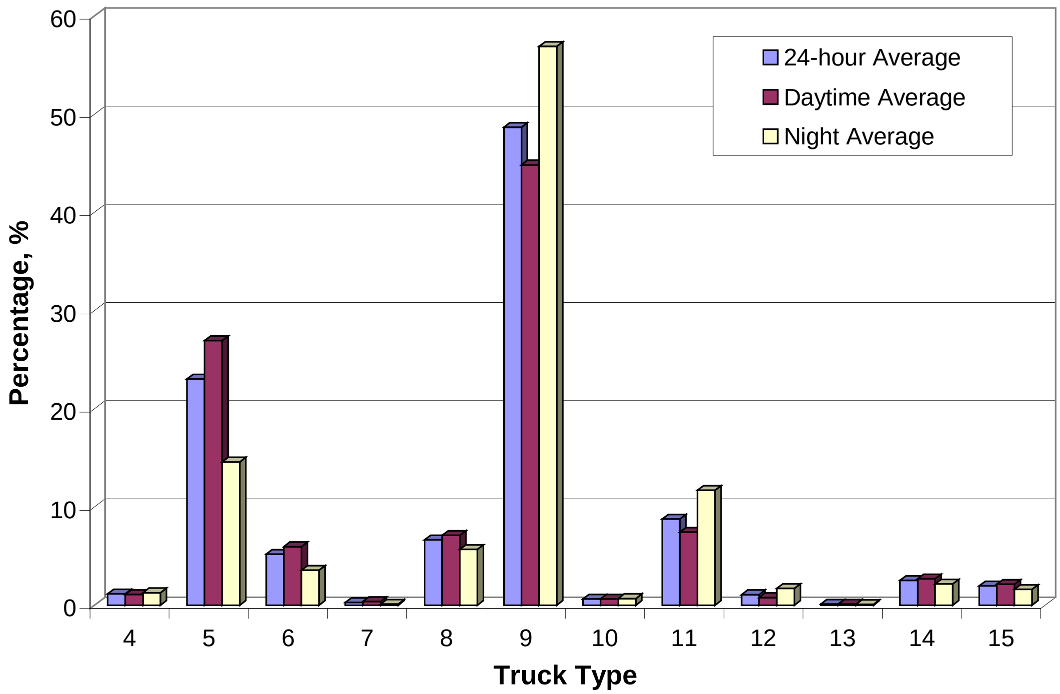



**Figure 12. General truck traffic compositions (day, night, and 24-hour).**

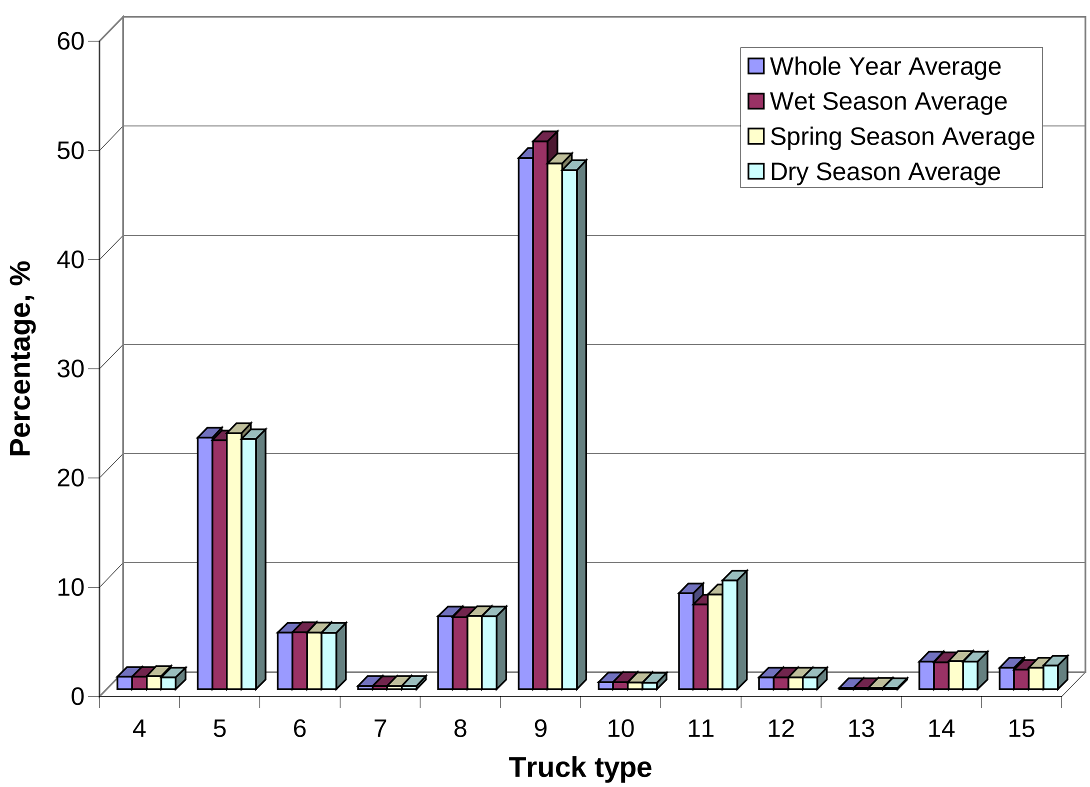



**Figure 13. General truck traffic compositions (yearly, wet season, spring season, and wet season averages).**

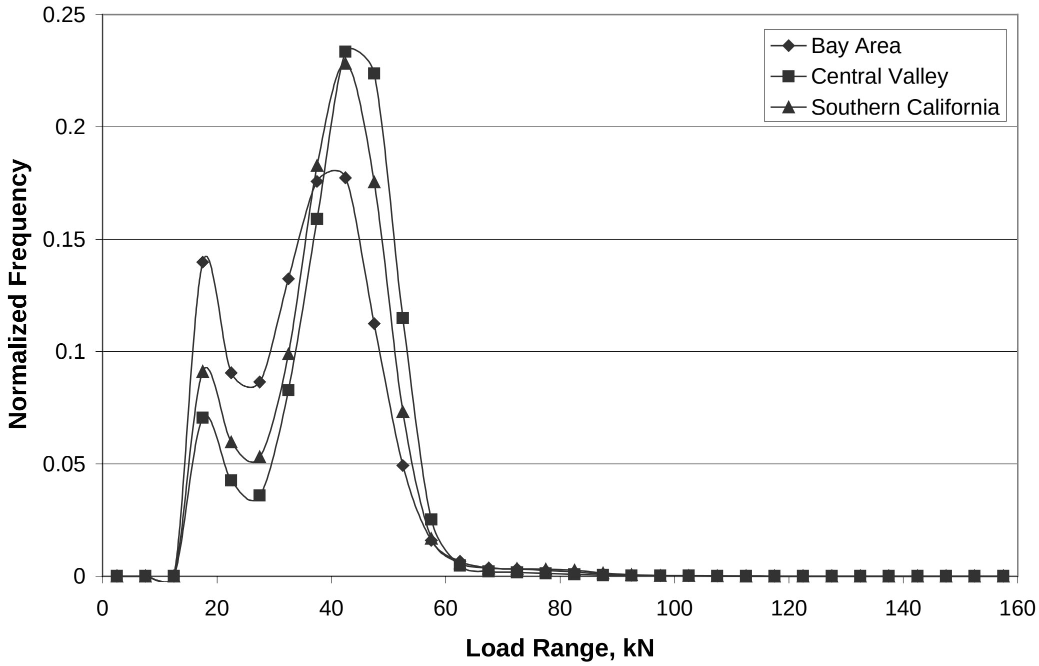



**Figure 14. Steering axle load spectra in three regions.**

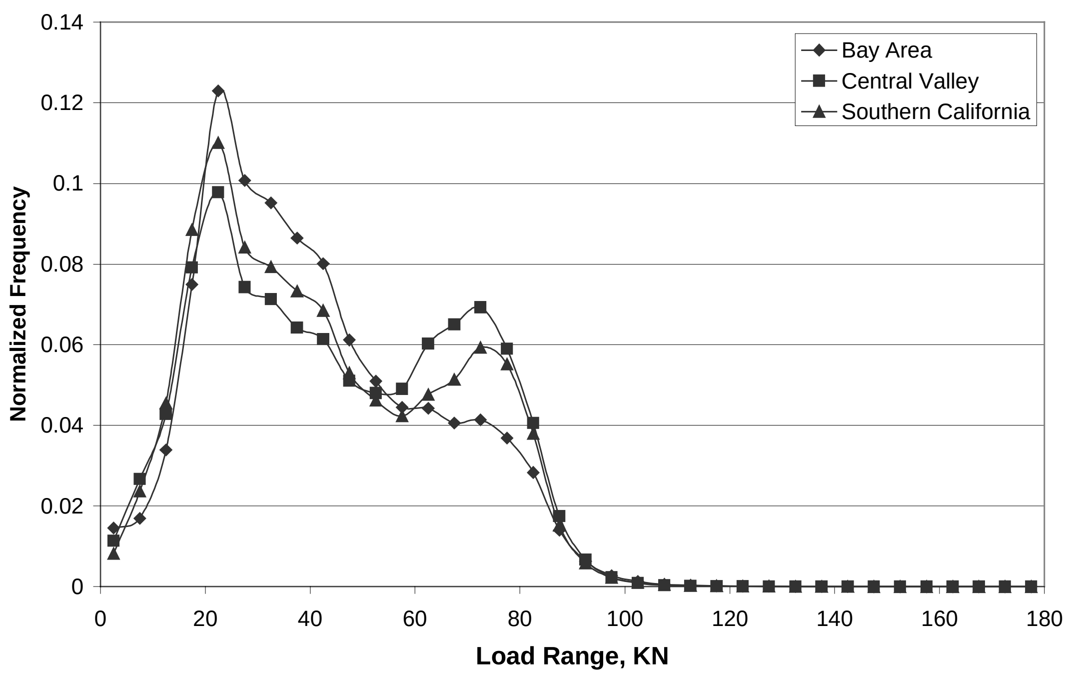



**Figure 15. Single axle load spectra in three regions.**

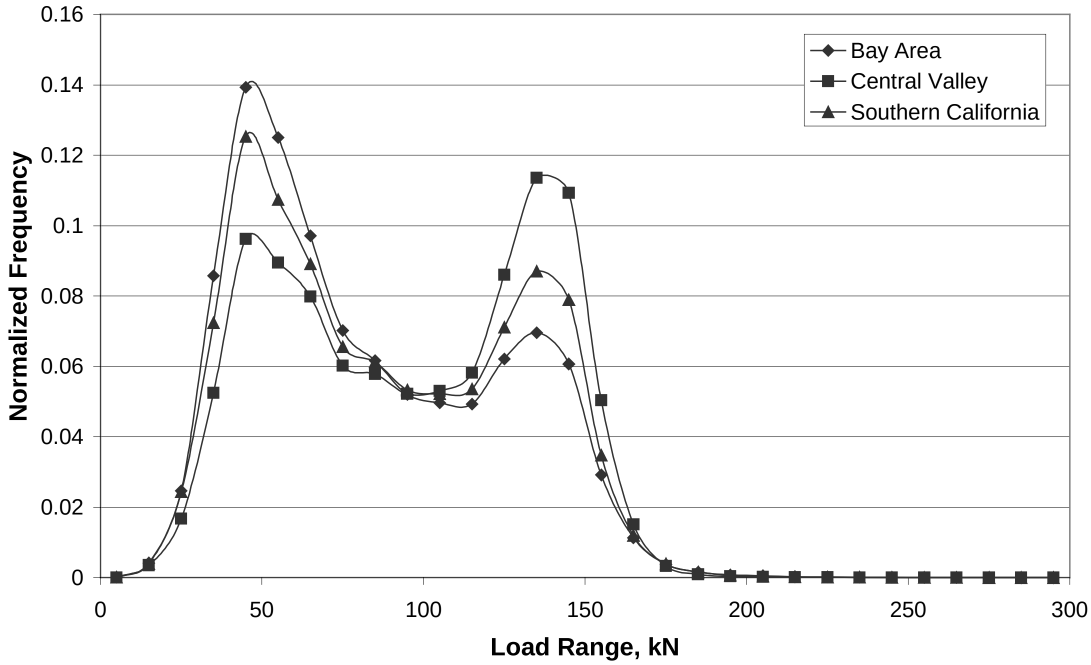



**Figure 16. Tandem load spectra in three regions.**

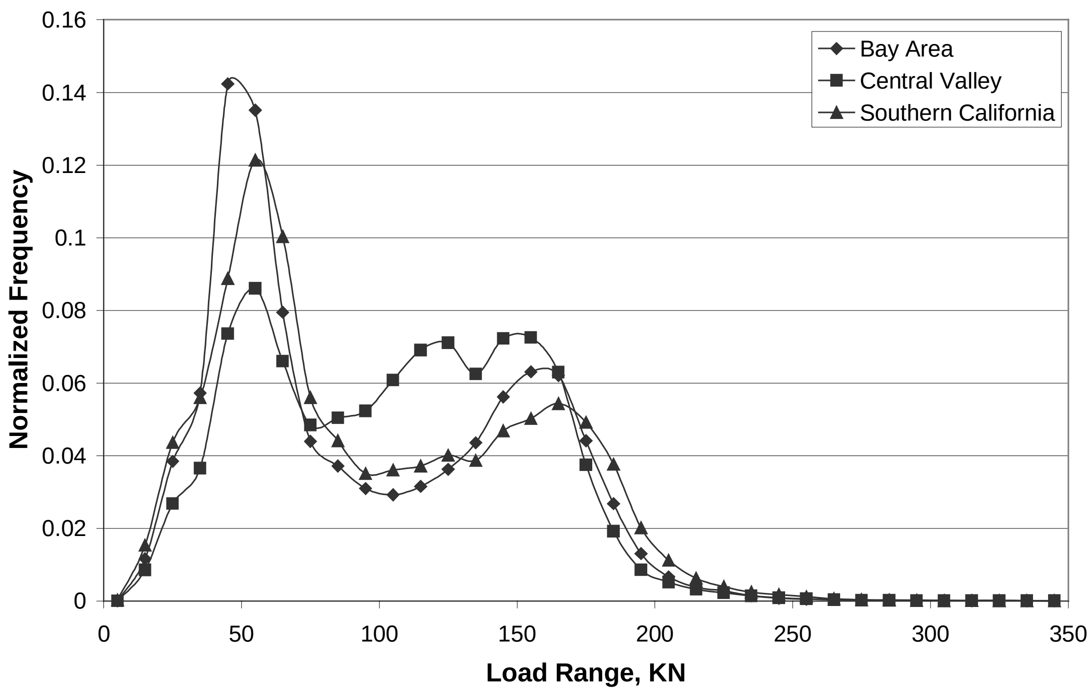



**Figure 17. Tridem load spectra in three regions.**

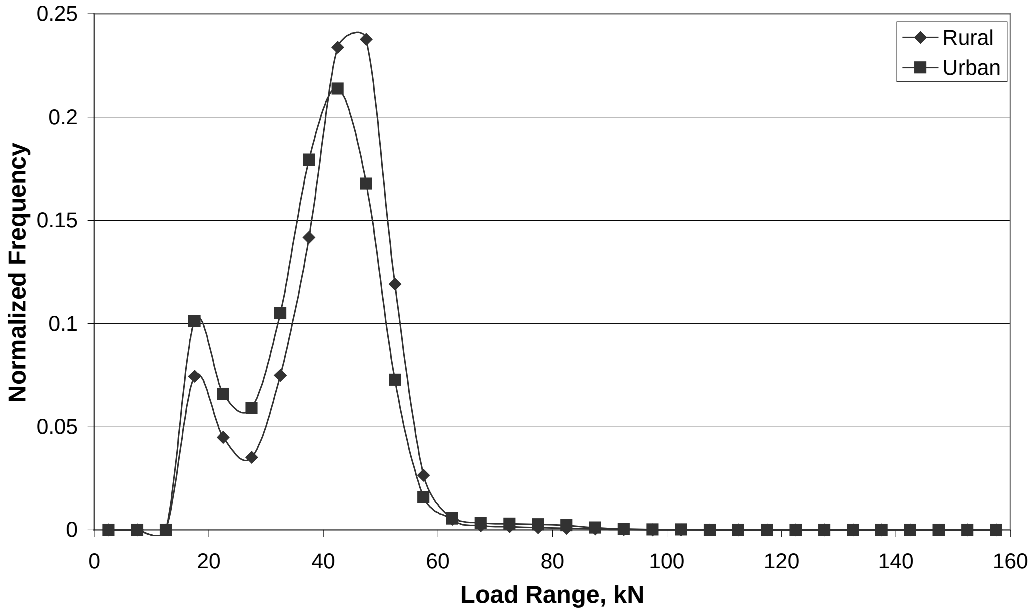



**Figure 18. Steering axle load spectra in two areas.**

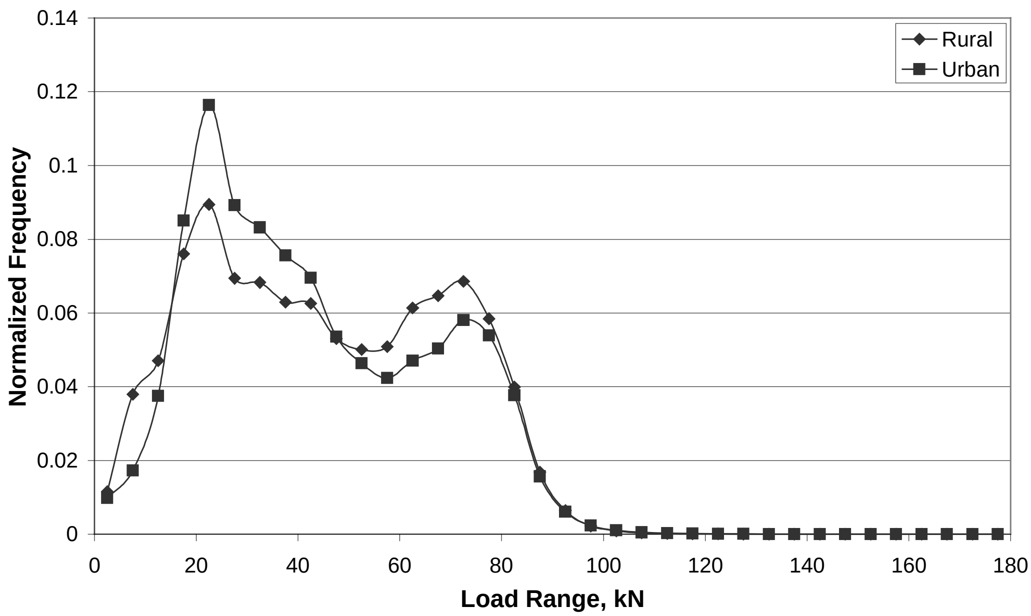



**Figure 19. Single axle load spectra in two areas.**

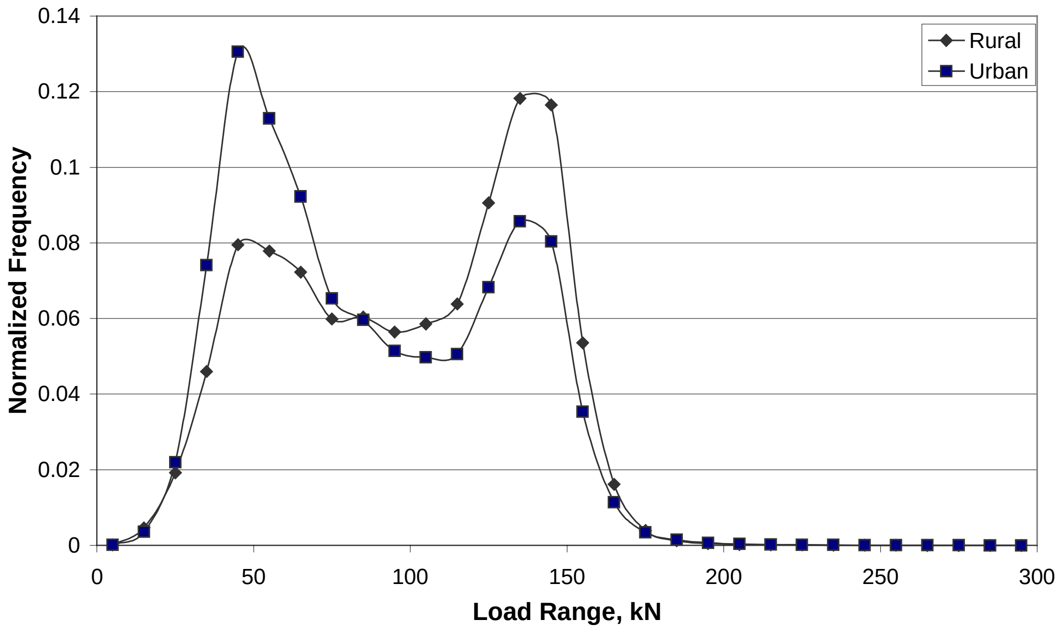



**Figure 20. Tandem load spectra in two areas.**

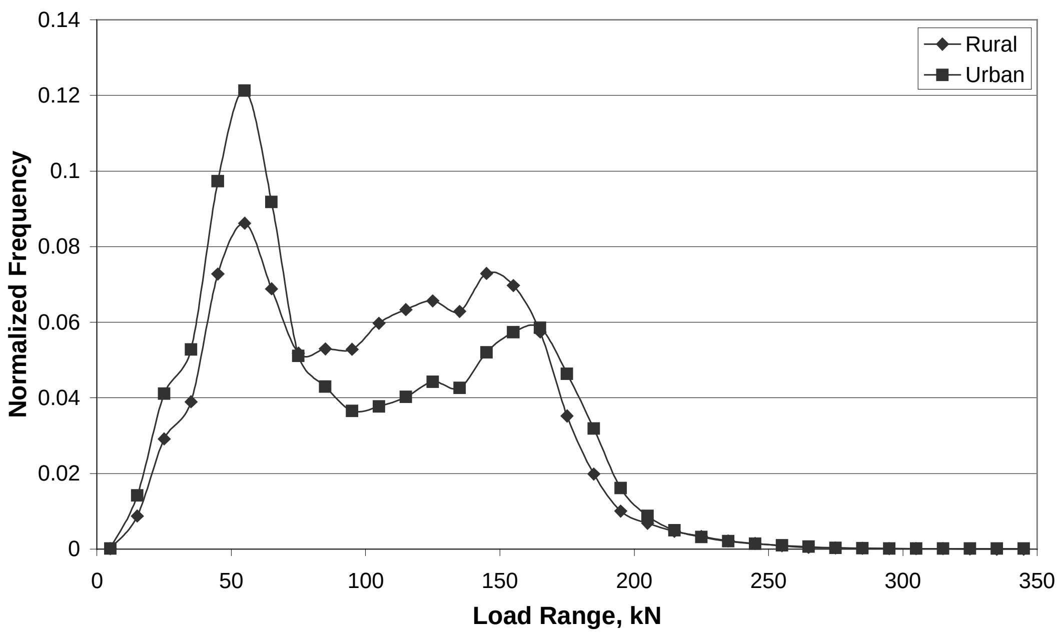



**Figure 21. Tridem load spectra in two areas.**

**Table 4 WIM Station Location Groupings**

| Geographical Region | WIM Station No. |
|---|---|
| Central Valley | 1, 2, 3, 4, 7, 10, 27 ,36, 44, 45, 46, 49, 51,52, 72, 73, 74, 75, 99 |
| Bay Area | 11, 17, 18, 24, 31, 32, 33, 34, 41, 42, 55, 56, 57, 58, 64 |
| Southern California | 8, 9, 12, 13, 14, 15, 16, 21, 37, 38, 39, 47, 48, 53, 54, 59, 60, 61, 62, 63, 65, 67, 69, 70, 77, 78, 79, 80, 82, 83, 84, 85, 87, 88, 89, 90, 91, 92, 95, 96, 97, 98 |
| **Type of Area** | **WIM Station No.** |
| Rural | 1, 2, 5, 7, 11, 20, 21, 22, 23, 24, 25, 26, 27, 28, 30, 35, 39, 41, 42, 43, 44, 45, 46, 49, 63, 65, 66, 68, 71, 72, 73, 77, 78, 86, 93, 94, 99 |
| Urban | 3, 4, 8, 10, 12, 13, 14, 15, 16, 17, 18, 29, 31, 32, 33, 34, 36, 37, 38, 40, 47, 48, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 64, 67, 69, 70, 74, 75, 76, 79, 80, 81, 82, 83, 84, 85, 87, 88, 89, 90, 91, 92, 95, 96, 97, 98 |

rail yard on I-880 and I-580; and the link between the Ports of Long Beach and Los Angeles and State Route 1 on I-710.

## 4.0 TRUCK TRAFFIC DATA ANALYSIS OF SIX WIM SITES

In this chapter, six WIM sites (listed in Table 5) were selected to illustrate the analysis results. These six sites are located in three regions (Bay Area, Central Valley and Southern California) and two areas (rural area and urban area), and in two different freight distribution directions (westbound/eastbound and southbound/northbound).

**Table 5 Descriptions of Six WIM Sites Selected as Representative Examples**

| Site No. | WIM Station No. | Location Information | | | | | Direction | Area [1] |
|---|---|---|---|---|---|---|---|---|
| | | Name | District | County | Route | Postmile | | |
| 1 | 2 | Redding | 2 | Shasta | 5 | R24.9 | SB/NB | CV/R |
| 2 | 17,18 | Hayward | 4 | Alameda | 880 | 14.7 | SB/NB | BA/U |
| 3 | 21 | Mojave | 6 | Kern | 58 | 108.1 | WB/EB | SC/R |
| 4 | 47,48 | Castaic | 7 | Los Angeles | 5 | R56.1 | SB/NB | SC/U |
| 5 | 57,58 | Pinole | 4 | Contra Costa | 80 | 7.5 | WB/EB | BA/U |
| 6 | 72 | Bowman | 3 | Placer | 80 | 23.4 | WB/EB | CV/R |

[1] CV-Central Valley; BA-Bay Area; SC-Southern California; U-Urban; R-Rural.

### 4.1 Axle Load Spectra Analysis

#### 4.1.1 Axle Load Spectra on All Lanes

The axle load spectra of both traveled directions combined for various times of the day (whole day, day, and night), and each direction for the whole day at Site 1 (Station 2) are shown in Figures 22–25. Spectra at the other five sites are shown in Appendix A.

It can be observed that steering axle load spectra are similar among all the six sites, but single axle, tandem and tridem load spectra are quite different among these sites. For all the sites, the load spectra of all the four axle groups at night shift slightly to the right (heavier) of those in the daytime. Furthermore, the load spectra are also a little different between the two directions. Similar results can also be observed from the load spectra coefficient (LSC) table (Tables 6 through 11).

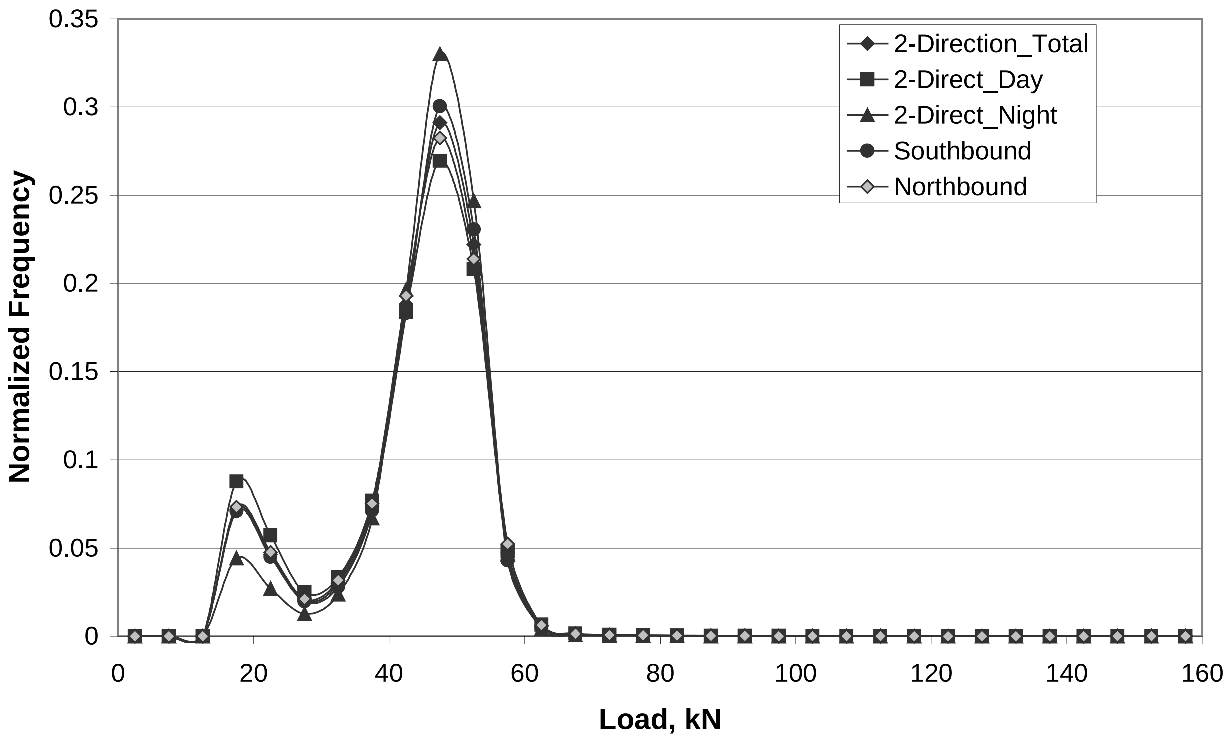



**Figure 22. Axle load spectra, Station 2 (Redding), steering axle.**

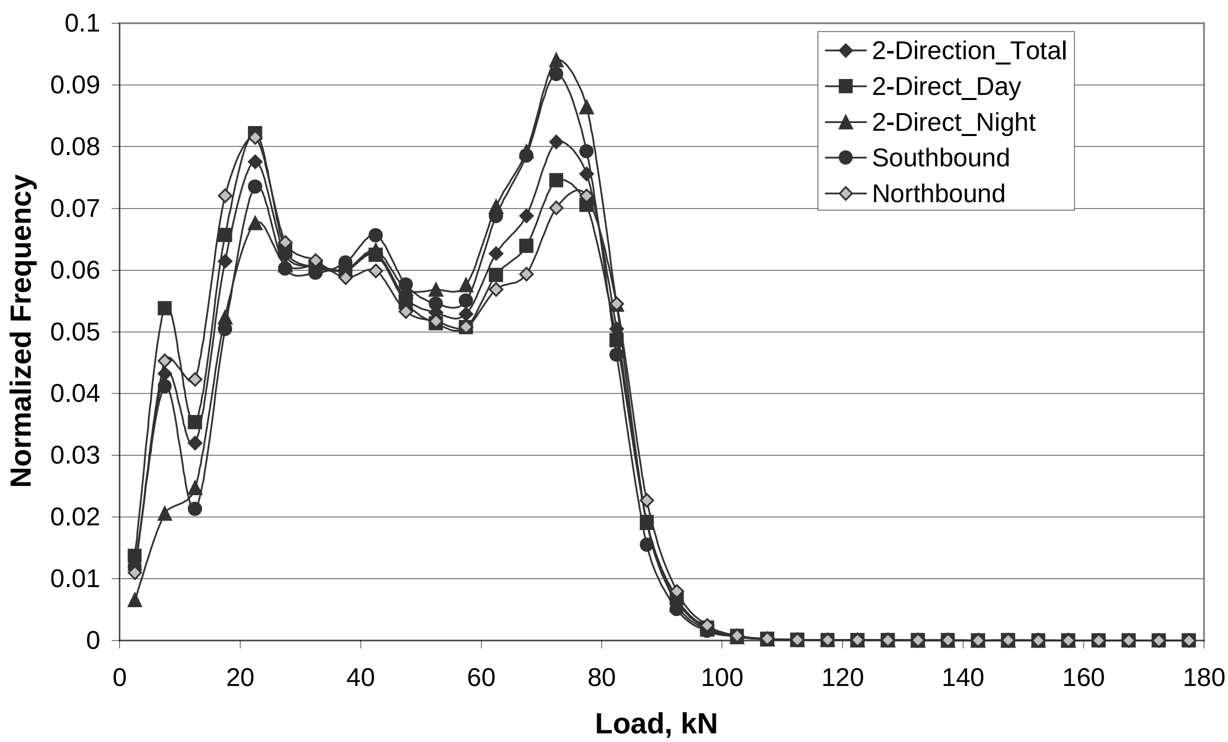



**Figure 23. Axle load spectra, Station 2 (Redding), single axle.**

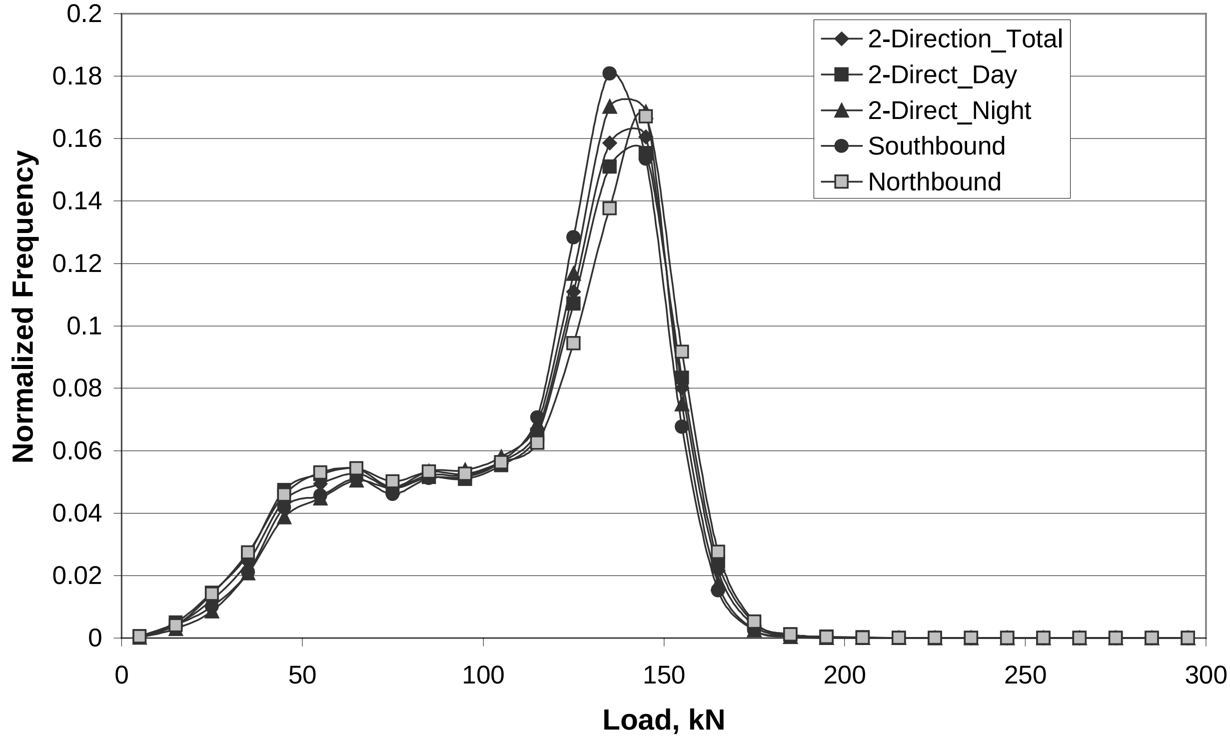



**Figure 24. Axle load spectra, Station 2 (Redding), tandem axle.**

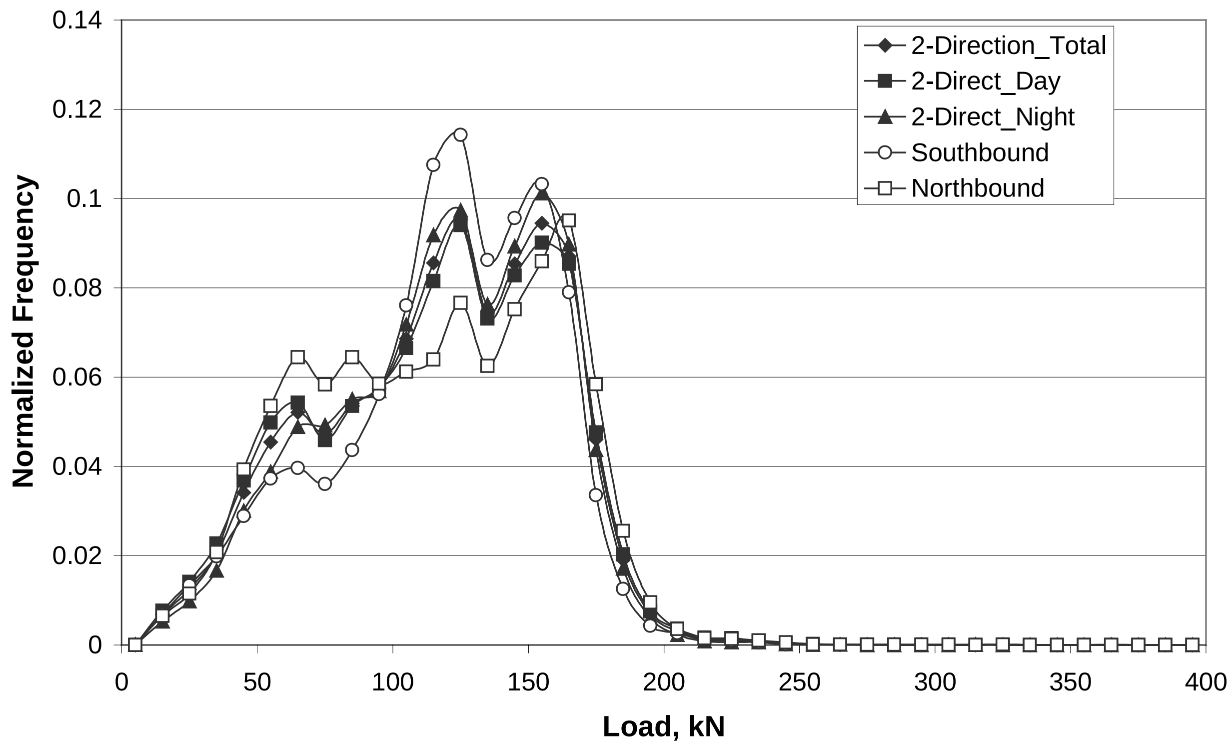



**Figure 25. Axle load spectra, Station 2 (Redding), tridem axle.**

Table 6 Load Spectra Coefficients for Site 1 (Station 2, Redding)

| Axle Group | Both Directions | Both Directions, Day | Both Directions, Night | Southbound | Northbound |
|---|---|---|---|---|---|
| **Steering** | 0.108 | 0.113 | 0.116 | 0.113 | 0.114 |
| **Single** | 0.322 | 0.309 | 0.351 | 0.326 | 0.319 |
| **Tandem** | 0.739 | 0.740 | 0.738 | 0.724 | 0.754 |
| **Tridem** | 0.279 | 0.282 | 0.274 | 0.267 | 0.291 |

Table 7 Load Spectra Coefficients for Site 2 (Stations 17 and 18, Hayward)

| Axle Group | Both Directions | Both Directions, Day | Both Directions, Night | Southbound | Northbound |
|---|---|---|---|---|---|
| **Steering** | 0.062 | 0.074 | 0.068 | 0.073 | 0.071 |
| **Single** | 0.193 | 0.182 | 0.225 | 0.195 | 0.190 |
| **Tandem** | 0.328 | 0.311 | 0.379 | 0.333 | 0.323 |
| **Tridem** | 0.226 | 0.215 | 0.269 | 0.272 | 0.174 |

Table 8 Load Spectra Coefficients for Site 3 (Station 21, Mojave)

| Axle Group | Both Directions | Both Directions, Day | Both Directions, Night | Westbound | Eastbound |
|---|---|---|---|---|---|
| **Steering** | 0.078 | 0.079 | 0.081 | 0.067 | 0.089 |
| **Single** | 0.295 | 0.281 | 0.316 | 0.337 | 0.259 |
| **Tandem** | 0.615 | 0.595 | 0.637 | 0.567 | 0.649 |
| **Tridem** | 0.267 | 0.273 | 0.257 | 0.277 | 0.257 |

Table 9 Load Spectra Coefficients for Site 4 (Stations 47 and 48, Castaic)

| Axle Group | Both Directions | Both Directions, Day | Both Directions, Night | Southbound | Northbound |
|---|---|---|---|---|---|
| **Steering** | 0.088 | 0.097 | 0.090 | 0.095 | 0.093 |
| **Single** | 0.253 | 0.248 | 0.259 | 0.252 | 0.255 |
| **Tandem** | 0.469 | 0.450 | 0.492 | 0.516 | 0.428 |
| **Tridem** | 0.240 | 0.224 | 0.260 | 0.257 | 0.222 |

Table 10 Load Spectra Coefficients for Site 5 (Stations 57 and 58, Pinole)

| Axle Group | Both Directions | Both Directions, Day | Both Directions, Night | Westbound | Eastbound |
|---|---|---|---|---|---|
| **Steering** | 0.083 | 0.094 | 0.091 | 0.089 | 0.097 |
| **Single** | 0.211 | 0.203 | 0.225 | 0.205 | 0.217 |
| **Tandem** | 0.398 | 0.393 | 0.411 | 0.432 | 0.356 |
| **Tridem** | 0.271 | 0.272 | 0.268 | 0.269 | 0.273 |

**Table 11 Load Spectra Coefficients of Site 6 (Station 72, Bowman)**

| Axle Group | Both Directions | Both Directions, Day | Both Directions, Night | Westbound | Eastbound |
|---|---|---|---|---|---|
| **Steering** | 0.105 | 0.102 | 0.111 | 0.109 | 0.102 |
| **Single** | 0.275 | 0.259 | 0.297 | 0.292 | 0.259 |
| **Tandem** | 0.636 | 0.620 | 0.657 | 0.614 | 0.659 |
| **Tridem** | 0.330 | 0.337 | 0.316 | 0.305 | 0.353 |

### 4.1.2 Axle Load Spectra for Each Lane

The axle load spectra vary among lanes. Figures 26–29 show the load spectra of the four axle groups on four lanes of Site 1. The load spectra of the other five sites are shown in Appendix B. The corresponding load spectra coefficients are listed in Tables 12 through 17. For each site, it can be observed that the load spectra for the lanes with the same lane number but different directions of travel are similar, and that load spectra on the outside lanes are mostly located to the right (heavier) side of the load spectra on the inside lanes. This difference shows that heavier trucks run more frequently on the outside lanes than on the inside lanes. At Sites 2, 4 and 5, each of which have 3 lanes in one direction, the load spectra on the outside two lanes are similar.

### 4.1.3 Axle Load Spectra by Year

The axle load spectra at Site 1 (Station 2) in each year from 1991 through 2000 are shown in Figures 30–33. Figure 34 presents load spectra coefficients (LSCs) for Site 1 over the same period for all four axle groups. It can be seen that the load spectra are similar in shape for each year while the LSCs change with time. The LSCs of tandem and tridem axles decreased from 1991 to 1994 and increased after 1995, which means that these two axle groups showed a trend of becoming lighter from 1991 to 1994 and a trend of becoming heavier after 1995. The

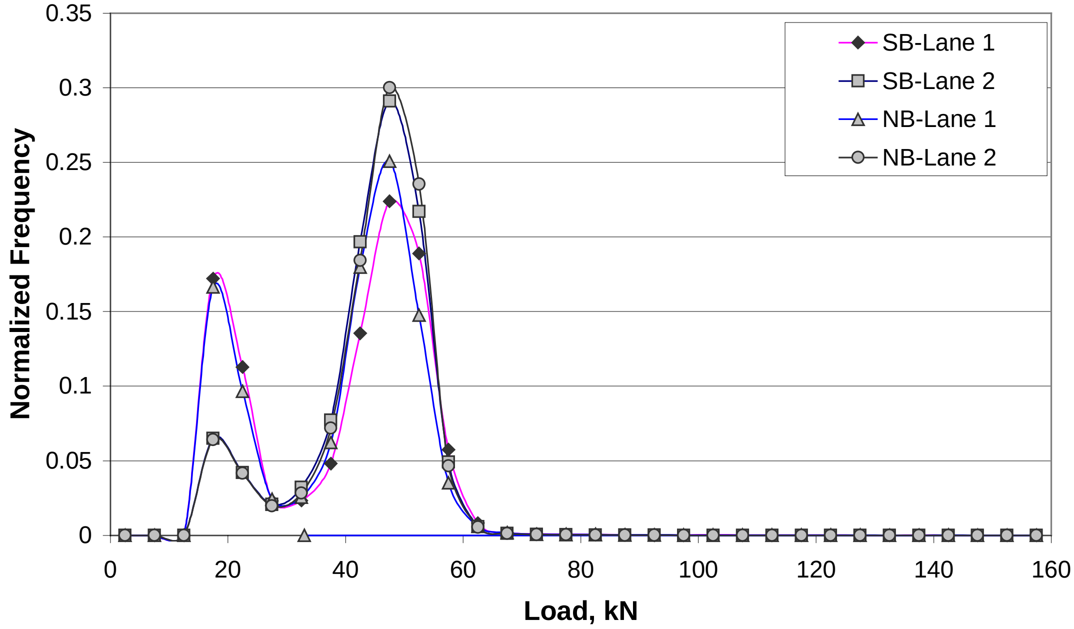



**Figure 26. Axle load spectra by lane, Station 2 (Redding), steering axle.**

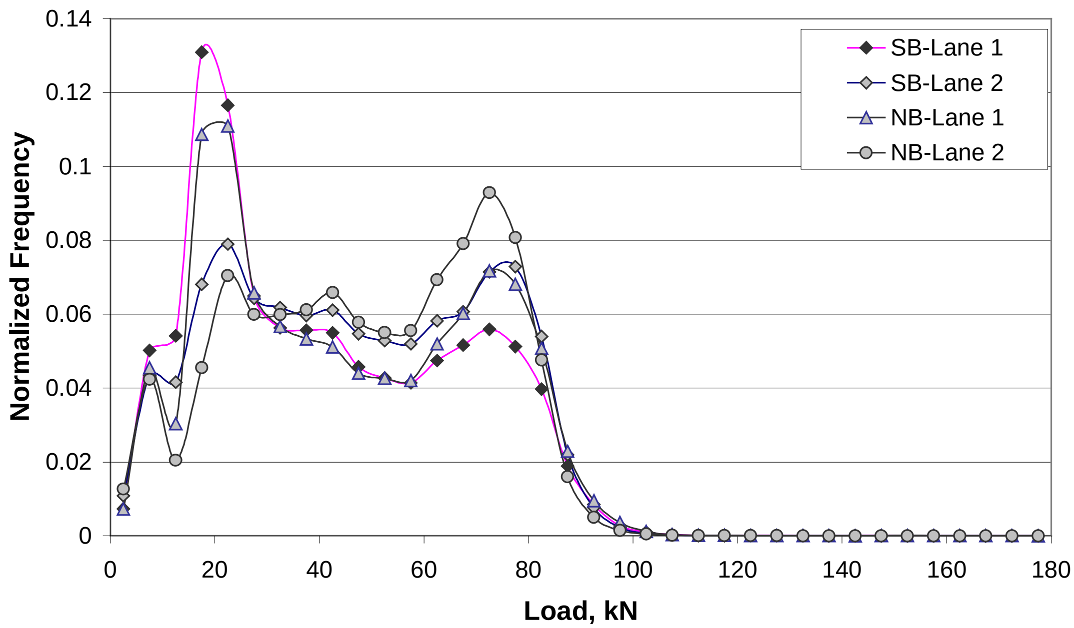



**Figure 27. Axle load spectra by lane, Station 2 (Redding), single axle.**

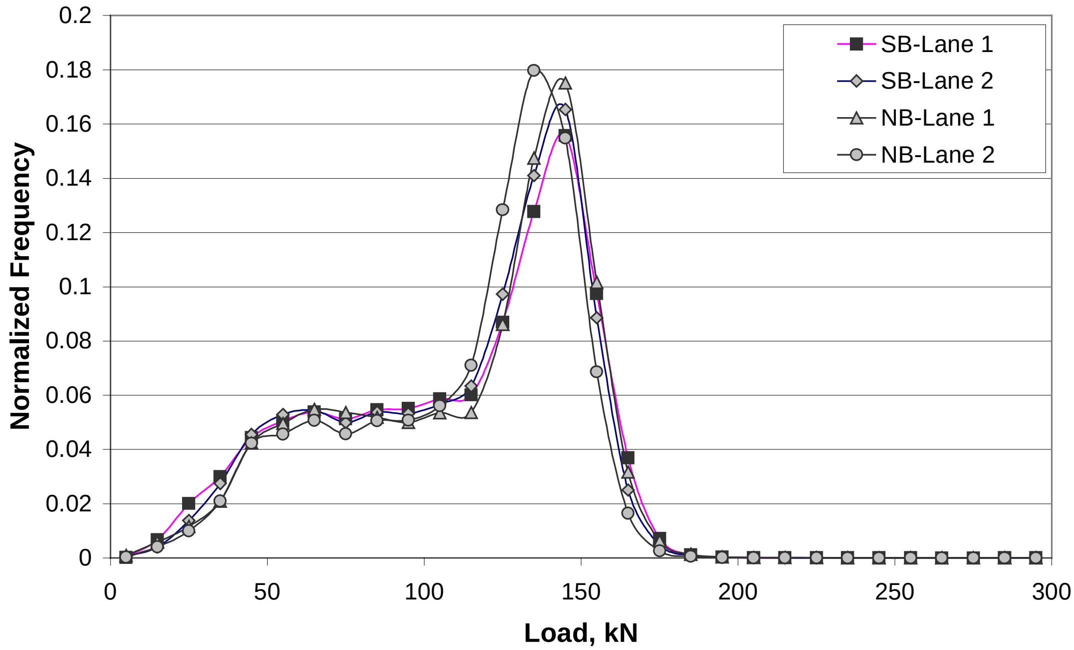



**Figure 28. Axle load spectra by lane, Station 2 (Redding), tandem axle.**

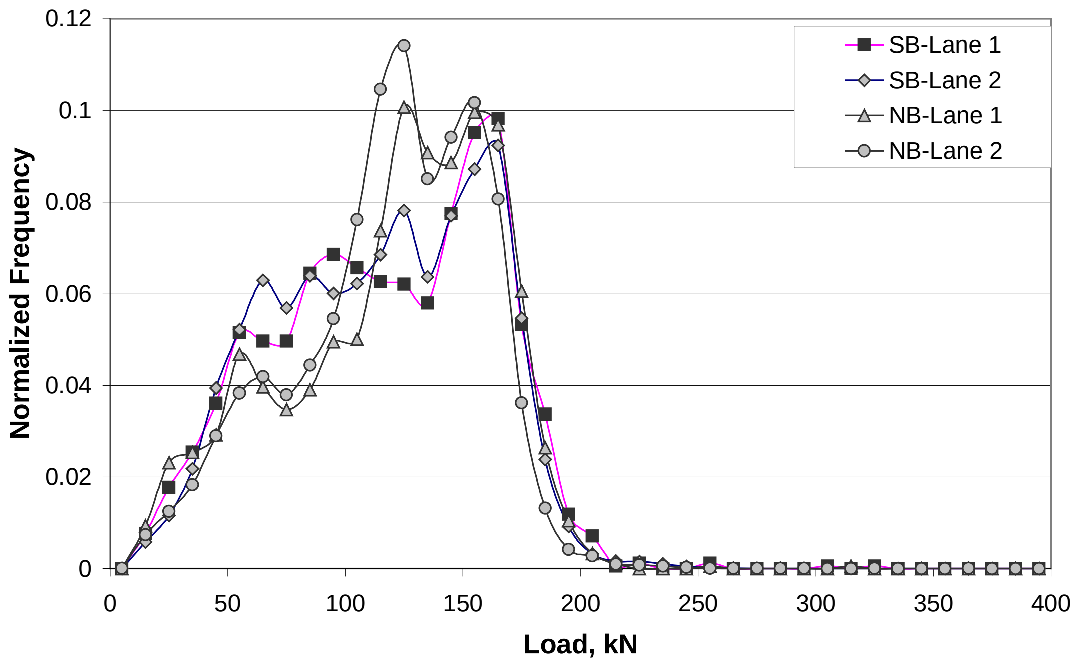



**Figure 29. Axle load spectra by lane, Station 2 (Redding), tridem axle.**

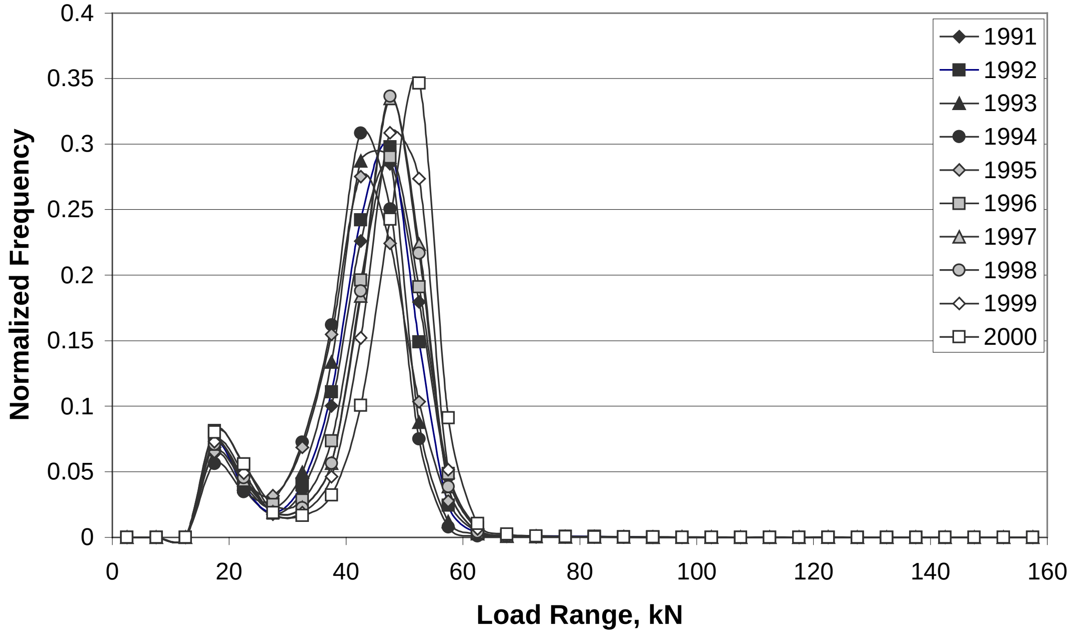



**Figure 30. Axle load spectra by year, Station 2 (Redding), steering axle.**

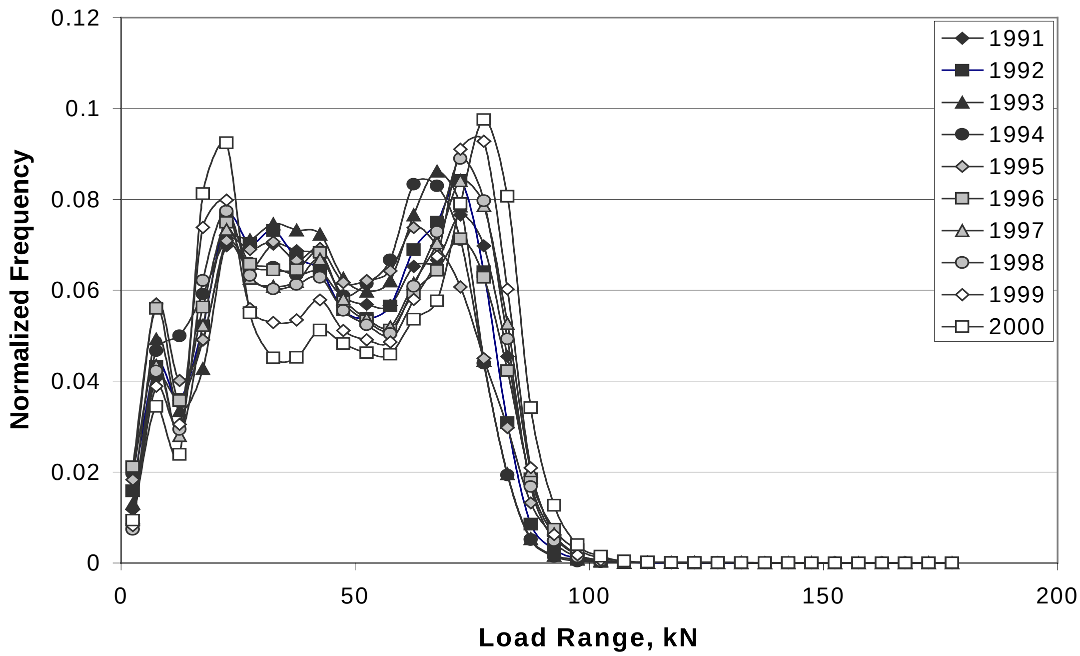



**Figure 31. Axle load spectra by year, Station 2 (Redding), single axle.**

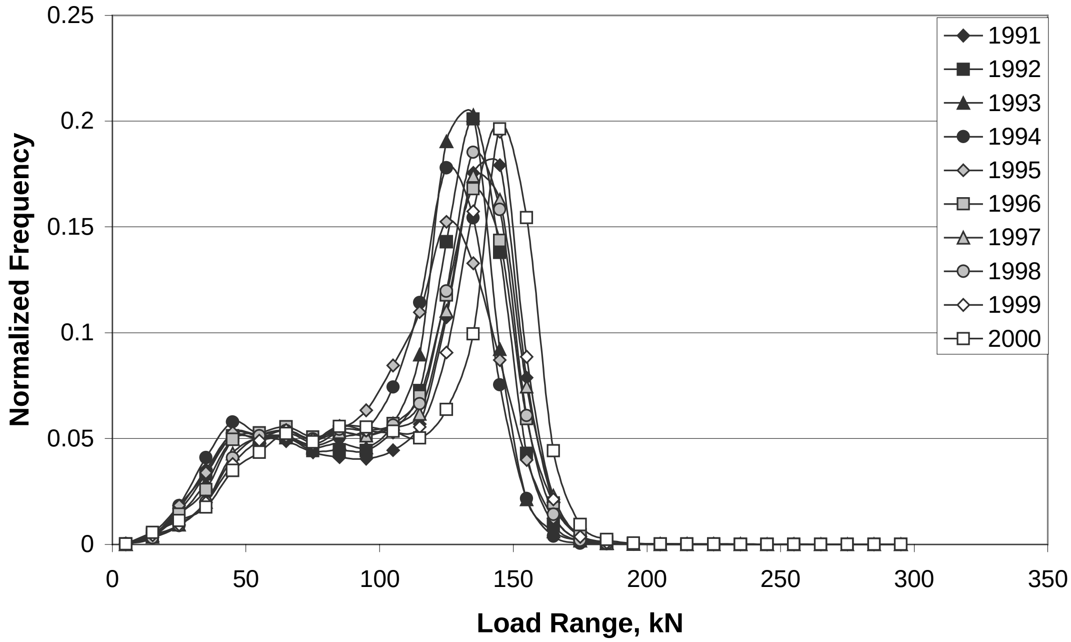



**Figure 32. Axle load spectra by year, Station 2 (Redding), tandem axle.**

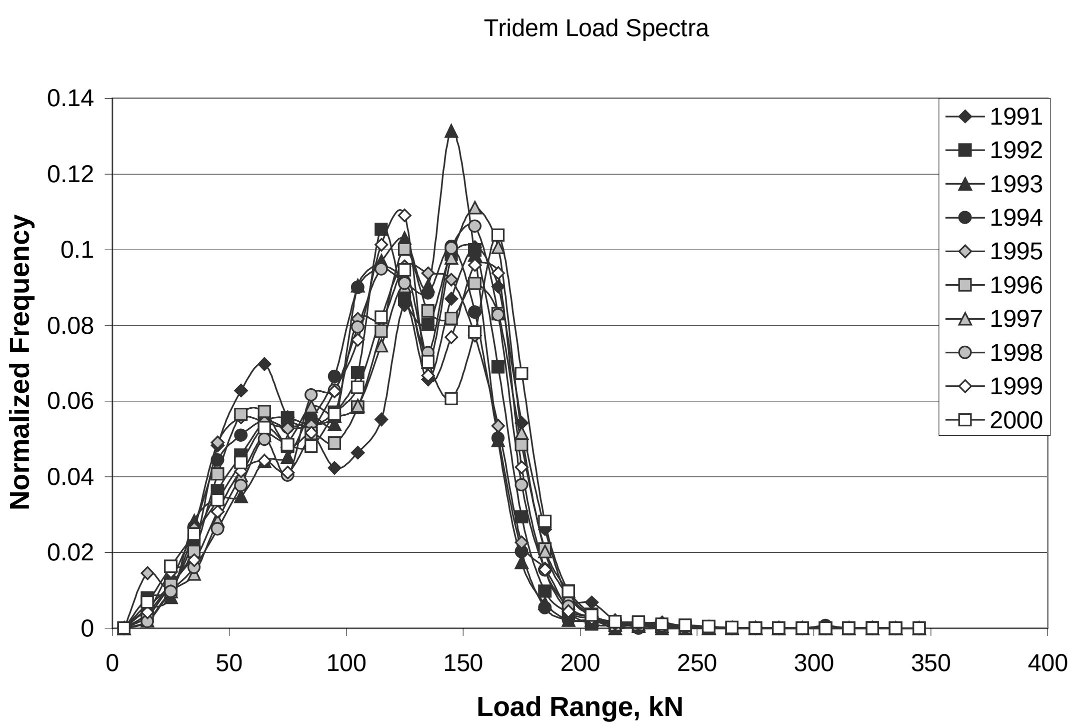



**Figure 33. Axle load spectra by year, Station 2 (Redding), tridem axle.**

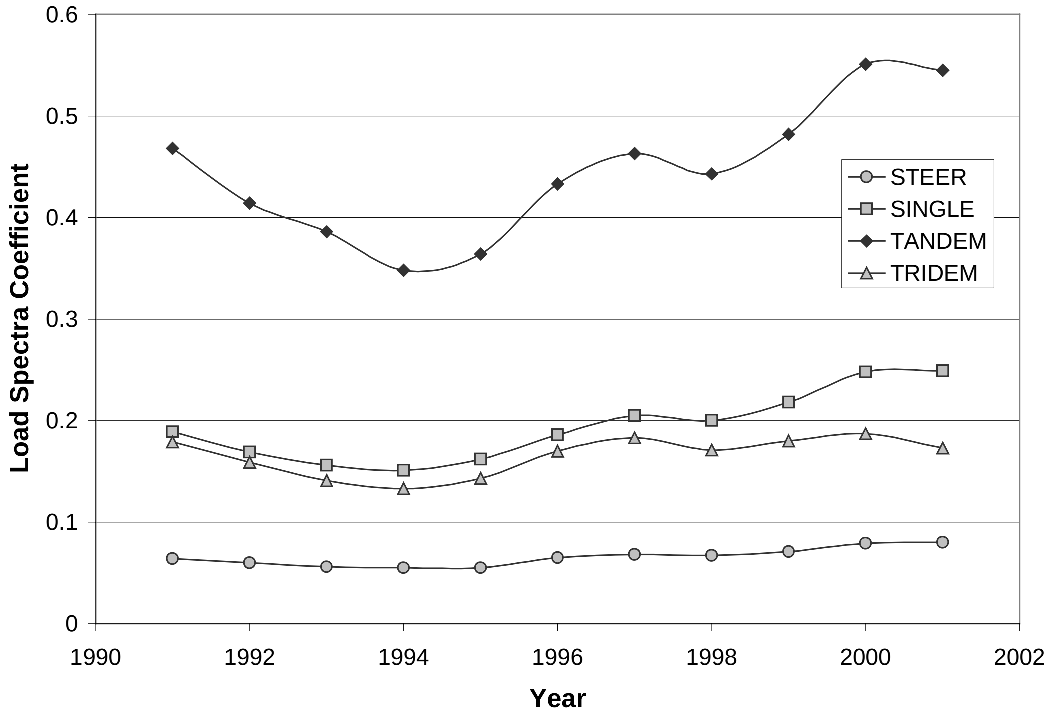



**Figure 34. Load spectra coefficients at Station 2 (Redding) by year for all four axle groups.**

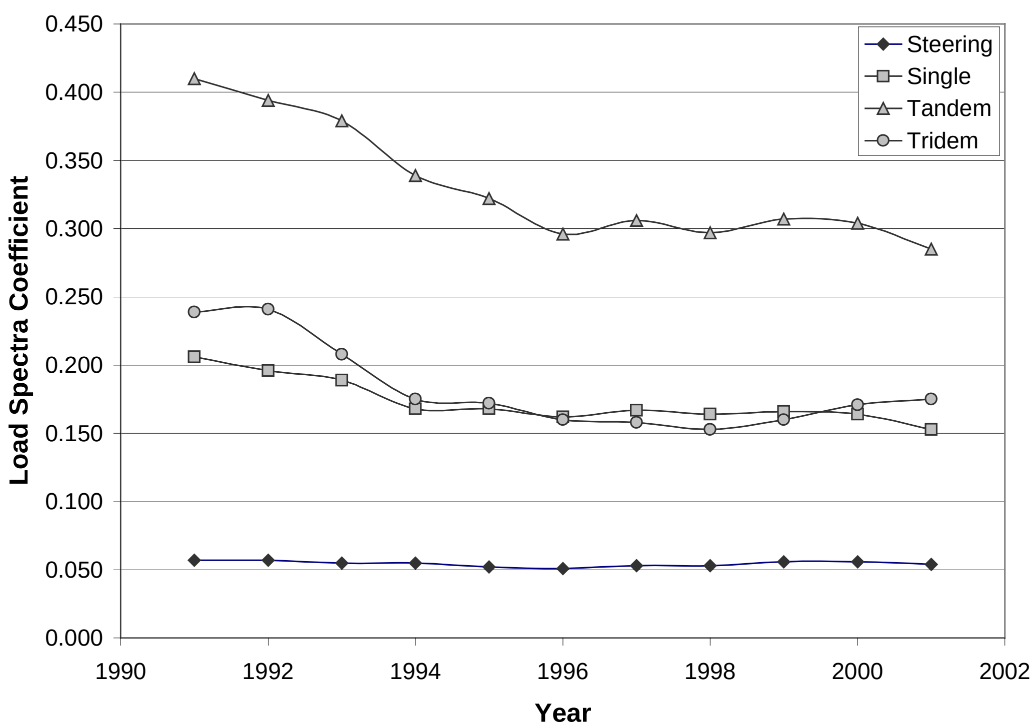



**Figure 35. General load spectra coefficients across all stations in California in each year 1991 through 2000.**

**Table 12 Load Spectra Coefficients of Site 1 (Station 2, Redding) by Lane**

| Axle Group | Southbound Lane 1 | Southbound Lane 2 | Northbound Lane 1 | Northbound Lane 2 |
|---|---|---|---|---|
| **Steering** | 0.135 | 0.112 | 0.117 | 0.114 |
| **Single** | 0.271 | 0.319 | 0.321 | 0.330 |
| **Tandem** | 0.782 | 0.743 | 0.818 | 0.727 |
| **Tridem** | 0.308 | 0.284 | 0.307 | 0.271 |

**Table 13 Load Spectra Coefficients of Site 2 (Stations 17 and 18, Hayward) by Lane**

| Axle Group | Southbound Lane 2 | Southbound Lane 3 | Southbound Lane 4 | Northbound Lane 2 | Northbound Lane 3 | Northbound Lane 4 |
|---|---|---|---|---|---|---|
| **Steering** | 0.052 | 0.079 | 0.069 | 0.035 | 0.067 | 0.079 |
| **Single** | 0.139 | 0.229 | 0.163 | 0.081 | 0.173 | 0.220 |
| **Tandem** | 0.320 | 0.333 | 0.334 | 0.279 | 0.295 | 0.357 |
| **Tridem** | 0.315 | 0.310 | 0.225 | 0.118 | 0.167 | 0.181 |

**Table 14 Load Spectra Coefficients of Site 3 (Station 21, Mojave) by Lane**

| Axle Group | Westbound Lane 1 | Westbound Lane 2 | Eastbound Lane 1 | Eastbound Lane 2 |
|---|---|---|---|---|
| **Steering** | 0.068 | 0.067 | 0.078 | 0.090 |
| **Single** | 0.160 | 0.348 | 0.217 | 0.261 |
| **Tandem** | 0.335 | 0.583 | 0.692 | 0.645 |
| **Tridem** | 0.151 | 0.284 | 0.223 | 0.259 |

**Table 15 Load Spectra Coefficients of Site 4 (Stations 47 and 48, Castaic) by Lane**

| Axle Group | Southbound Lane 2 | Southbound Lane 3 | Southbound Lane 4 | Northbound Lane 2 | Northbound Lane 3 | Northbound Lane 4 |
|---|---|---|---|---|---|---|
| **Steering** | 0.050 | 0.098 | 0.094 | 0.051 | 0.086 | 0.097 |
| **Single** | 0.088 | 0.286 | 0.235 | 0.081 | 0.206 | 0.278 |
| **Tandem** | 0.296 | 0.560 | 0.492 | 0.271 | 0.339 | 0.461 |
| **Tridem** | 0.190 | 0.352 | 0.212 | 0.125 | 0.171 | 0.238 |

**Table 16 Load Spectra Coefficients of Site 5 (Stations 57 and 58, Pinole) by Lane**

| Axle Group | Westbound Lane 2 | Westbound Lane 3 | Westbound Lane 4 | Eastbound Lane 2 | Eastbound Lane 3 | Eastbound Lane 4 |
|---|---|---|---|---|---|---|
| **Steering** | 0.064 | 0.085 | 0.093 | 0.056 | 0.091 | 0.109 |
| **Single** | 0.114 | 0.189 | 0.218 | 0.116 | 0.171 | 0.268 |
| **Tandem** | 0.425 | 0.360 | 0.472 | 0.364 | 0.245 | 0.480 |
| **Tridem** | 0.065 | 0.217 | 0.309 | 0.039 | 0.194 | 0.380 |

**Table 17 Load Spectra Coefficients of Site 6 (Station 72, Bowman) by Lane**

| Axle Group | Westbound Lane 2 | Westbound Lane 3 | Eastbound Lane 2 | Eastbound Lane 3 |
|---|---|---|---|---|
| **Steering** | 0.095 | 0.114 | 0.091 | 0.105 |
| **Single** | 0.193 | 0.322 | 0.140 | 0.303 |
| **Tandem** | 0.623 | 0.612 | 0.638 | 0.662 |
| **Tridem** | 0.241 | 0.316 | 0.158 | 0.376 |

LSCs of steering and single axles did not show much yearly change. The LSCs of the other five sites (shown in Appendix C) also show that the LSCs of steering and single axles are similar among years, while the LSCs of tandem and tridem axles vary from year to year.

Figure 35 shows the general load spectra coefficients across all stations in California for each year. It shows that the LSC of the steering axle group is stable across all years, while the LSCs of single, tandem, and tridem axles decreased from 1991 to 1995 and then remained stable after 1996.

## 4.2 Truck Traffic Volume Analysis

### 4.2.1 Traffic distribution between day and night

Traffic distribution between day and night is an important factor in pavement design because the environmental factors (e.g., temperature) vary greatly between day and night, which leads to corresponding changes in pavement material properties.

The percentage of trucks operating in the daytime for each direction for each truck type and total and total truck types for the six sites are shown in Figures 36 through 41. It can be observed that the daytime percentages are similar for both directions at a given WIM site. In general, the daytime truck percentage for total truck types ranges from 55 to 75 percent, and is close to the corresponding values of Truck Type 9.

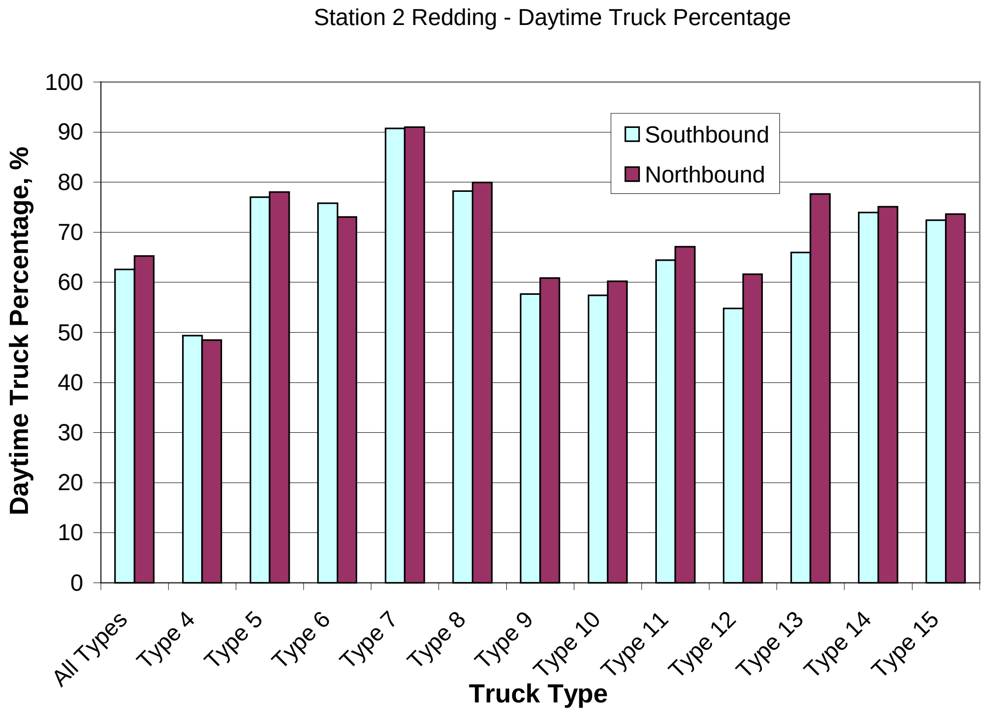



**Figure 36. Percentage of trucks operating in the daytime, Station 2 (Redding).**

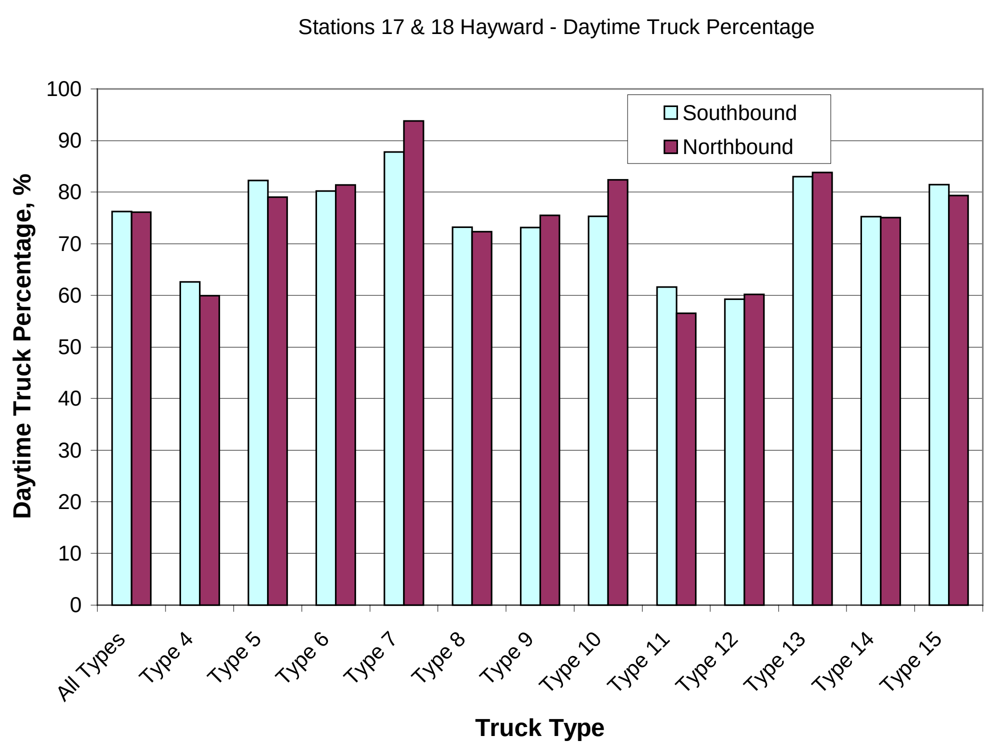



**Figure 37. Percentage of trucks operating in the daytime, Stations 17 and 18 (Hayward).**

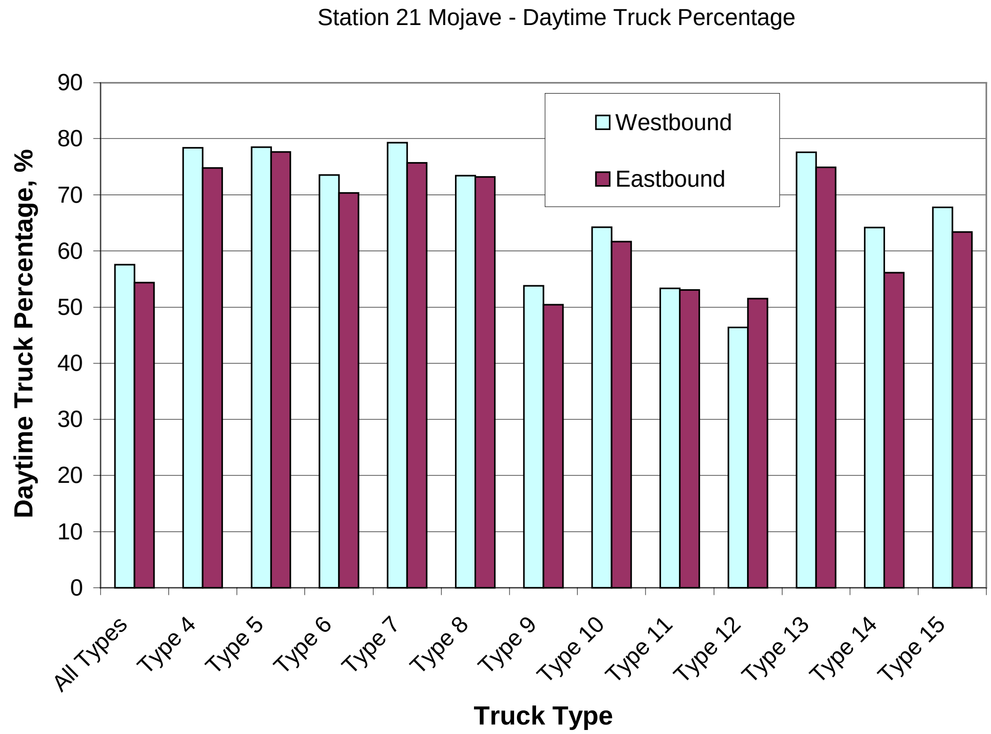



**Figure 38. Percentage of trucks operating in the daytime, Station 21 (Mojave).**

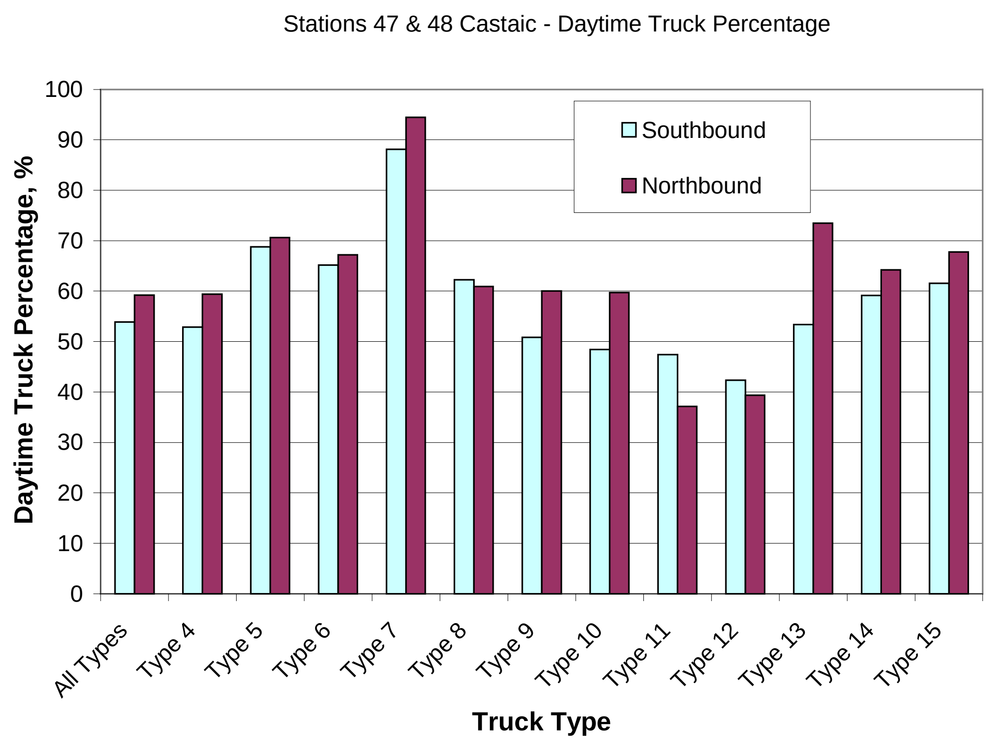



**Figure 39. Percentage of trucks operating in the daytime, 47 and 48 (Castaic).**

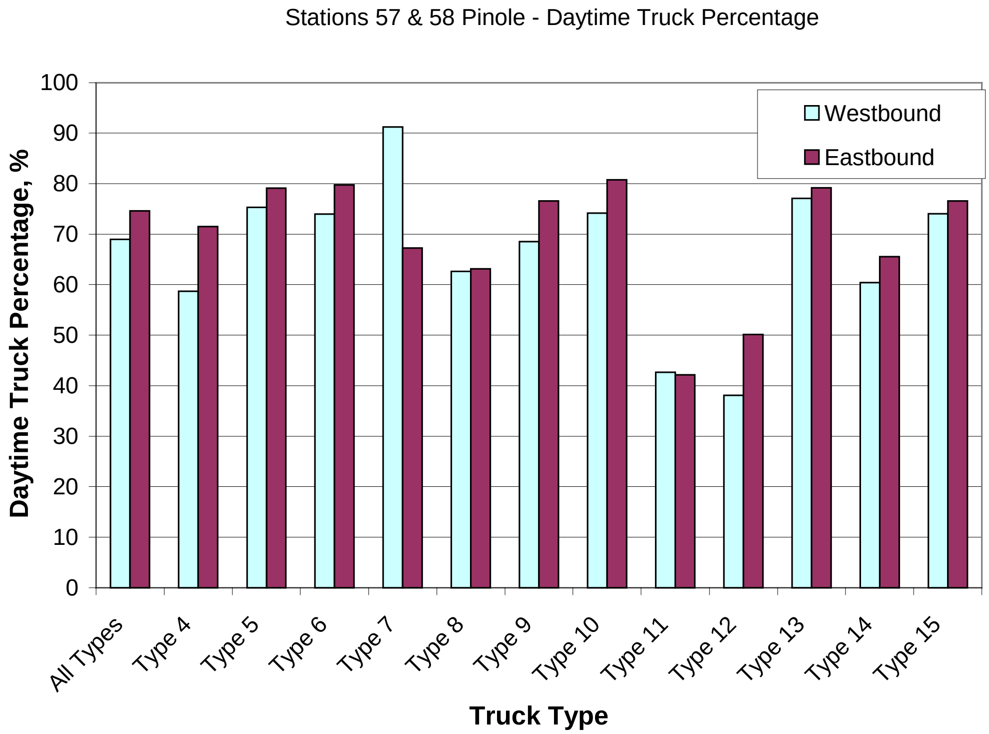



**Figure 40. Percentage of trucks operating in the daytime, Stations 57 and 58 (Pinole).**

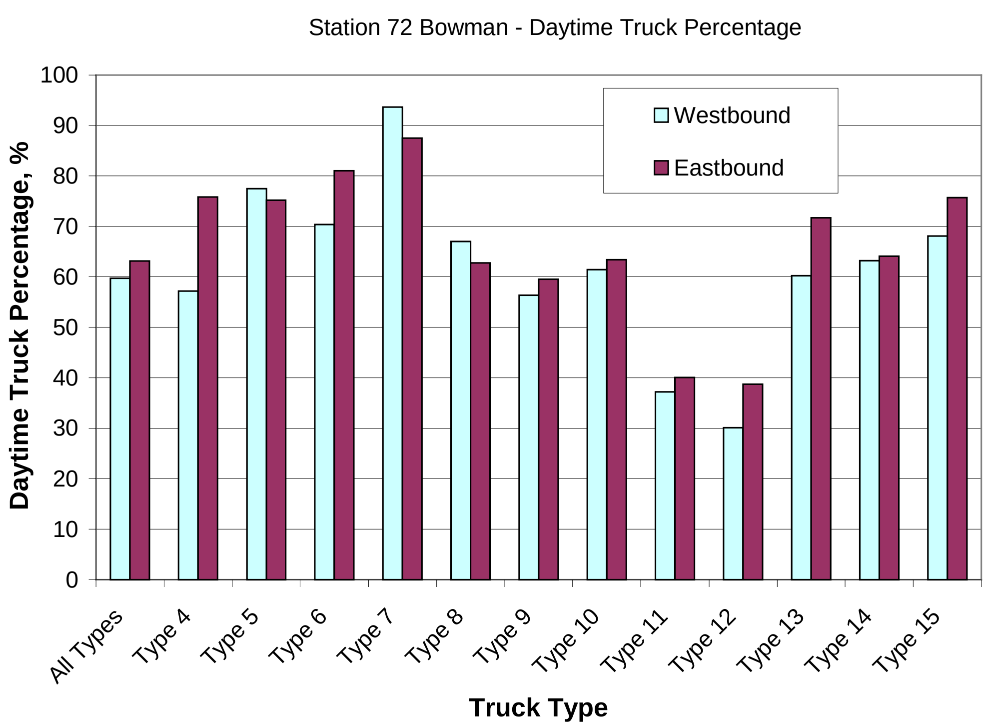



**Figure 41. Percentage of trucks operating in the daytime, (Bowman).**

Figure 42 shows each sampled day's daytime percentage for total truck types at Station 2. The higher points in the figure are for weekdays and the lower points are for weekends. This figure shows that the daytime percentage is quite stable across the whole analysis period. Similar conclusions can be made from other sites' daytime truck percentage diagrams, which are shown in Appendix D.

4.2.2 Traffic Seasonal Distribution

Traffic seasonal distribution is also an important factor in pavement design because the same traffic loading will have different effects on pavement damage during different seasons.

The seasonal average daily truck traffic volume for Site 1 (Station 2) and Site 2 (Stations 17 and 18) are shown in Figures 43 and 44, respectively. The figures show that there is little seasonal variation in traffic volume. The same conclusion can be drawn from the other 4 sites.

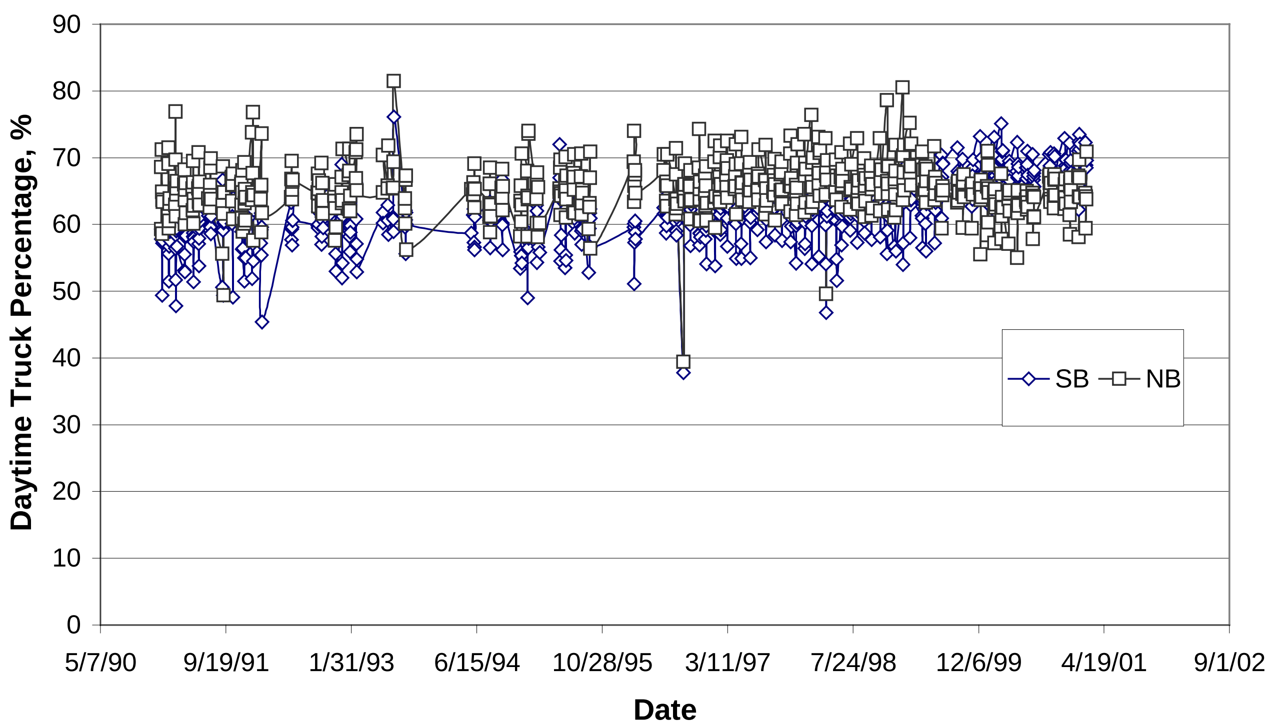



**Figure 42. Percentage of trucks operating in the daytime, (Redding).**

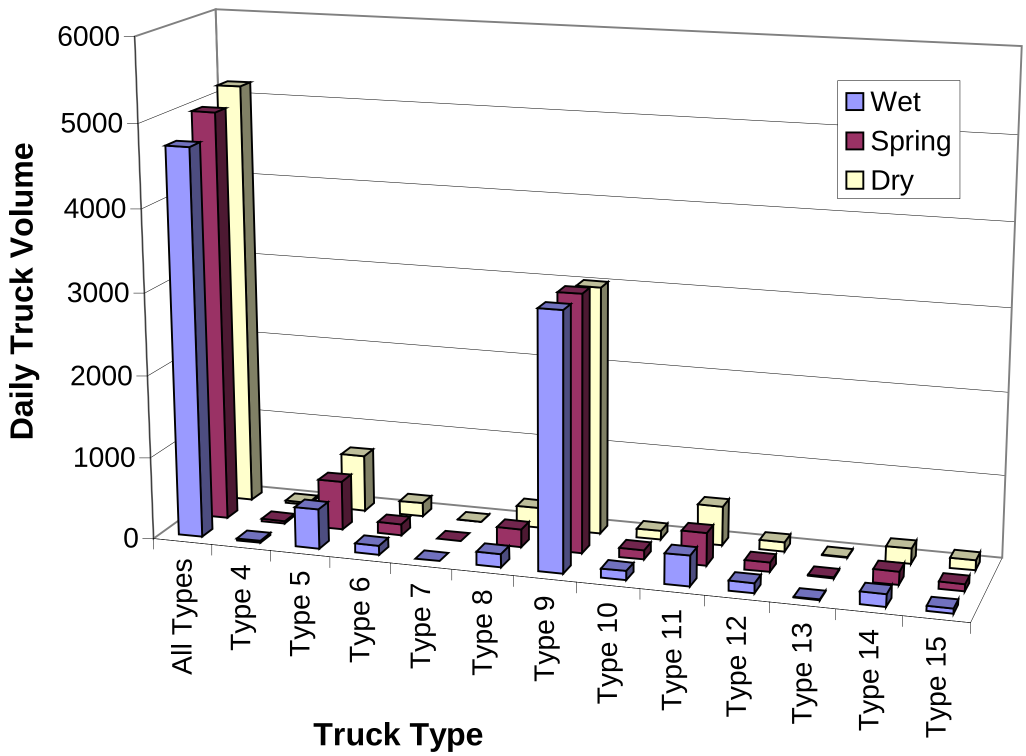



**Figure 43. Seasonal average daily truck volume (both directions), Site 1 (Station 2, Redding).**

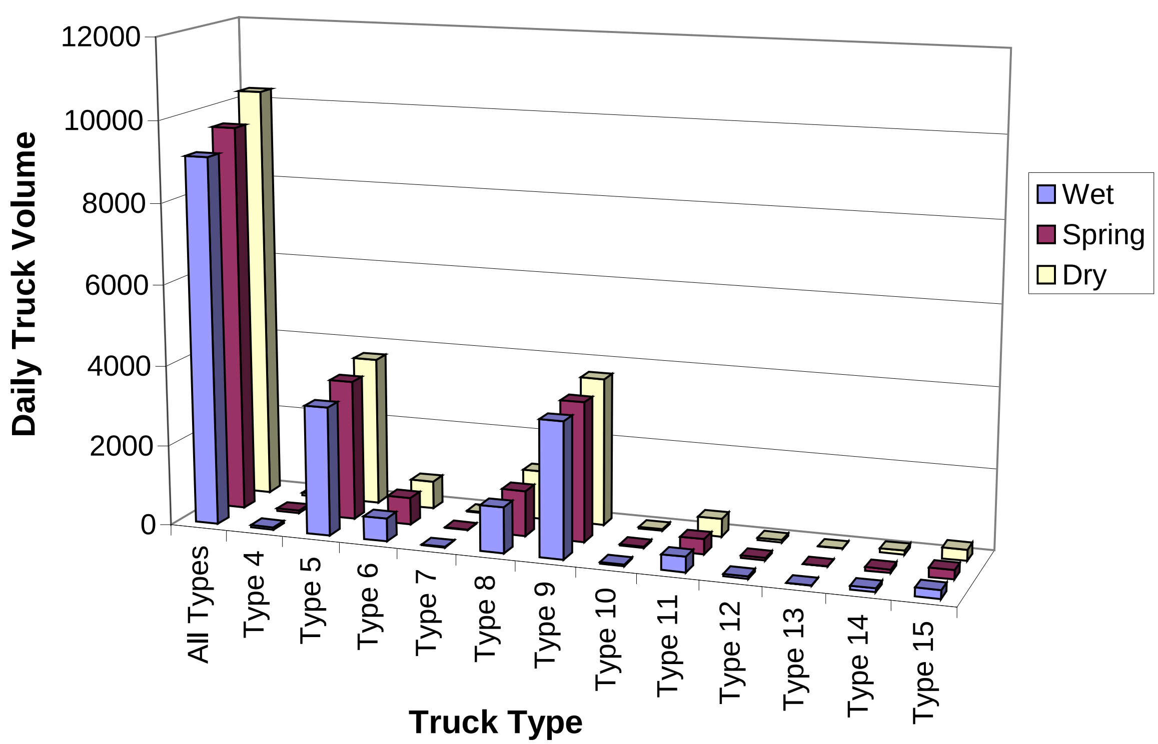



**Figure 44. Seasonal averaged daily truck volume (both directions), Site 2 (Stations 17 and 18, Hayward).**

### 4.2.3 Traffic Distribution by Lane

The knowledge of traffic distribution by lane is important in determining the expected traffic volume that will travel on the designed pavement. Table 18 summarizes the distribution of each truck type at the six WIM sites by lane.

Table 18 shows that when there are two lanes in one driving direction, over 90 percent of the truck traffic will travel on the outside lane, and when there three or more lanes in one driving direction, over 90 percent of the truck traffic will travel on the outermost two lanes. In the latter situation, the truck traffic distribution between the outermost two lanes differs across sites. For example, at Stations 17 and 18, the right-hand lane has a slightly smaller percentage than the left-hand lane, while at Stations 47 and 48, the right-hand lane has a much larger percentage than the left-hand lane.

Figures 45 through 48 show the averaged daily truck traffic volume distributions by lane at Site 1 (Station 2) and Site 2 (Stations 17 and 18). The figures show that the truck traffic distributions by lane are similar in both directions for a given WIM site.

### 4.2.4 Traffic Growth Trend Analysis

One of the main goals of truck traffic analysis is to produce a long-term forecast of traffic loading on the pavement being considered. Two parameters are currently used by Caltrans to estimate the traffic growth trend: annual average daily truck traffic (AADTT) and equivalent single axle loads (ESALs). Figures 49 through 54 show truck volume and ESALs of the six WIM sites for each sampled day. In each series, the higher points occur on weekdays and the lower points occur on weekends. The figures show that the traffic volume reaches its maximum value during June through August of each year.

**Table 18 Truck Traffic Distribution by Lane**

| Station | Lane No. | Truck Traffic Distribution for Each Truck Type (percent) | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | All Types | Type 4 | Type 5 | Type 6 | Type 7 | Type 8 | Type 9 | Type 10 | Type 11 | Type 12 | Type 13 | Type 14 | Type 15 |
| **Station 2 Southbound** | **1** | 7 | 18 | 18 | 8 | 4 | 7 | 6 | 4 | 5 | 5 | 8 | 4 | 8 |
| | **2** | 93 | 82 | 82 | 92 | 96 | 93 | 94 | 96 | 95 | 95 | 92 | 96 | 92 |
| **Station 2 Northbound** | **1** | 7 | 19 | 17 | 9 | 0 | 8 | 6 | 5 | 5 | 6 | 5 | 5 | 10 |
| | **2** | 93 | 81 | 83 | 91 | 100 | 92 | 94 | 95 | 95 | 94 | 95 | 95 | 90 |
| **Stations 17 & 18 Southbound** | **2** | 7 | 27 | 15 | 3 | 1 | 2 | 2 | 1 | 2 | 1 | 1 | 3 | 16 |
| | **3** | 53 | 46 | 47 | 55 | 46 | 52 | 59 | 55 | 57 | 47 | 45 | 71 | 44 |
| | **4** | 40 | 27 | 39 | 42 | 54 | 46 | 39 | 44 | 40 | 52 | 54 | 26 | 40 |
| **Stations 17&18 Northbound** | **2** | 5 | 23 | 12 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 7 |
| | **3** | 49 | 45 | 43 | 51 | 29 | 47 | 56 | 58 | 44 | 42 | 35 | 60 | 51 |
| | **4** | 46 | 32 | 45 | 48 | 71 | 53 | 44 | 42 | 56 | 58 | 65 | 40 | 42 |
| **Station 21 Westbound** | **1** | 7 | 24 | 11 | 10 | 2 | 6 | 6 | 5 | 5 | 5 | 5 | 9 | 6 |
| | **2** | 93 | 76 | 89 | 90 | 30 | 94 | 94 | 95 | 95 | 95 | 96 | 91 | 94 |
| **Station 21 Eastbound** | **1** | 7 | 18 | 11 | 9 | 1 | 5 | 7 | 6 | 6 | 5 | 5 | 5 | 5 |
| | **2** | 93 | 82 | 89 | 91 | 28 | 95 | 93 | 94 | 94 | 95 | 95 | 95 | 95 |
| **Stations 47 & 48 Southbound** | **2** | 2 | 46 | 10 | 4 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 2 |
| | **3** | 38 | 44 | 43 | 40 | 19 | 37 | 37 | 33 | 37 | 38 | 19 | 34 | 34 |
| | **4** | 60 | 11 | 47 | 56 | 81 | 62 | 62 | 66 | 63 | 62 | 81 | 66 | 64 |
| **Stations 47 & 48 Northbound** | **2** | 3 | 49 | 10 | 4 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 5 |
| | **3** | 27 | 37 | 42 | 30 | 5 | 30 | 26 | 22 | 22 | 22 | 12 | 26 | 32 |
| | **4** | 70 | 14 | 48 | 66 | 95 | 69 | 74 | 77 | 78 | 77 | 88 | 74 | 63 |
| **Stations 57 & 58 Westbound** | **2** | 3 | 24 | 8 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 6 |
| | **3** | 36 | 52 | 39 | 30 | 8 | 29 | 37 | 45 | 24 | 27 | 24 | 20 | 29 |
| | **4** | 61 | 24 | 53 | 68 | 72 | 70 | 63 | 55 | 76 | 73 | 76 | 80 | 65 |
| **Stations 57 & 58 Eastbound** | **2** | 6 | 31 | 14 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5 |
| | **3** | 48 | 53 | 46 | 41 | 14 | 44 | 55 | 59 | 35 | 45 | 37 | 29 | 41 |
| | **4** | 46 | 16 | 40 | 55 | 86 | 56 | 45 | 41 | 65 | 55 | 63 | 71 | 54 |
| **Station 72 Westbound** | **2** | 24 | 61 | 50 | 35 | 6 | 14 | 17 | 13 | 12 | 13 | 7 | 7 | 21 |
| | **3** | 76 | 39 | 50 | 65 | 94 | 86 | 83 | 87 | 88 | 87 | 93 | 93 | 79 |
| **Station 72 Eastbound** | **2** | 25 | 56 | 60 | 31 | 0 | 17 | 12 | 13 | 8 | 10 | 1 | 11 | 18 |
| | **3** | 75 | 44 | 40 | 69 | 100 | 83 | 88 | 87 | 92 | 90 | 99 | 89 | 82 |

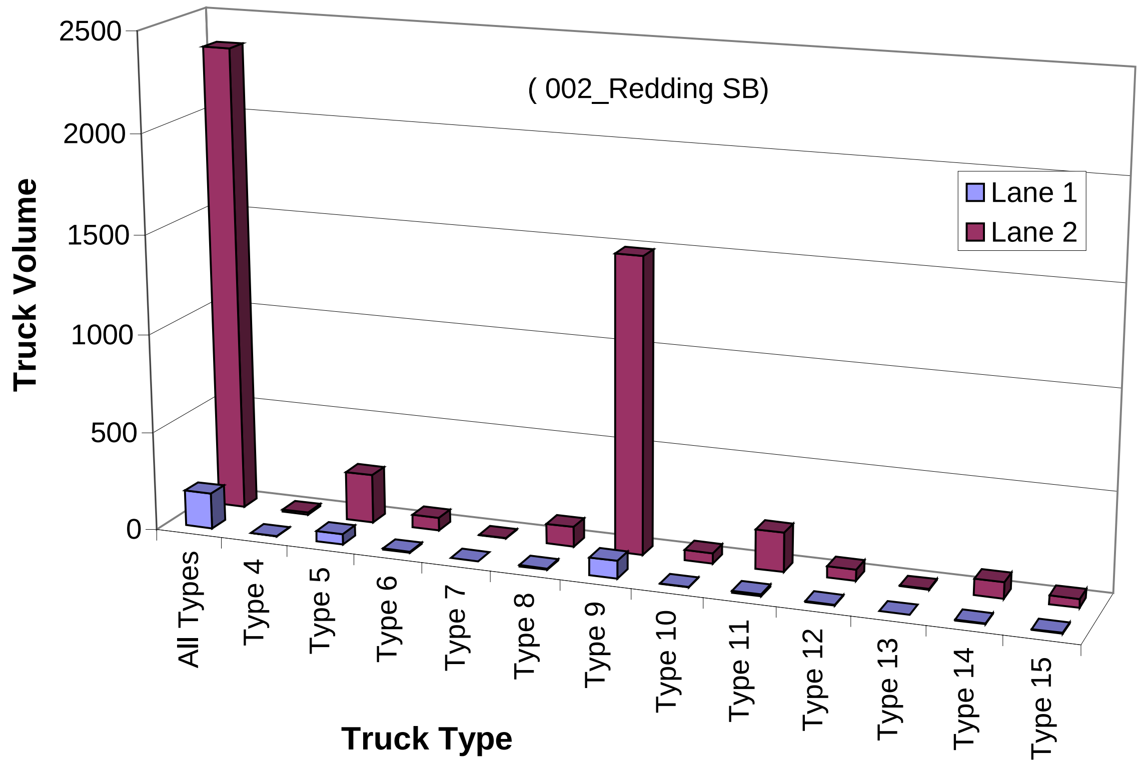



**Figure 45. Truck traffic distribution by lane, Site 1 (Station 2, Redding), Southbound.**

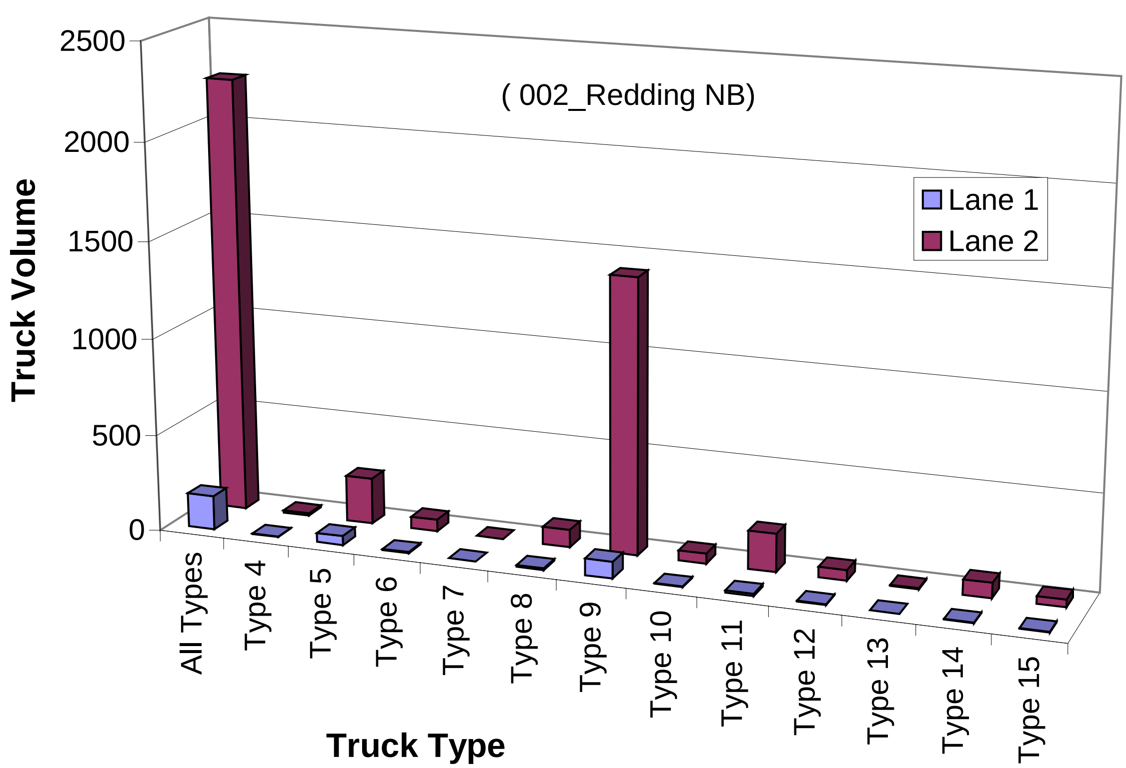



**Figure 46. Truck traffic distribution by lane, Site 1 (Station 2, Redding), Northbound.**

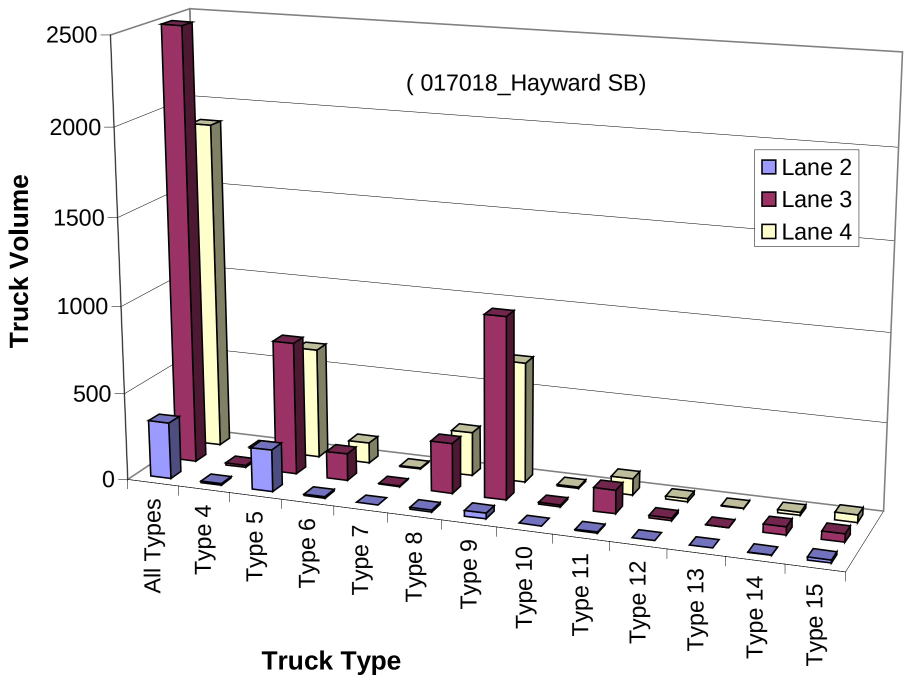



**Figure 47. Truck traffic distribution by lane, Site 2 (Stations 17 and 18, Hayward), Southbound.**

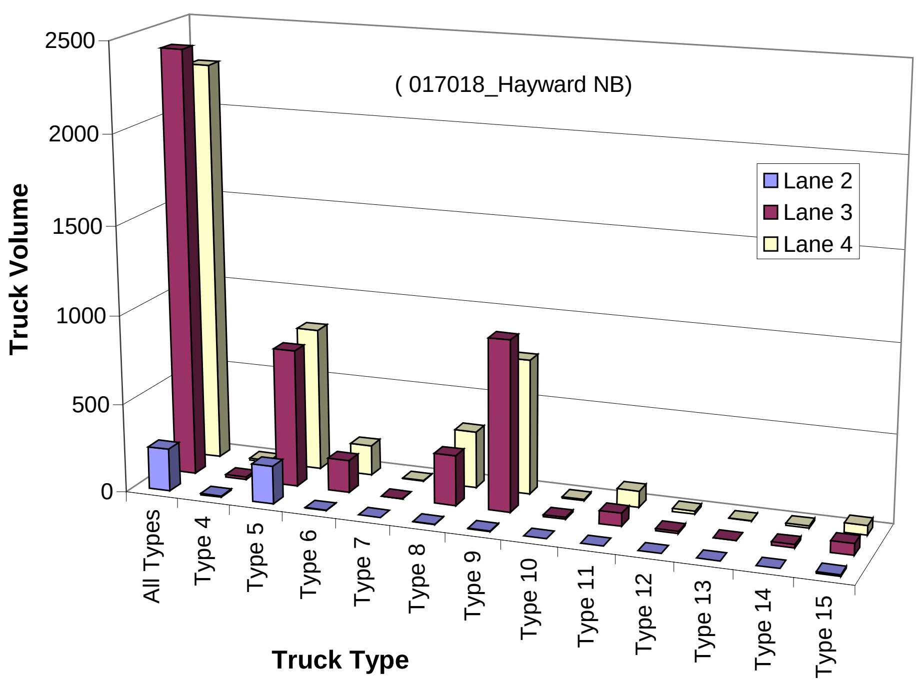



**Figure 48. Truck traffic distribution by lane, Site 2 (Stations 17 and 18, Hayward), Northbound.**

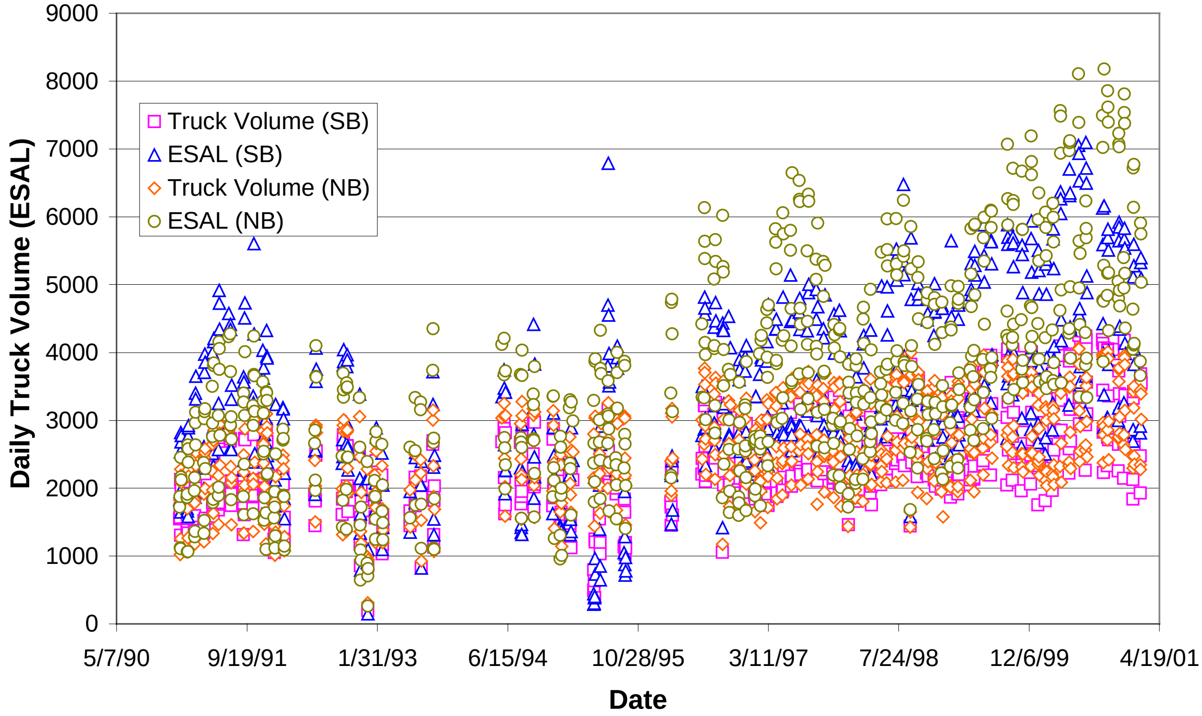



**Figure 49. Daily truck volume and ESALs at Site 1 (Station 2, Redding).**

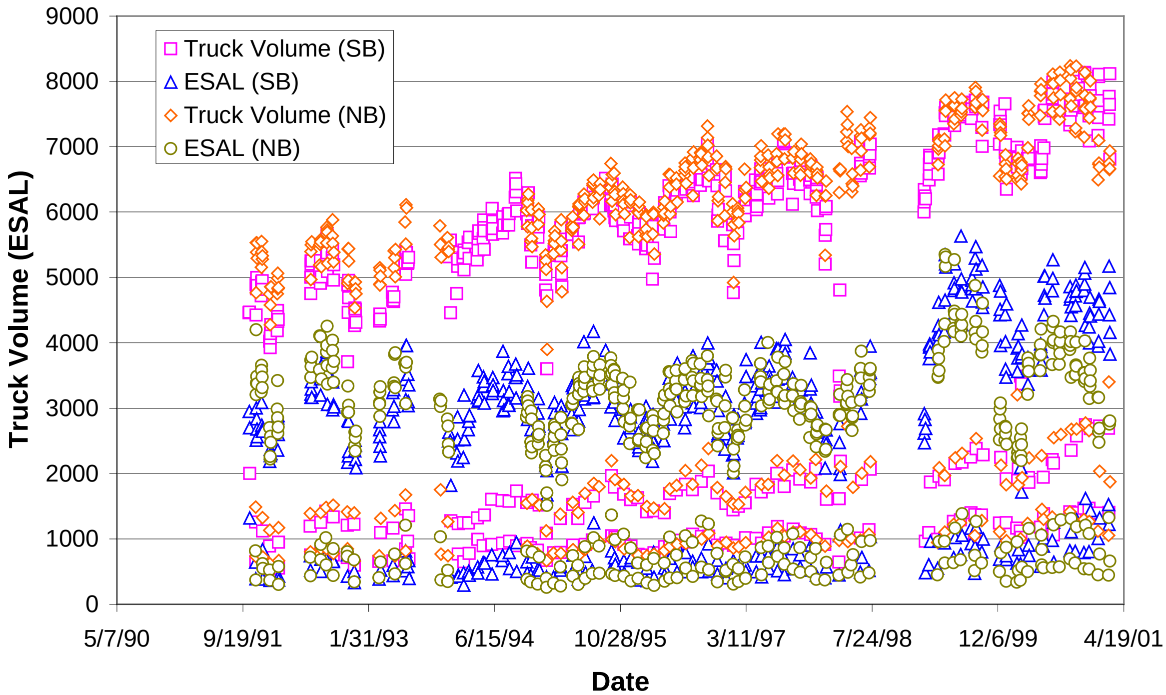



**Figure 50. Daily truck volume and ESALs at Site 2 (Stations 17 and 18, Hayward).**

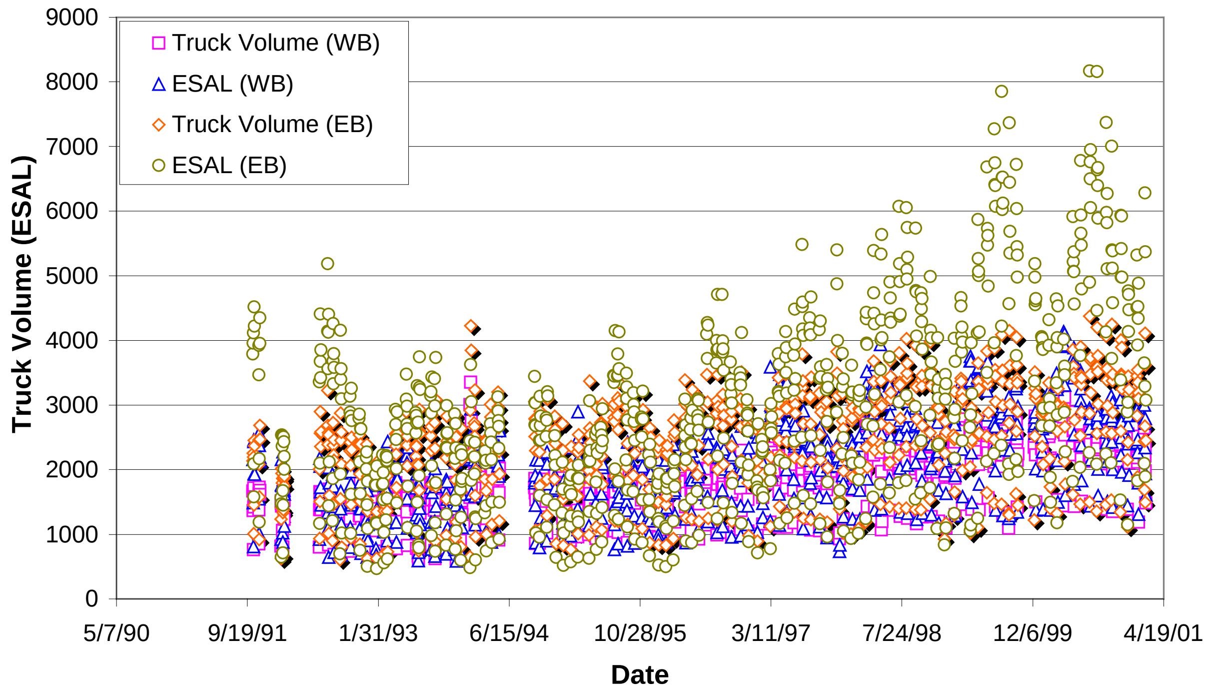



**Figure 51. Daily truck volume and ESALs at Site 3 (Station 21, Mojave).**

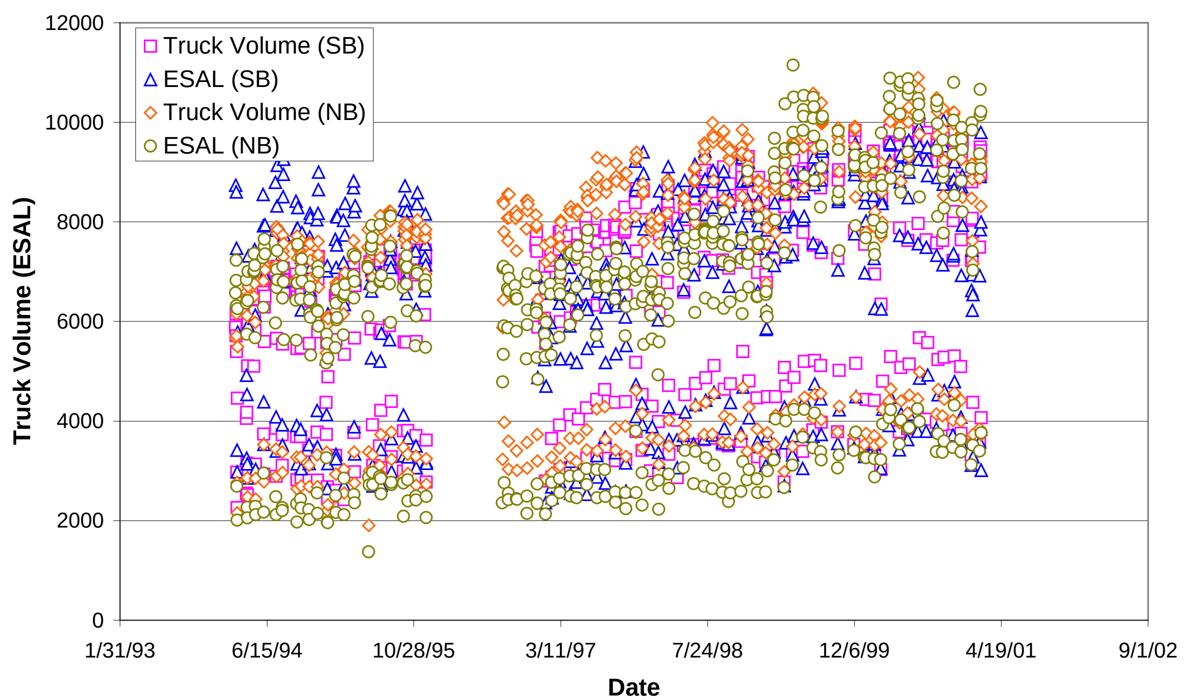



**Figure 52. Daily truck volume and ESALs at Site 4 (Stations 47 and 48, Castaic).**

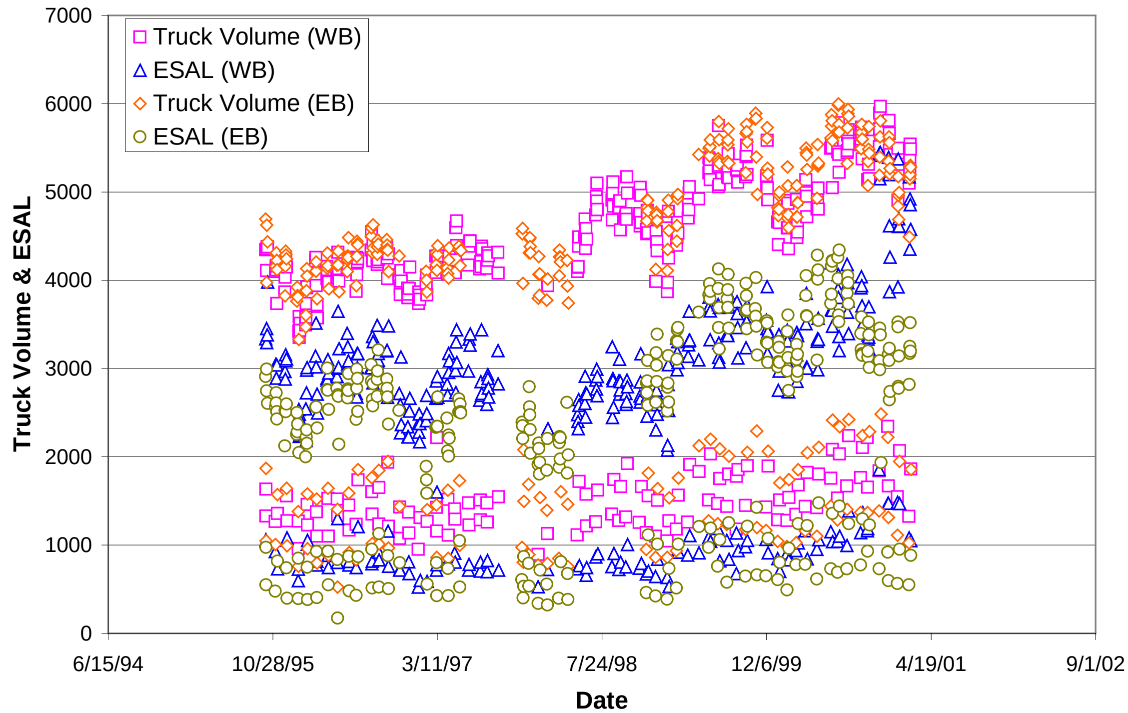



**Figure 53. Daily truck volume and ESALs at Site 5 (Stations 57 and 58, Pinole).**

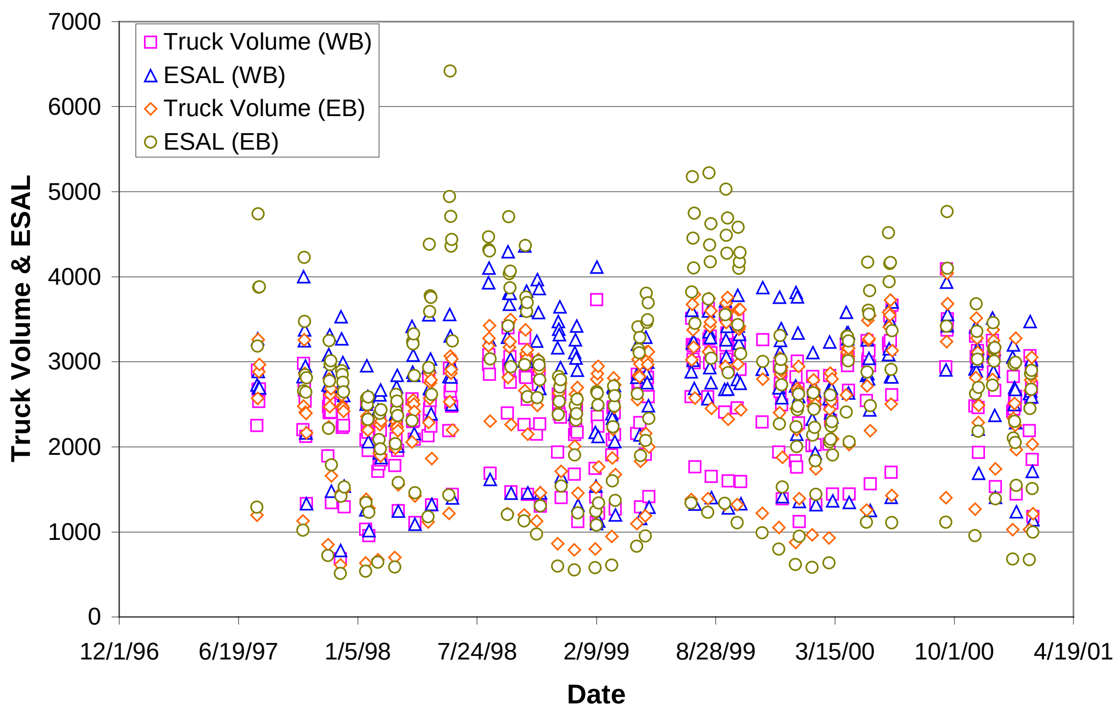



**Figure 54. Daily truck volume and ESALs at Site 6 (Station 72, Bowman).**

It can also be observed from Figures 49–54 that the traffic volume growth trends are identical for both directions. Moreover, both traffic volume and ESALs show similar growth trends over the time period studied.

However, traffic volume is the better choice to measure trends in truck traffic growth for the following two reasons:

- ESALs have a larger variance than traffic volume. One of the reasons for this is that there are still some erroneous records (e.g., extremely heavy axle load records) in the raw data. Although their percentage is small, they generate erroneously large ESAL numbers due to their heavy loads.
- In the analysis of load spectra, all the identifiable erroneous records were deleted. These records, however, usually represent some real trucks. These records cannot be used to calculate ESALs, but they should be included in the truck volume.

Based on these two reasons, it is more appropriate to use traffic volume to reflect truck traffic growth trend.

Figure 55 shows the AADTT of Site 1 (Station 2), including the volume for each direction of travel individually and both directions combined. Figure 56 shows the AADTT of each truck type at this site.

From Figure 55, it can be observed that the southbound AADTT and the northbound AADTT are almost identical and have the same growth trend.

Using simple linear regression modeling, a linear function was fitted to the AADTT for both directions combined, which is given by:

$$AADTT = -416653 + 211.29 \times year \tag{4}$$

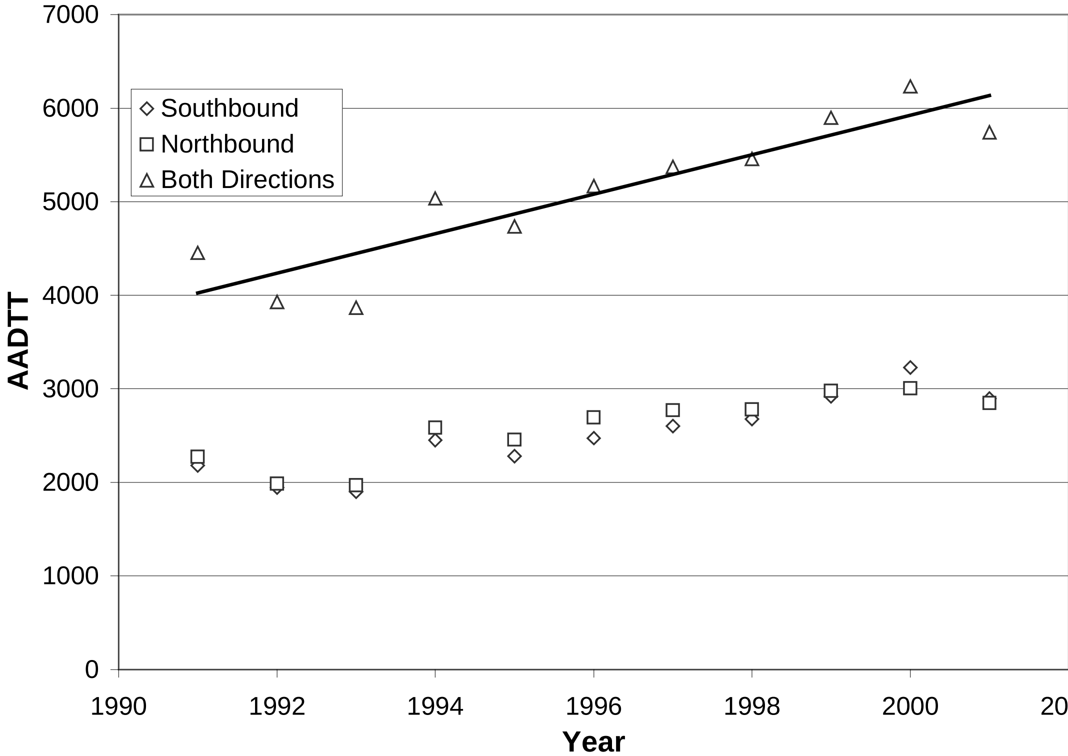



**Figure 55. Annual average daily truck traffic (AADTT) at Site 1 (Station 2, Redding).**

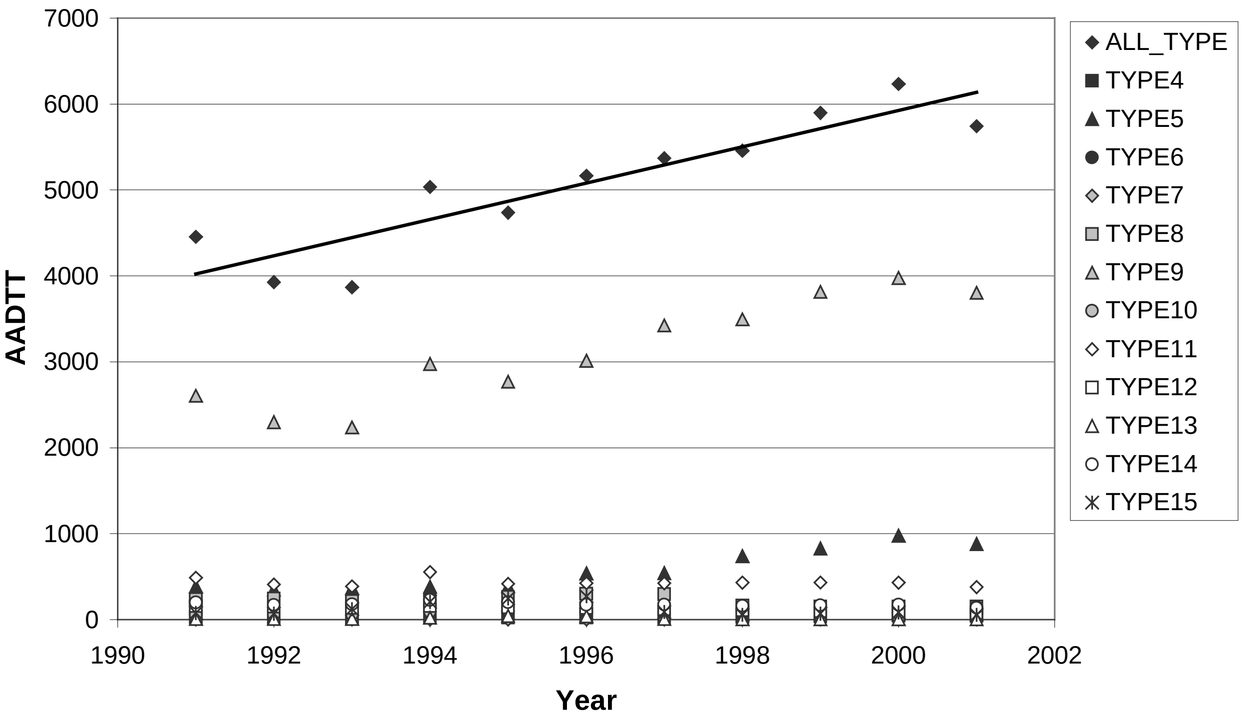



**Figure 56. Annual average daily truck traffic of each truck type at Site 1 (Station 2, Redding).**

The multiple R-Squared is 0.82, which indicates that the linear relationship between AADTT and year is good.

Using annual growth rate can also be estimated using non-linear regression modeling. The function used in the non-linear regression analysis has the following form:

$$AADTT = b_0 \times (1 + b_1)^{(year - 1990)} \tag{5}$$

Where:

$b_0$ = Coefficient.
$b_1$ = Annual Growth Rate.

For Site 1, the estimated annual growth rate $b_1$ of truck traffic volume (both directions combined) is 4.2 percent.

Figure 56 shows that the increase in the total traffic volume was mainly caused by the increase in the volumes of Truck Types 5 and 9 — especially Truck Type 9. Therefore, the growth trend of total traffic volume can be roughly estimated from the growth trend of Truck Type 9. This conclusion is valid with the qualification that if these truck types fall out of favor due to legislation or other causes, then their use as an estimate will no longer be valid.

Similar conclusions for the other 5 sites can be obtained from their AADTT diagrams, which are shown in the appendices, and the estimated annual growth rates listed in Table 19.

**Table 19 Estimated Annual Growth Rate of Truck Traffic Volume at 6 WIM sites**

| Station No. | Annual Growth Rate of Total Truck Traffic (%) | Annual Growth Rate of Type 9 Truck Traffic (%) |
|---|---|---|
| 2 (Redding) | 4.2 | 5.7 |
| 17 & 18 (Hayward) | 3.0 | 2.5 |
| 21 (Mojave) | 3.9 | 3.6 |
| 47 & 48 (Castaic) | 2.4 | 4.4 |
| 57 & 58 (Pinole) | 4.9 | 5.1 |
| 72 (Bowman) | 2.0 | 1.3 |

### 4.3 Side Wheel Load Difference Analysis

In pavement mechanical analysis, axle load is generally assumed to be distributed equally on the wheels at each end of the axle. The validity of this assumption, however, directly affects pavement performance. Large unequal distribution of axle load will accelerate pavement damage and shorten pavement service life on the side where the heavier wheel travels.

Side wheel load difference can be represented by Side Wheel Load Difference Ratio (SWLDR), which is calculated with the following equation:

$$SWLDR = \left(L_{right} - L_{left}\right) / \left(L_{right} + L_{left}\right) \times 100\% \tag{2}$$

Where:

$L_{right}$ = Right side wheel load (kN)
$L_{left}$ = Left side wheel load (kN)

The side wheel load difference ratio distributions of the four axle groups at Station 2 are shown in Figures 57 and 58. It can be observed that SWLDR has a normal distribution shape, with most of its values in the range of –20 to +20 percent. The expectations of this distribution are greater than zero and smaller than 3 percent, which means that right-side wheel loads are a little heavier than the left-side loads. This result can be attributed to the transverse slope of the pavement. The SWLDR distributions at the other 5 sites are shown in Appendix E, which gives similar results. These results suggest that the side wheel load difference can probably be ignored in pavement analysis.

### 4.4 Truck Speed Analysis

Truck speed information is also useful in pavement design. Figures 59 and 60 show the speed distribution of each truck type at Station 2. It can be observed from these figures that the speed of each truck type has a narrow distribution, mainly between 80 km/h (50 mph) and 112

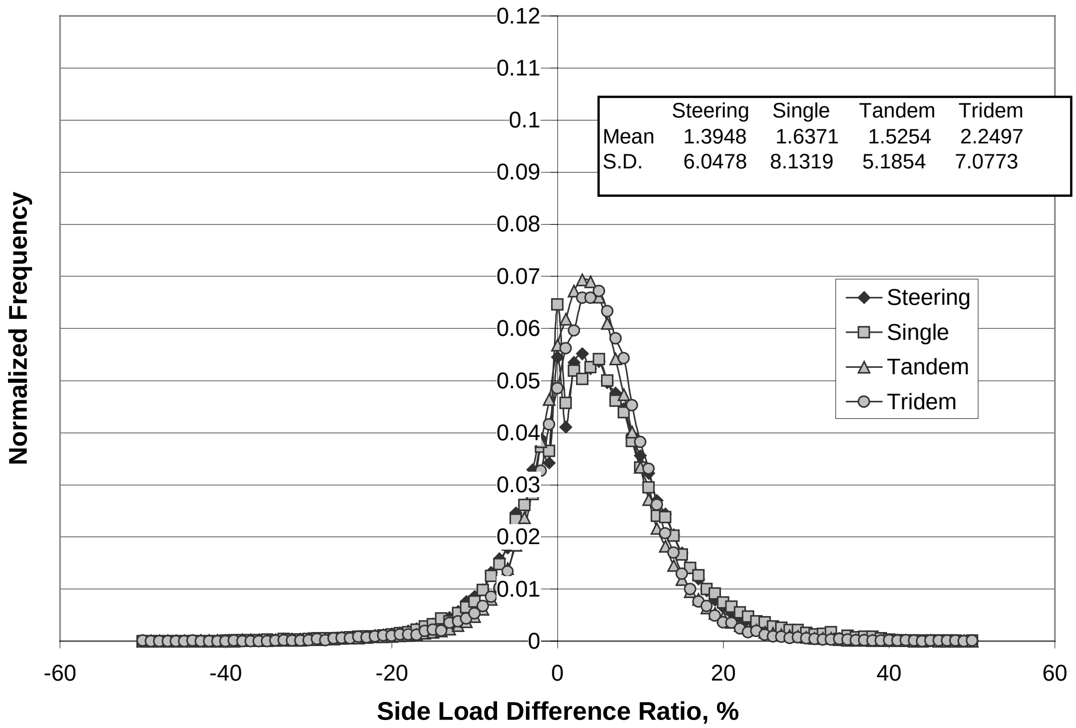



**Figure 57. Side wheel load difference ratio distribution, Site 1 (Station 2, Redding), Southbound.**

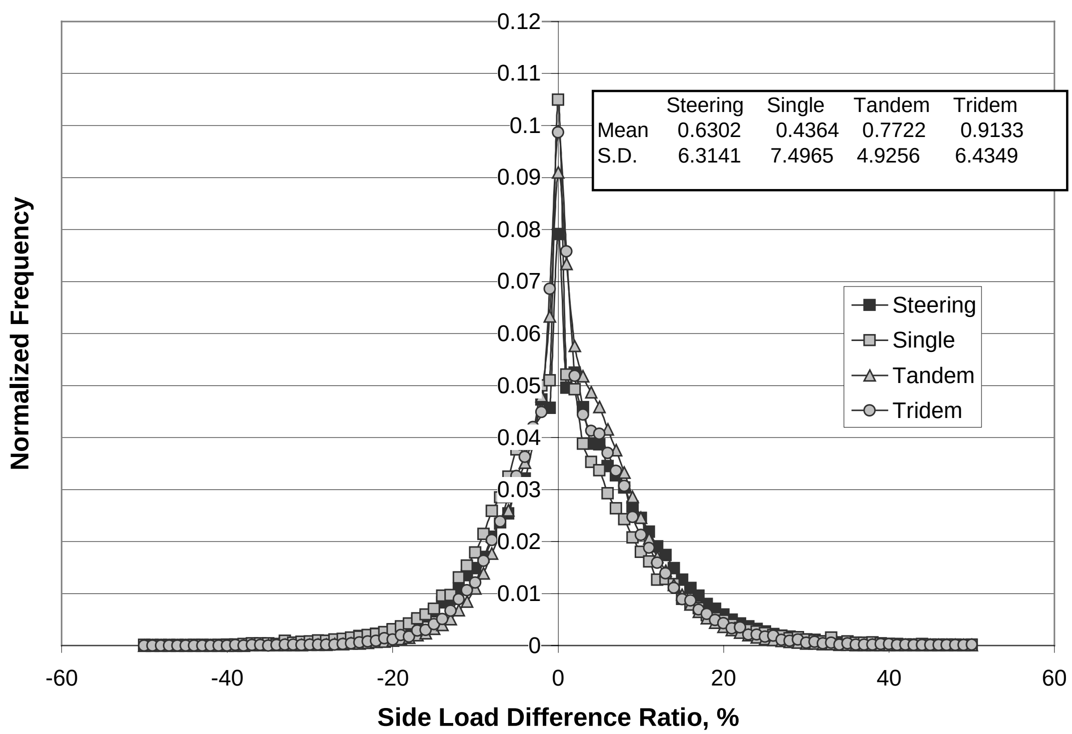



**Figure 58. Side wheel load difference ratio distribution, Site 1 (Station 2, Redding), Northbound.**

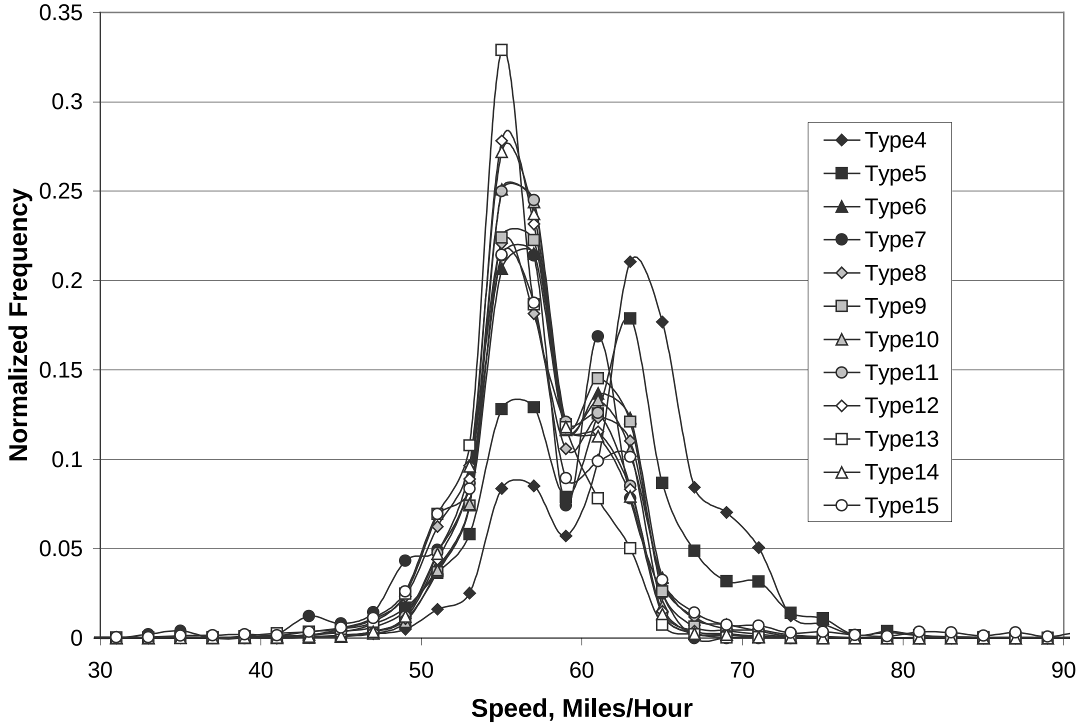



**Figure 59. Speed distribution of each truck type at Site 1 (Station 2, Redding), Southbound.**

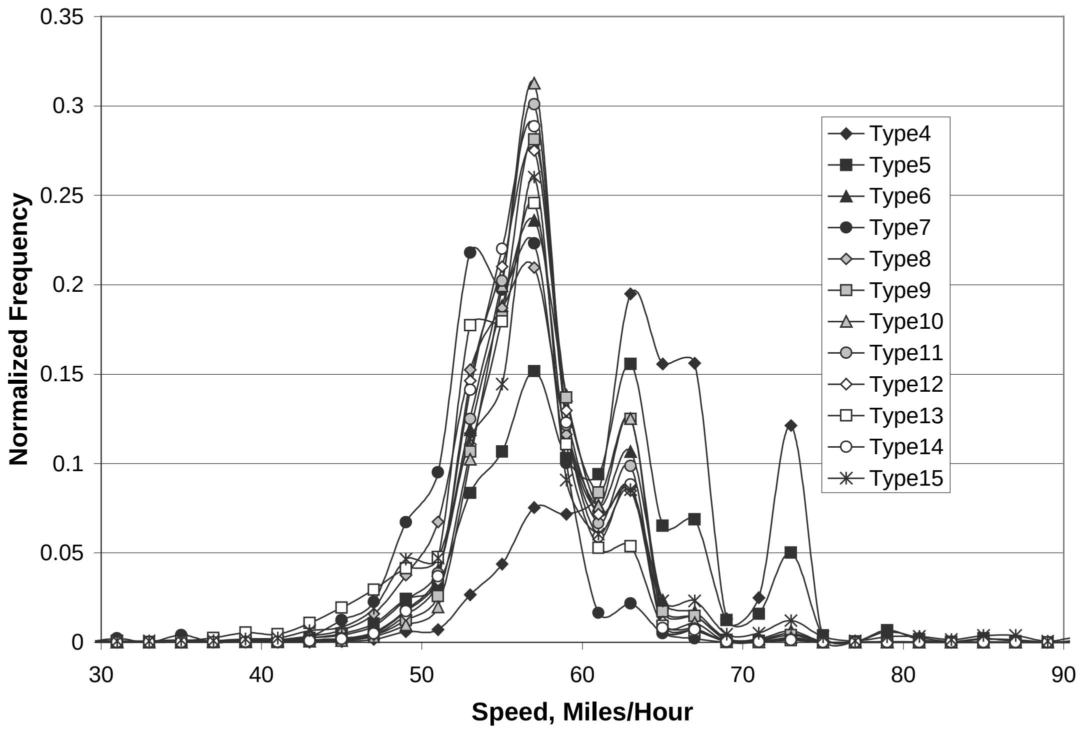



**Figure 60. Speed distribution of each truck type at Site 1 (Station 2, Redding), Northbound.**

km/h (70 mph), except for the speed distributions of Truck Types 4 and 5, which fall between 80 km/h (50 mph) and 120 km/h (75 mph).

Table 20 gives the average speed of each truck type at the six WIM sites. This table shows that the average speed of each truck is similar between two directions, but different between sites. The table also shows that the average speeds of Truck Type 5 through Truck Type 15 are quite similar at the same site, most of which vary between 80 km/h (50 mile/h) and 96 km/h (60 mile/h).

**Table 20 Average Speed Of Each Truck Type at 6 WIM Sites**

| Station No. | Location | Direction | Speed by Truck Type (km/h) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| 2 | Redding | Southbound | 103 | 97 | 93 | 90 | 92 | 93 | 92 | 92 | 92 | 90 | 92 | 92 |
| | | Northbound | 103 | 97 | 92 | 87 | 90 | 93 | 92 | 92 | 92 | 89 | 92 | 92 |
| 17 & 18 | Hayward | Southbound | 92 | 87 | 85 | 84 | 85 | 85 | 85 | 85 | 87 | 77 | 87 | 76 |
| | | Northbound | 89 | 84 | 82 | 80 | 82 | 82 | 80 | 84 | 82 | 79 | 84 | 77 |
| 21 | Mojave | Westbound | 92 | 87 | 87 | 76 | 84 | 84 | 82 | 76 | 79 | 66 | 84 | 84 |
| | | Eastbound | 97 | 92 | 93 | 89 | 90 | 92 | 90 | 92 | 92 | 85 | 90 | 90 |
| 47 & 48 | Castaic | Southbound | 101 | 93 | 92 | 85 | 90 | 90 | 90 | 92 | 92 | 85 | 90 | 89 |
| | | Northbound | 100 | 93 | 90 | 84 | 90 | 90 | 90 | 90 | 90 | 84 | 90 | 90 |
| 57 & 58 | Pinole | Westbound | 89 | 85 | 80 | 74 | 80 | 80 | 80 | 79 | 79 | 71 | 77 | 77 |
| | | Eastbound | 95 | 90 | 87 | 85 | 89 | 89 | 87 | 89 | 89 | 84 | 87 | 84 |
| 72 | Bowman | Westbound | 109 | 106 | 101 | 97 | 100 | 101 | 101 | 103 | 103 | 98 | 98 | 95 |
| | | Eastbound | 105 | 105 | 100 | 95 | 97 | 95 | 95 | 93 | 95 | 93 | 93 | 92 |

## 4.5 Truck Gross Weight Analysis

The changes in truck gross weight are directly related to the effect that truck traffic has on pavement damage. They can also reflect the economic development of an area. Changes in truck gross weights were analyzed for this report for the period 1991–2000. The legal maximum gross vehicle weight in California is 355 kN (80,000 lbs.).

Because the gross weight of one truck type running on a certain highway has a distribution pattern instead of a single value, it's somewhat difficult to describe its variation trend. One direct method is to draw the gross weight distribution curve of each year in the same diagram and make a visual comparison.

Figures 61–72 show the gross weight distribution of each truck type at Station 2 (Redding) northbound from 1991 to 2000. It can be observed that the gross weight distribution shifts slightly to the right (heavier) over time for Truck Types 6, 8 and 9, and shows no significant change for other truck types except Truck Types 7 and 13, which came from small sample sizes. As Truck Types 5, 6, 8, 9, and 11 make up the majority of total truck traffic volume, it can be concluded that in general, there is a slight increase in the truck gross weight at Station 2. To quantify this increase, the mean value of truck gross weight distribution was computed and fitted with non-linear regression functions. The maximum legal truck gross weight for Truck Type 9 is 356 kN (80,000 lbs.)

Figure 73 shows the yearly averaged truck gross weight at Station 2 northbound.

The fitted annual growth rates at the six sites are shown in Table 21 and Figure 74. The apparent large values of Truck Type 13 were caused by a small sample size and do not have much meaning.

It can be observed that the growth rates of truck gross weight are different between sites and between truck types. Generally the value is between –1 and +2 percent.

**Table 21 Annual Growth Rate of Truck Gross Weight at Six WIM Sites.**

| **Station No.** | **Growth Rate by Truck Type (percent)** | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **11** | **12** | **13** | **14** | **15** |
| 2 | 1.54 | -0.13 | 0.75 | 3.05 | 3.41 | 0.95 | 0.76 | 1.57 | 1.81 | 4.93 | 0.49 | -0.74 |
| 17 & 18 | 0.45 | 0.07 | 0.29 | 0.47 | 0.78 | -0.43 | 1.04 | -0.24 | -0.67 | 3.46 | -0.27 | 3.51 |
| 21 | 0.76 | 0.89 | 1.57 | -0.17 | 2.47 | 0.12 | 0.44 | 0.67 | 0.51 | 2.59 | 0.89 | -1.80 |
| 47 & 48 | 0.17 | 0.54 | 0.69 | 0.96 | 1.65 | -0.37 | -0.88 | -0.39 | -1.45 | 0.25 | -0.72 | 1.71 |
| 57 & 58 | -0.20 | -0.10 | 0.25 | -0.49 | 2.34 | 0.05 | 0.61 | 0.06 | 0.45 | 3.36 | 0.81 | 0.42 |
| 72 | -0.06 | -2.86 | 0.99 | 1.65 | 0.68 | -1.35 | 0.62 | -0.16 | -0.15 | 4.41 | -0.41 | -6.27 |

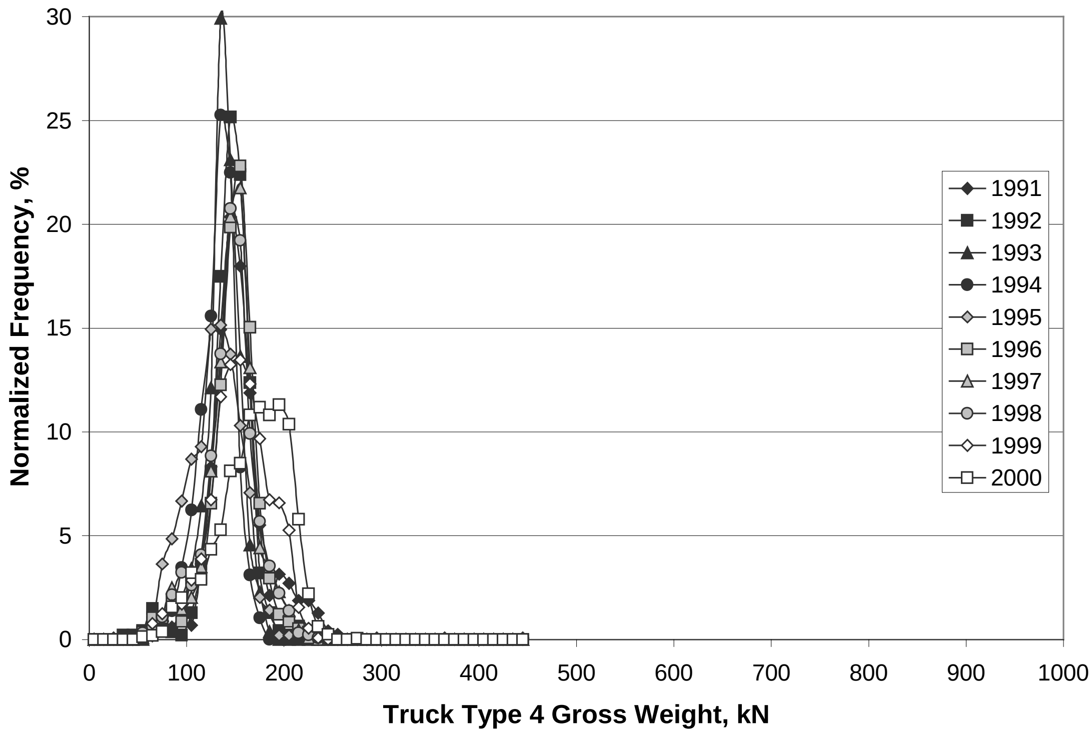



**Figure 61. Truck gross weight distribution for Truck Type 4 at Site 1 (Station 2, Redding), Northbound.**

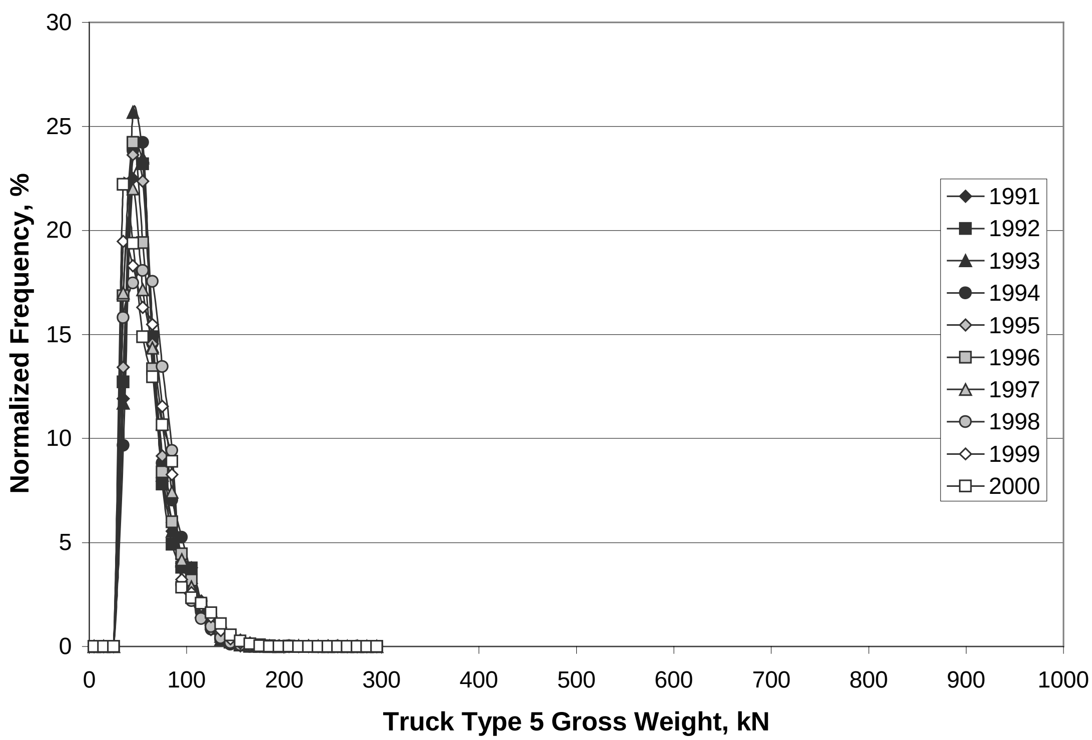



**Figure 62. Truck gross weight distribution for Truck Type 5 at Site 1 (Station 2, Redding), Northbound.**

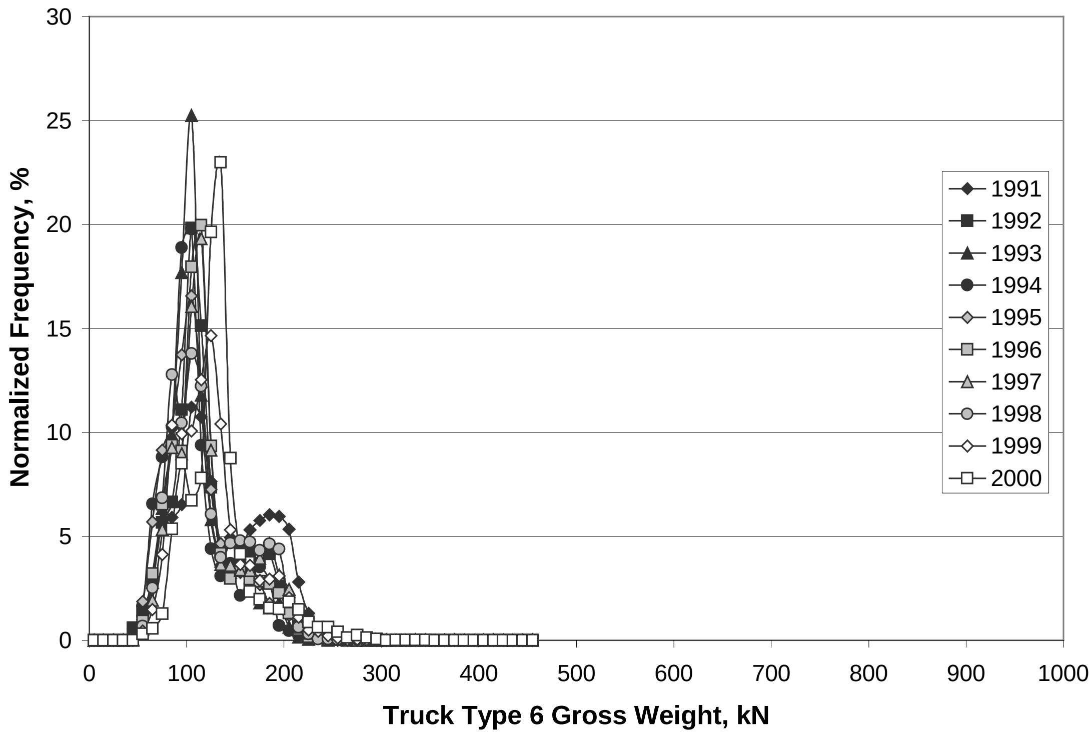



**Figure 63. Truck gross weight distribution for Truck Type 6 at Site 1 (Station 2, Redding), Northbound.**

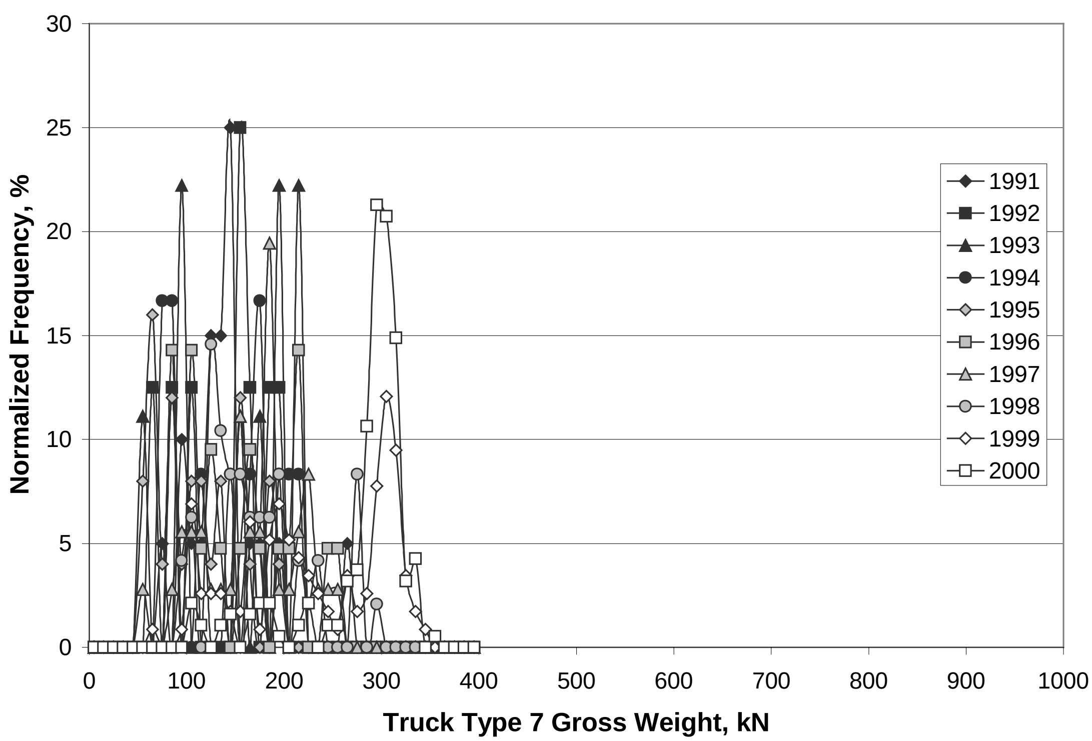



**Figure 64. Truck gross weight distribution for Truck Type 7 at Site 1 (Station 2, Redding), Northbound.**

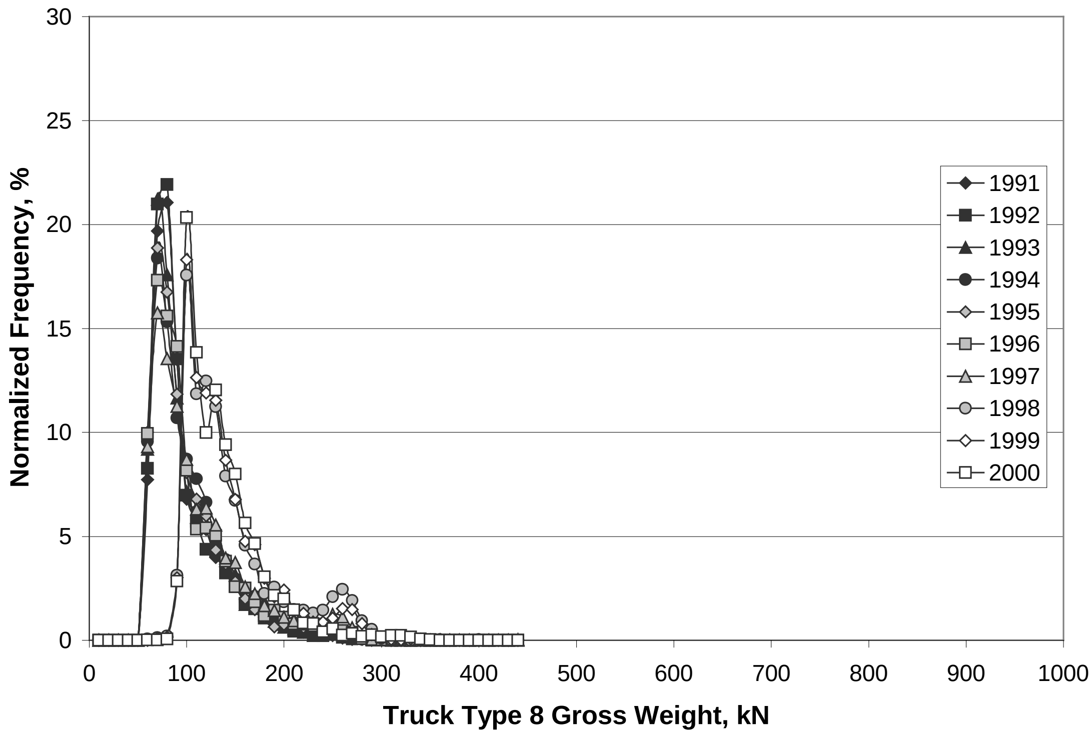



**Figure 65. Truck gross weight distribution for Truck Type 8 at Site 1 (Station 2, Redding), Northbound.**

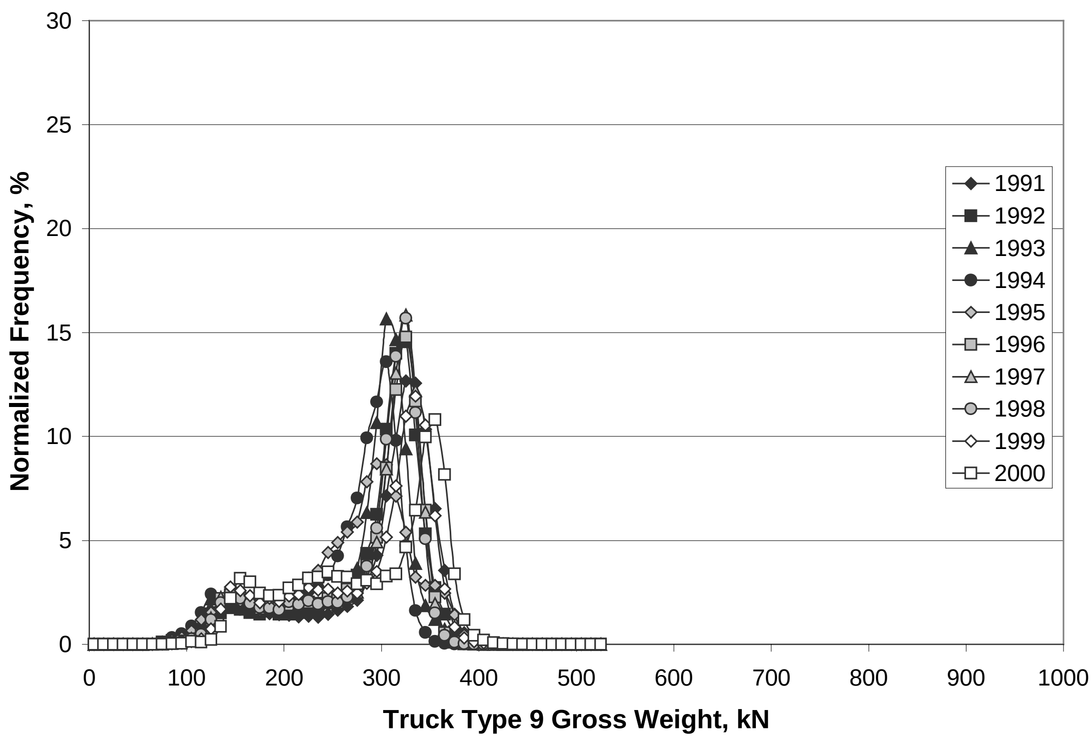



**Figure 66. Truck gross weight distribution for Truck Type 9 at Site 1 (Station 2, Redding), Northbound.**


**Figure 67. Truck gross weight distribution for Truck Type 10 at Site 1 (Station 2, Redding), Northbound.**


**Figure 68. Truck gross weight distribution for Truck Type 11 at Site 1 (Station 2, Redding), Northbound.**

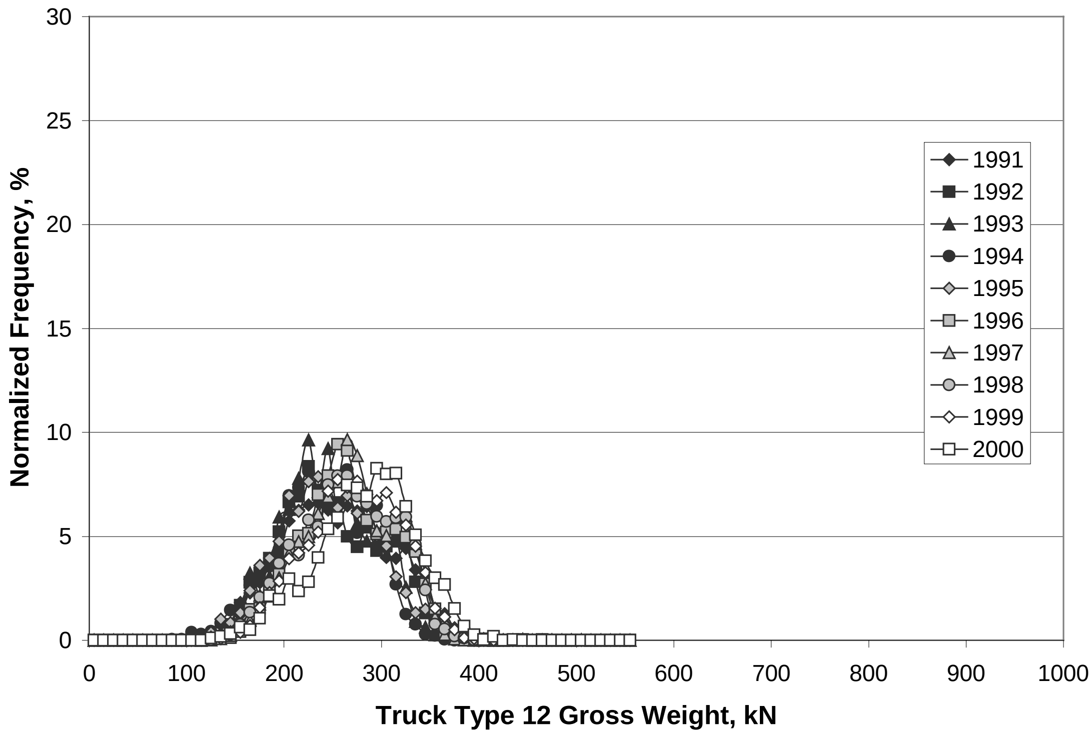



**Figure 69. Truck gross weight distribution for Truck Type 12 at Site 1 (Station 2, Redding), Northbound.**

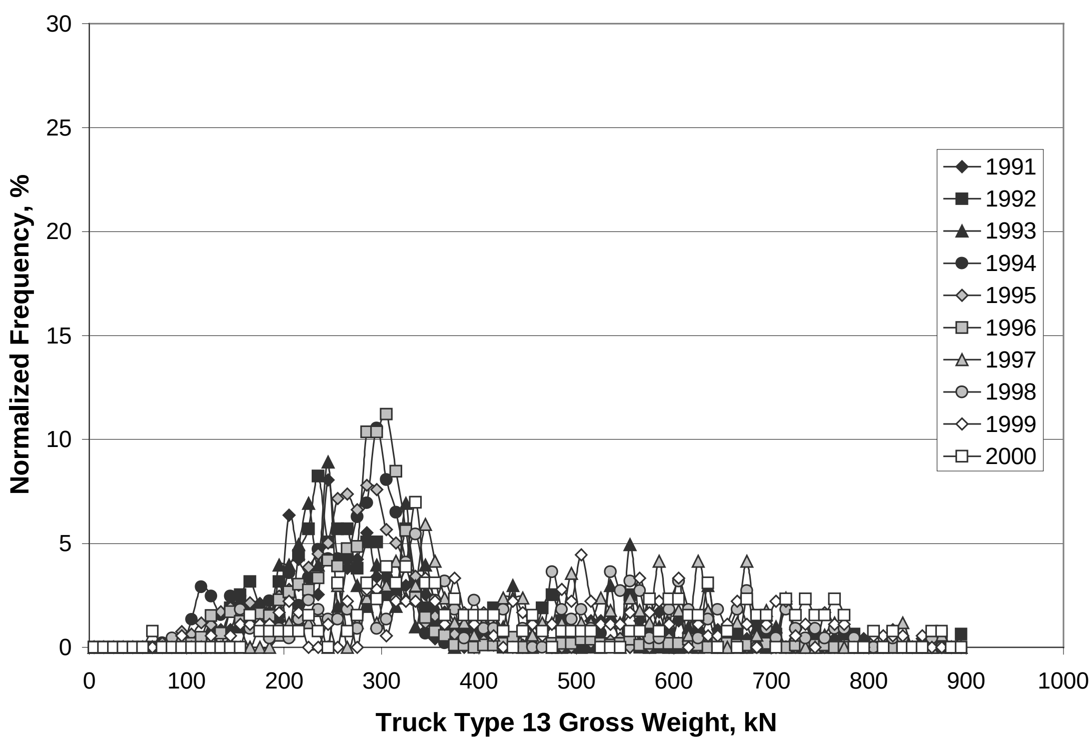



**Figure 70. Truck gross weight distribution for Truck Type 13 at Site 1 (Station 2, Redding), Northbound.**

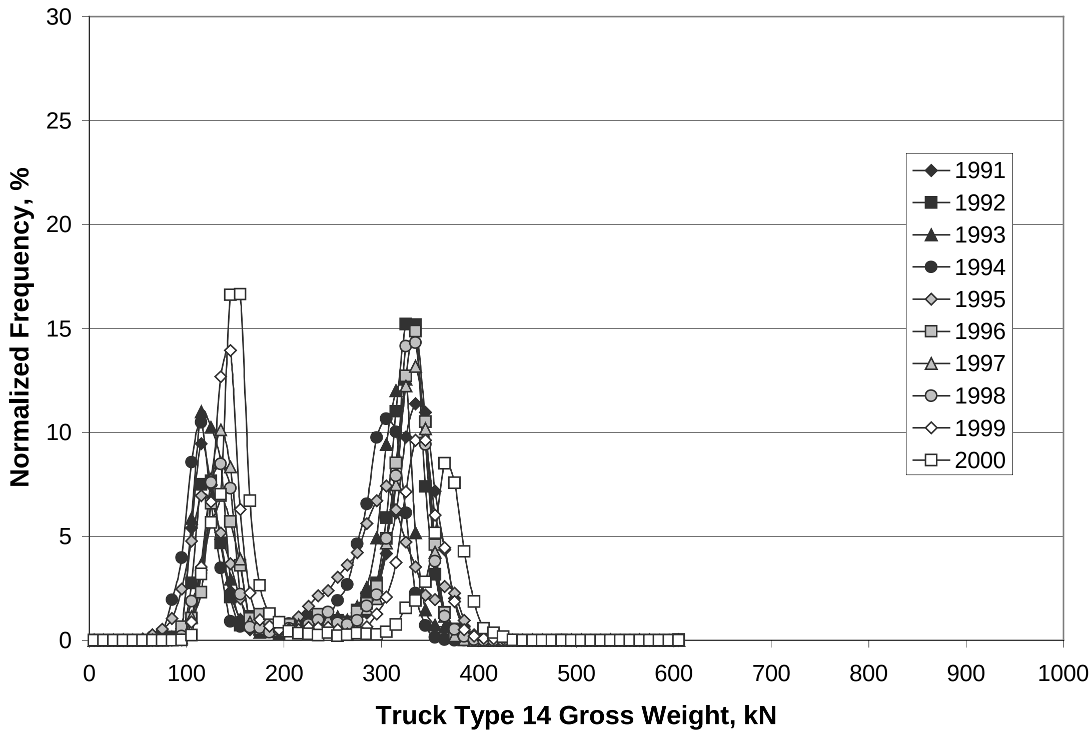



**Figure 71. Truck gross weight distribution for Truck Type 14 at Site 1 (Station 2, Redding), Northbound.**

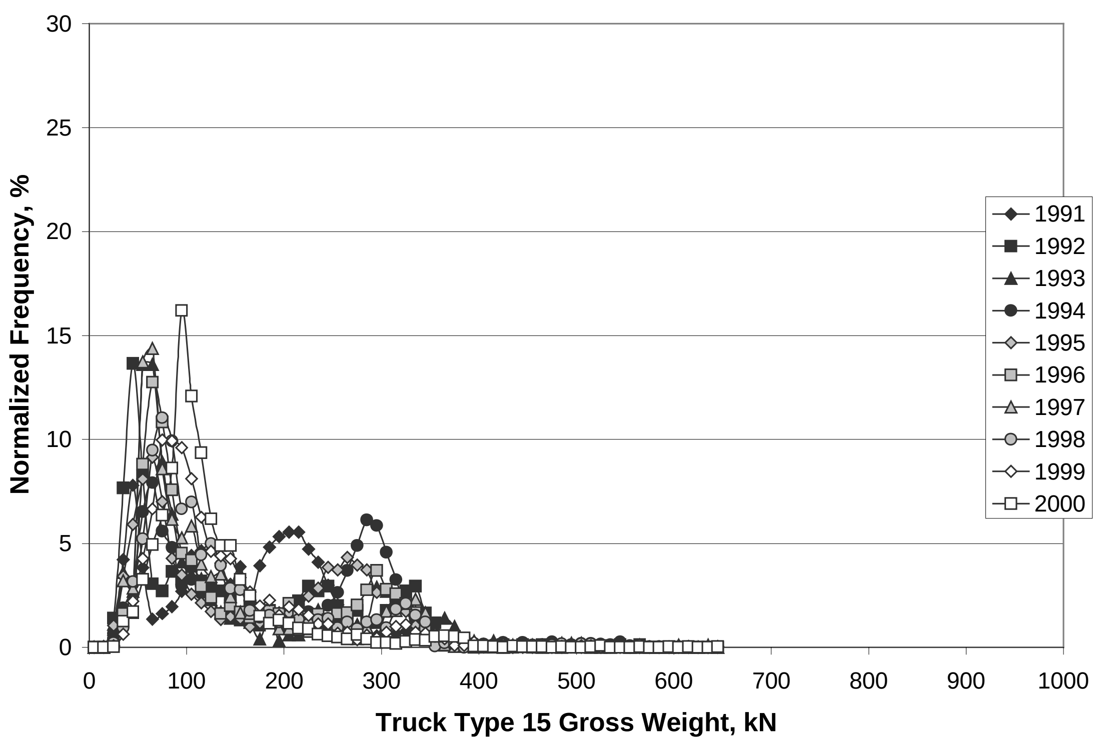



**Figure 72. Truck gross weight distribution for Truck Type 15 at Site 1 (Station 2, Redding), Northbound.**

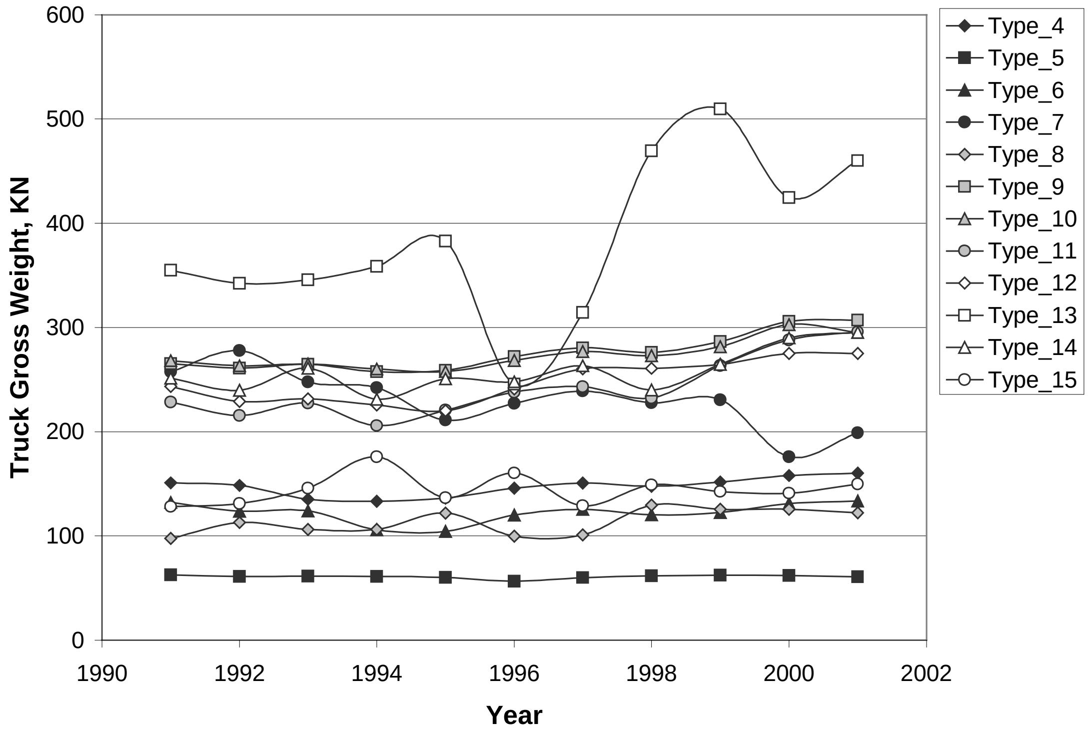



**Figure 73. Average yearly truck gross weight at Site 1 (Station 2, Redding), Northbound.**

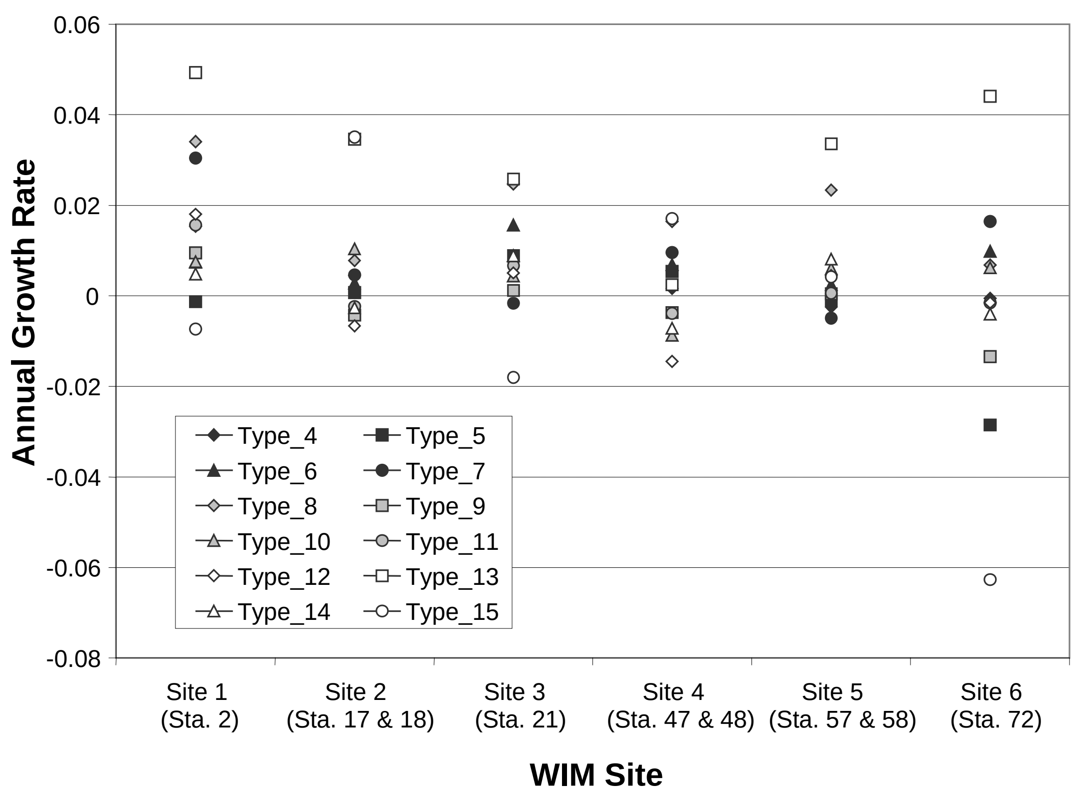



**Figure 74. Annual growth rate of truck gross weight at six WIM sites.**

## 5.0 COMPARISON OF TRUCK TRAFFIC AMONG SITES

Although there are more than 100 WIM stations across the state highway system in California and more stations will be installed in the future, there still remain many highway links from which traffic data are not available. It would be useful if the truck traffic characteristics on these links can be inferred from the traffic data from adjacent WIM stations.

The two most important traffic characteristics are axle load spectra and truck traffic volume. In this section, these two factors are compared for selected adjacent WIM sites.

Six WIM station groups were selected according to their geographic distribution, which is shown in Table 22 and Figure 75. All these station groups are located in areas with low WIM station density, and all WIM stations in one group are close to each other geographically.

**Table 22 Six WIM Station Groups Compared**

| Group No. | WIM Stations Included |
|---|---|
| 1 | 20, 86, 93 |
| 2 | 2, 28, 30 |
| 3 | 21, 73, 74 |
| 4 | 25, 66, 71 |
| 5 | 43, 76, 94 |
| 6 | 22, 23, 26 |

Load spectra coefficient (LSC) was used to compare the load spectra of each axle group, and AADTT (both directions combined) from year 2000 was used to compare truck traffic volume of each site. Their values are presented in Table 23. Load spectra coefficients are also shown in Figures 76 through 81.

It can be observed from the data presented in Table 23 that for Groups 2, 5, and 6, the LSCs are close to one another for all four axle groups. For Groups 1, 3, and 4, the LSCs of tandem and tridem axles are significantly across the stations in the group, but the LSCs of the

**Table 23 Load Spectra Coefficient and AADTT of Six WIM Station Groups**

| Group | WIM Station | Load Spectra Coefficient | | | | AADTT |
|---|---|---|---|---|---|---|
| | | Steering | Single | Tandem | Tridem | |
| 1 | Station 20 | 0.083 | 0.300 | 0.863 | 0.190 | 1446 |
| | Station 86 | 0.079 | 0.303 | 0.739 | 1.912 | 2057 |
| | Station 93 | 0.050 | 0.185 | 0.446 | 0.161 | 561 |
| 2 | Station 2 | 0.108 | 0.322 | 0.739 | 0.279 | 6234 |
| | Station 28 | 0.094 | 0.357 | 0.751 | 0.258 | 1054 |
| | Station 30 | 0.098 | 0.301 | 0.737 | 0.229 | 5689 |
| 3 | Station 21 | 0.078 | 0.295 | 0.615 | 0.267 | 5443 |
| | Station 73 | 0.111 | 0.300 | 0.532 | 0.214 | 7604 |
| | Station 74 | 0.087 | 0.288 | 0.405 | 0.172 | 8529 |
| 4 | Station 25 | 0.101 | 0.340 | 0.738 | 0.339 | 5824 |
| | Station 66 | 0.107 | 0.342 | 0.589 | 0.238 | 6584 |
| | Station 71 | 0.114 | 0.334 | 0.746 | 0.222 | 3784 |
| 5 | Station 43 | 0.070 | 0.271 | 0.545 | 0.200 | 1782 |
| | Station 76 | 0.068 | 0.242 | 0.465 | 0.202 | 3616 |
| | Station 94 | 0.085 | 0.208 | 0.487 | 0.215 | 3123 |
| 6 | Station 22 | 0.067 | 0.213 | 0.405 | 0.279 | 1666 |
| | Station 23 | 0.072 | 0.241 | 0.429 | 0.270 | 3217 |
| | Station 26 | 0.079 | 0.175 | 0.394 | 0.289 | 1811 |

steering and single axles are similar. This means that it is possible to extend the axle load spectra of available WIM stations to adjacent sites where WIM stations are not installed, especially for the load spectra of steering axle and single axle. But this interpolation should be made judiciously according to results from these adjacent WIM stations. These LSCs/Truck Factors can probably be improved by inclusion of additional information such as area economic factors, local population, and highway direction.

Table 23 shows that AADTT varies widely in each group and therefore the interpolation of AADTT is not useful. However, this value can be obtained from the *Annual Average Daily Truck Traffic on the California State Highway System* compiled by Traffic and Vehicle Data Systems, which can be obtained from Caltrans *(6)*.

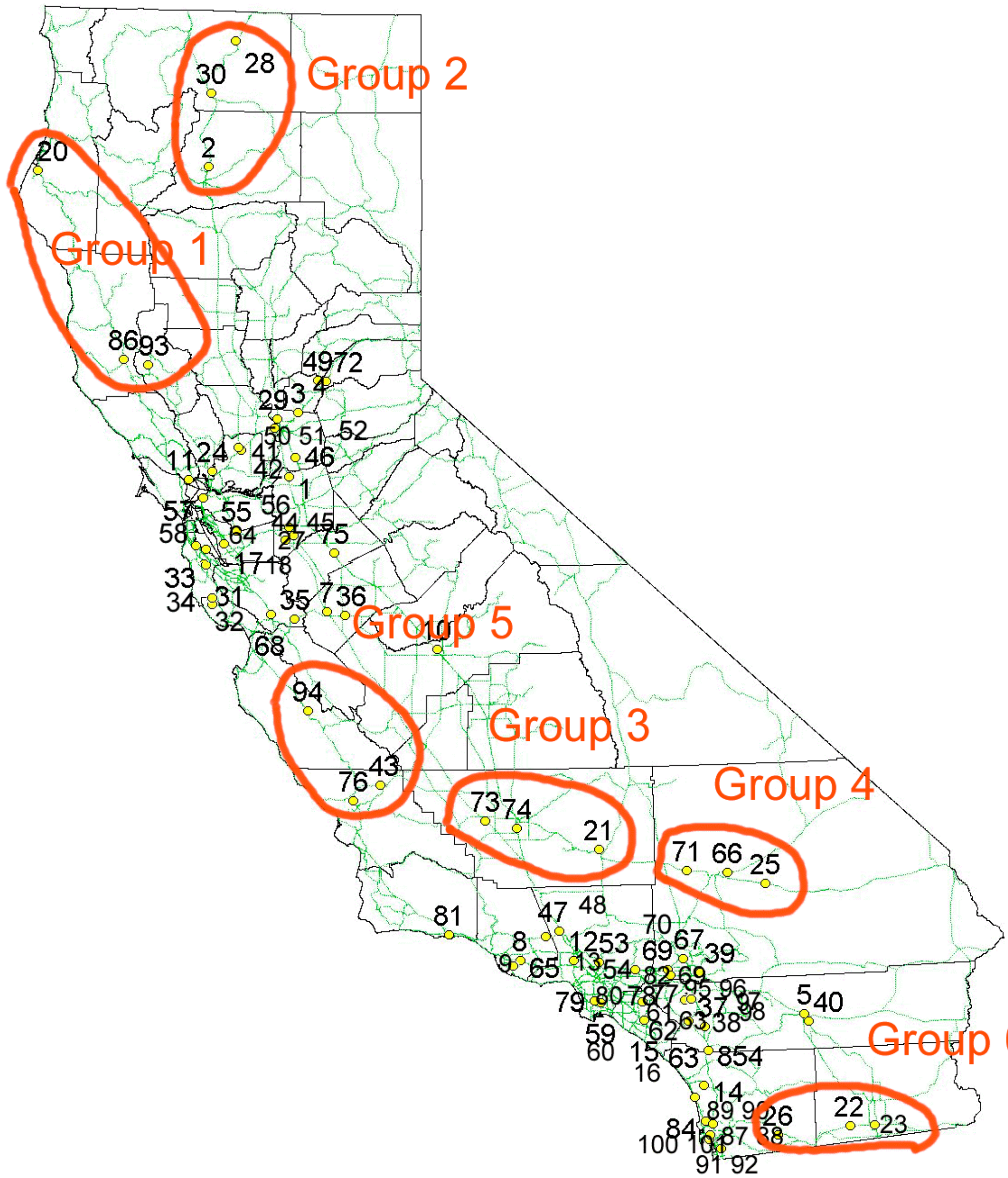



**Figure 75. The six WIM station groups used in comparison.**

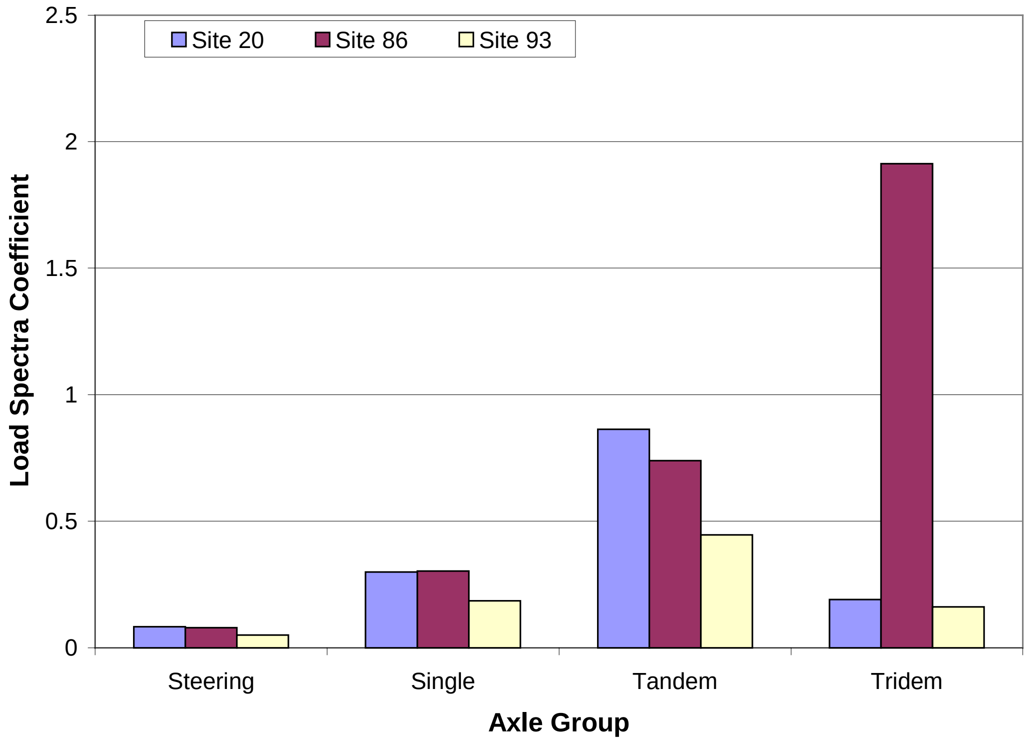



**Figure 76. Comparison of load spectra coefficients from Group 1.**

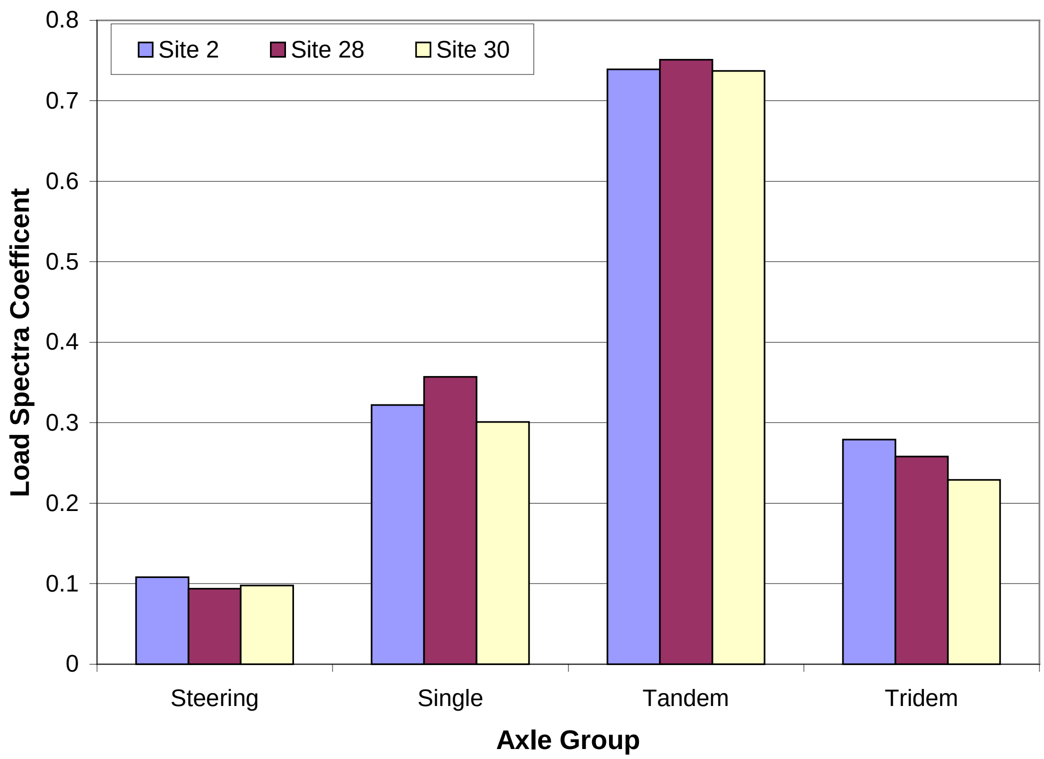



**Figure 77. Comparison of load spectra coefficients from Group 2.**

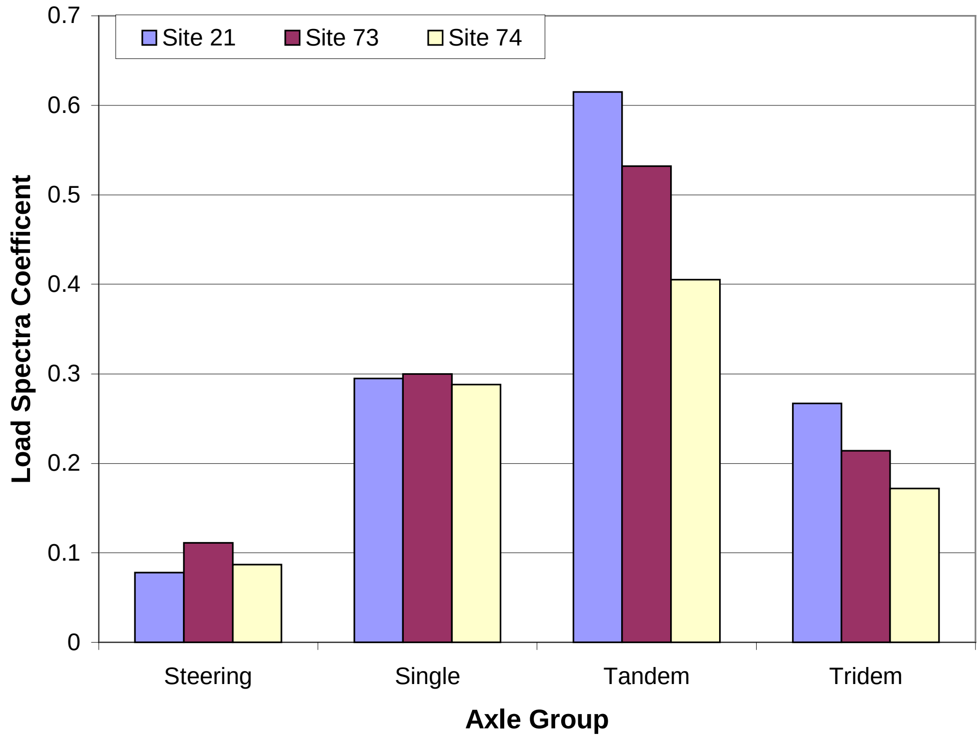



**Figure 78. Comparison of load spectra coefficients from Group 3.**

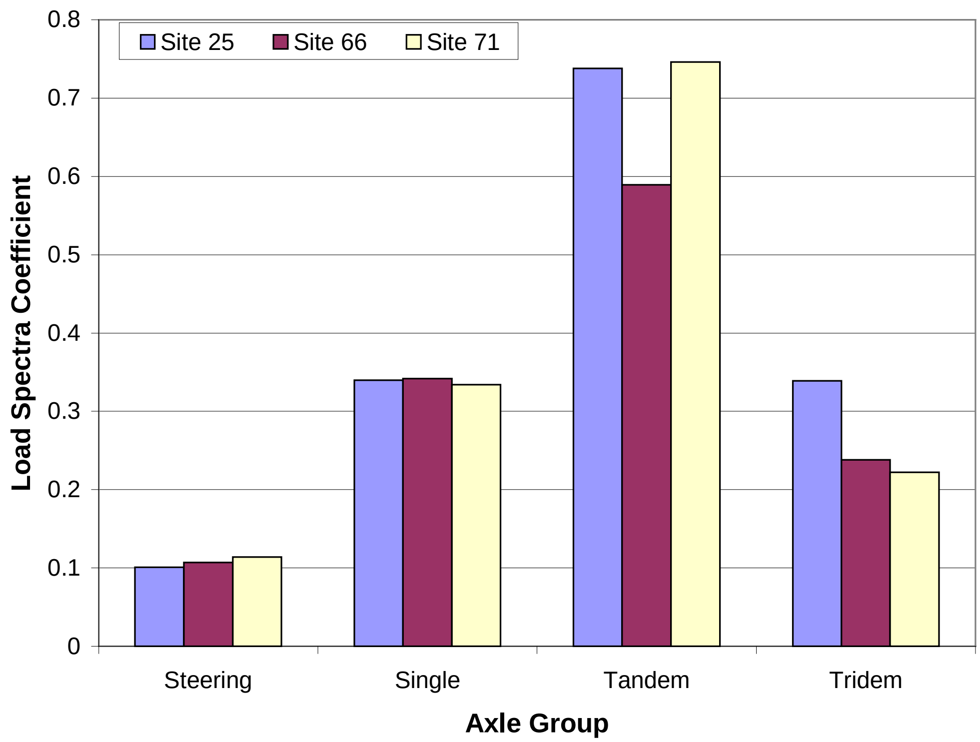



**Figure 79. Comparison of load spectra coefficients from Group 4.**

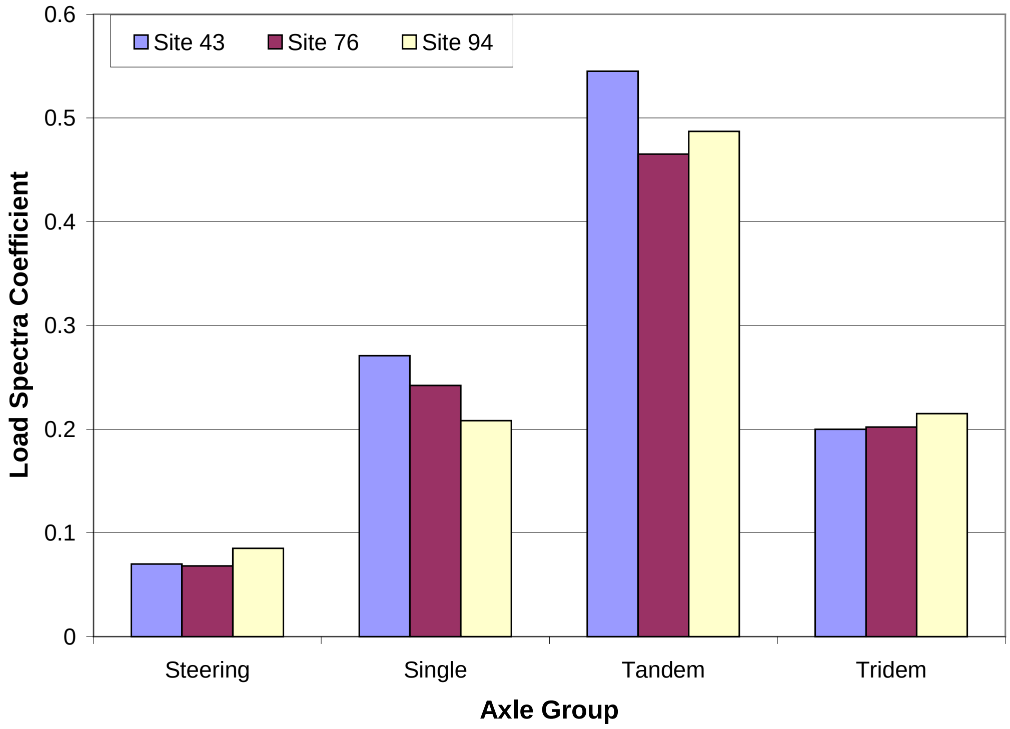



**Figure 80. Comparison of load spectra coefficients from Group 5.**

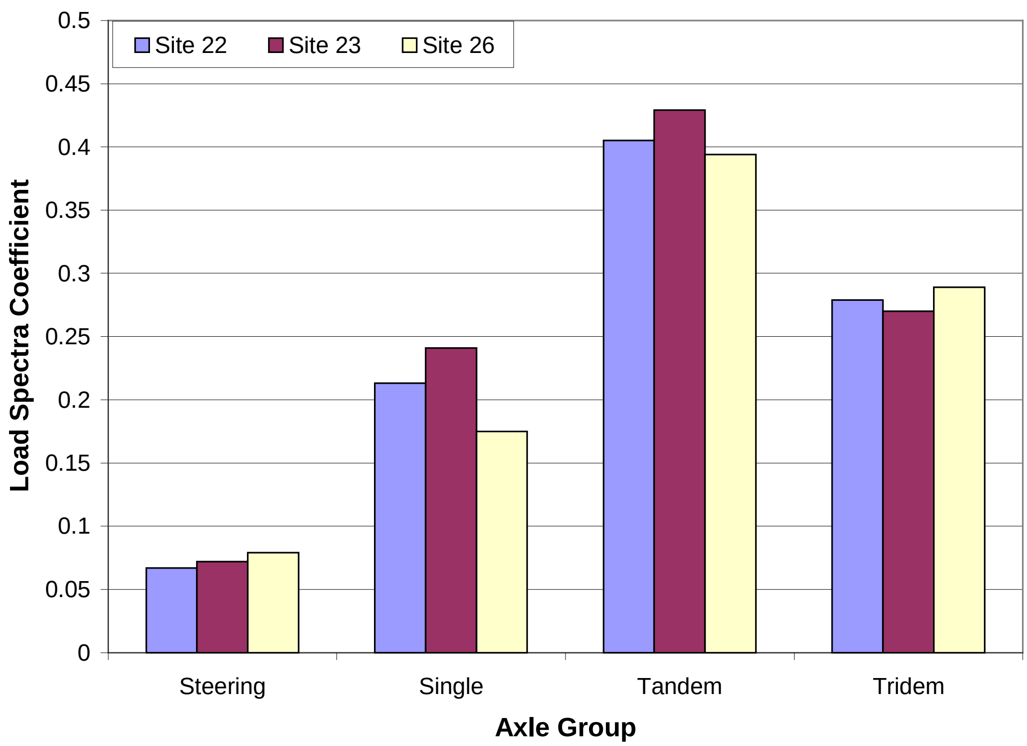



**Figure 81. Comparison of load spectra coefficients from Group 6.**

## 6.0 CONCLUSIONS AND RECOMMENDATIONS

The complete truck traffic data collected from more than 100 WIM stations on the California state highway network since 1991 were sampled and used in this analysis. For sites where WIM stations were installed in the late 1990s, conclusions on truck traffic growth trend may not be reliable because of the small sample size. The computer program developed in this project to perform the analyses included in this report can accommodate more data collected in the future, which will make future analysis results more accurate.

### 6.1 Summary

The database of Weigh-In-Motion (WIM) axle load and truck traffic count measurements collected by the Caltrans from early 1991 through 2001 was converted from binary format, cleaned, and organized into an accessible relational database. This database includes data from more than 100 stations that were installed during that time.

Once the database was set up, a research-grade computer program was developed to analyze the massive amount of data with the goal of answering specific questions of interest for pavement design and management. Some questions were analyzed using the full data set from all WIM stations, although only data from one week per month were analyzed because of the time required to perform the analyses on the complete data set. Other questions were analyzed using only data from six representative WIM stations, again because of the time required to perform the analyses on the huge database.

The analyses performed for this study and included in this report are by no means exhaustive, and were intended to answer a few important questions as well as to demonstrate the quality and potential uses of the data included in the database. For sites where WIM stations were installed in the late 1990s, conclusions regarding truck traffic growth trends may not be reliable because of the small sample size. The computer program developed for this project can accommodate more data collected in the future.

## 6.2 Conclusions Regarding Axle Load Spectra

### 6.2.1 Analysis of the Full Data Set

The following conclusions were drawn from analysis of the full data set of all WIM stations across the time they were in operation:

1. A very small number of extremely high axle loads in the database are probably due to error in the equipment and were not included in the analyses. A very few of these loads may be real, and may represent permitted as well as illegal overloads.
2. Across all truck types operating in California:
   a. nearly all steering axle loads are less than 90 kN,
   b. nearly all of the single axle loads are less than 110 kN,
   c. nearly all of the tandem axle loads are less than 210 kN, and
   d. nearly all of the tridem axle loads are less than 260 kN.

   The legal load limit for single axle loads is 89 kN, and the legal limit for tandem axle loads is 151 kN. It is clear that there is a small, but significant portion of the axle loads that are over the legal limit.
3. All four axle types had a bimodal pattern of load spectra. The reasons for these bimodal patterns varied. For tandem axles, the bimodal pattern is due to the empty and full loading status of Truck Type 9 (the predominant truck type, consisting of a tractor with a tandem axle and a single semi-trailer with a tandem axle [3S2]). For

the other three axle types, the bimodal pattern is caused by the different loading levels associated with the various truck types.

4. Axle load spectra are heavier at night than in the daytime. Two possible reasons for this are that it is more efficient to operate when car traffic is lighter, and that heavier and potentially overloaded trucks operate more at night when more Highway Patrol load enforcement stations are closed.
5. Axle load spectra show very little seasonal variation. This contradicts the assumption that truck loads are significantly influenced by agricultural hauling during the harvest season (fall).
6. Axle load spectra are much higher in the Central Valley than in the Bay Area and Southern California, particularly for tandem axles. Axle load spectra in the Southern California are higher than those in the Bay Area.
7. Axle load spectra are much higher at rural WIM stations compared to urban WIM stations. This is likely due to the presence of more long-haul trucking at rural WIM stations, and more short-haul, less-than-full-load trucking in urban areas.
8. The predominant truck types across the state are Truck Type 9, accounting for 49 percent of all trucks, and Truck Type 5 (two-axle truck with dual tires at the back [2D]), accounting for 23 percent of all trucks. Truck Type 11 (tractor with single axle, one semi-trailer with a single axle and another trailer with single axles [2S12]) accounted for 8 percent of all trucks, and the rest of the truck types together accounted for the remaining 20 percent of all trucks.
9. The proportion of larger truck types, which would more typically be used for long-haul trucking, increases at night, with Truck Type 9 accounting for 56 percent of all

trucks at night. The proportion of smaller truck types, such as Truck Type 5, that would more typically be used for shorter deliveries decreases at night.

10. Truck type distribution does not change much across the seasons.

### 6.2.2 Conclusions from Analysis of the Six Representative WIM Sites: Axle Load Spectra, Truck Traffic Volumes, and Equivalent Single Axle Loads (ESALs)

The following conclusions were drawn from a set of six WIM sites selected to represent different combinations of direction (east/westbound versus north/southbound), region (Bay Area, Central Valley and Southern California), and urban versus rural:

11. Steering axle load spectra were similar across all six stations.
12. Axle load spectra for other axle types varied considerably across the six stations.
13. Axle load spectra were similar for both directions.
14. Axle load spectra were much heavier in the outside lanes.
15. Axle load spectra for steering and single axles remained fairly constant across the years. Axle load spectra for tandem and tridem axles exhibited yearly variation.
16. The right-side (outside) ends of each axle were heavier on average than the left-side ends, which can probably be attributed to the transverse slope of most facilities. The difference was typically less than 3 percent on average, which indicates that it is probably not significant enough to include in pavement design calculations.
17. For facilities with two lanes in each direction, more than 90 of the truck traffic traveled in the outside lane. For facilities with three or more lanes in each direction, more than 90 percent of the truck traffic traveled in the two outside lanes. The distribution of trucks across those two outside lanes varied across the six sites.

18. All six sites showed growth of Average Annual Daily Truck Traffic (AADTT), with growth rates ranging between 2 and 5 percent.
19. The growth rates for different truck types varied considerably.
20. Equivalent Single Axle Loads (ESAL) were calculated for each site and growth trends were estimated for ESALs. Equivalent single axle loads were calculated using the Caltrans exponential function with a 4.2 exponent. However, the growth trends were erratic, primarily because a few very heavy and possibly erroneously measured loads significantly influenced the ESAL calculations.

#### 6.2.3 Conclusions from Analysis of the Six Representative WIM Sites: Truck Speeds and Gross Vehicle Weights

21. Truck speeds typically fall within the range of 80 to 120 km/h (50 to 75 mph).
22. Truck speeds vary by truck type.
23. Examination of the truck speed distributions at Station 2 on Interstate 5 in Redding indicated that many truck types have a bimodal speed distribution, which may reflect loaded trucks traveling more slowly than unloaded trucks.
24. Gross Vehicle Weights (GVW) generally did not grow across the six sites. Annual growth rates of GVW typically ranged between –1 and +2 percent. This conclusion combined with conclusion 18, indicates that there were increasing numbers of trucks using California highways in the 1990s, but the trucks were generally not carrying heavier loads.

### 6.3 Conclusions Regarding Extrapolation of WIM Data to Adjacent Sites

The following conclusions are drawn from comparison of data from adjacent WIM sites:

25. Truck traffic volumes (AADTT) cannot be extrapolated from one site to another, and must be measured for each site.
26. Axle load spectra, as characterized by Load Spectra Coefficients ([LSC] similar to truck factors) can generally be extrapolated for steering and single axles to adjacent sites. Differences in LSC for tandem and tridem axles are larger and more common among adjacent sites, which means that extrapolation to adjacent sites for design is more risky. The effect of extrapolation of axle load spectra to adjacent sites was not quantified for different pavement types.

## 6.4 Recommendations for the Use of the WIM Database

1. <u>It is recommended that Caltrans begin to use the WIM database for pavement design and management.</u> Caltrans does not currently use its WIM data for pavement design and management. Traffic indices (summations of ESALs in the design period) for pavement designs are currently estimated by a variety of means, and are often considered to include gross over- and under-estimates. Anecdotal checks performed by Caltrans Traffic Operations between WIM truck traffic counts and Traffic Index calculations, and design estimates used in the districts have shown some large discrepancies.

   Truck volume estimates and ESAL estimates in the Caltrans Pavement Management System database (*7*) are also suspected of containing significant numbers of errors or poor relation to actual traffic, based on comparison of pavement performance and traffic levels.

   The data in the WIM database appears to be of much higher quality than the data currently being used for pavement design and management. The primary problem will be estimation of truck traffic volumes and load spectra coefficients for locations that are not equipped with WIMs.  A standard method needs to be developed for filtering out the few super-heavy overloads that are probably errors, and that can skew Traffic Index estimates using the WIM data.

2. It is recommended that further research be conducted to improve methods of estimation for locations that are not equipped with WIMs.  This research should develop improved, statistically based estimation methods for truck traffic volumes (AADTT) and Load Spectra Coefficients (LSC).  The results should include procedures for short-term measurements on non-WIM equipped locations, and verification of the risk associated with errors in these estimation methods for different pavement types.

## 6.5 Recommendations for Improving the Capability of the WIM Data Collection System

3. It is recommended that the two WIM vendors that Caltrans uses, IRD Inc. and PAT Traffic Control Corporation, be contacted to find an improved method for identifying and modifying erroneous records that appear as super-heavy overloads.
4. It is recommended that Caltrans continue to collect WIM data, and that Caltrans Traffic Operations assume responsibility for expanding and maintaining the WIM database that the University of California has created.  This database can be of great value to Design, Maintenance, and Materials for the design and maintenance of pavements.  The WIM database can also be used by Traffic Operations for the development of Traffic Management Plans, because it provides very good estimates of truck traffic volume that can augment loop detector data.  If this recommendation is implemented, the University of California and Caltrans Design, Maintenance, and

Materials can work with Traffic Operations in the future to increase the accessibility of the WIM database to Caltrans engineers, and the ability to use it for analysis.

5. It is recommended that adequate resources be provided to perform quality assurance checks at all WIM stations and to maintain them as needed. The high quality of the WIM data is dependent upon the WIM devices being routinely checked, calibrated, and maintained.

## 7.0 REFERENCES


1. Portland Cement Association. *Thickness Design for Concrete Pavement*. Portland Cement Association, Illinois, 1966.

2. Personal conversation with developers of 2002 AASHTO Test Methods, currently in process of writing.

3. Lee, C. E. and N. Souny-Slitine. *Final Research Findings on Traffic-Load Forecasting Using Weigh-in-Motion Data.* Research Report 987-7, Center for Transportation Research, Bureau of Engineering Research, the University of Texas at Austin, September 1998.

4. Hajek, J. J. and O. I. Selezneva. *Estimating Cumulative Traffic Loads, Final Report for Phase 1.* FHWA-RD-00-054, Federal Highway Administration, July 2000.

5. Hajek, J. .J. "General Axle Load Equivalency Factors." *Transportation Research Board Record 1482*, Transportation Research Board, National Research Council, Washington, DC, 1995, pp. 57-68.

6. California Department of Transportation. *Annual Average Daily Truck Traffic on the California State Highway System.* State of California, Business, Transportation and Housing Agency, Department of Transportation, 1998.

7. Lea, J. et al. *Datamining of the Caltrans PMS Database.* Draft report delivered to California Department of Transportation. Pavement Research Center, University of California. June 2002.

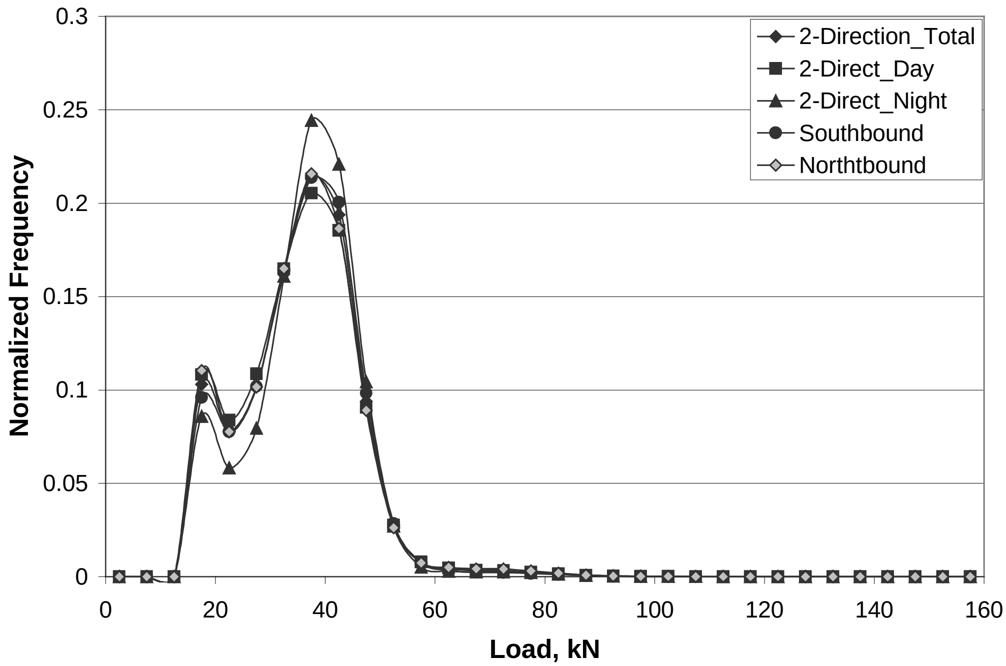
8. *Weigh in Motion Program*, Office Truck Services, Division of Traffic Operations, California Department of Transportation, September, 2002.

9. http://www.gis.ca.gov/meta.epl?data_title=Urban/Rural&catalog=casil&name=urbrura

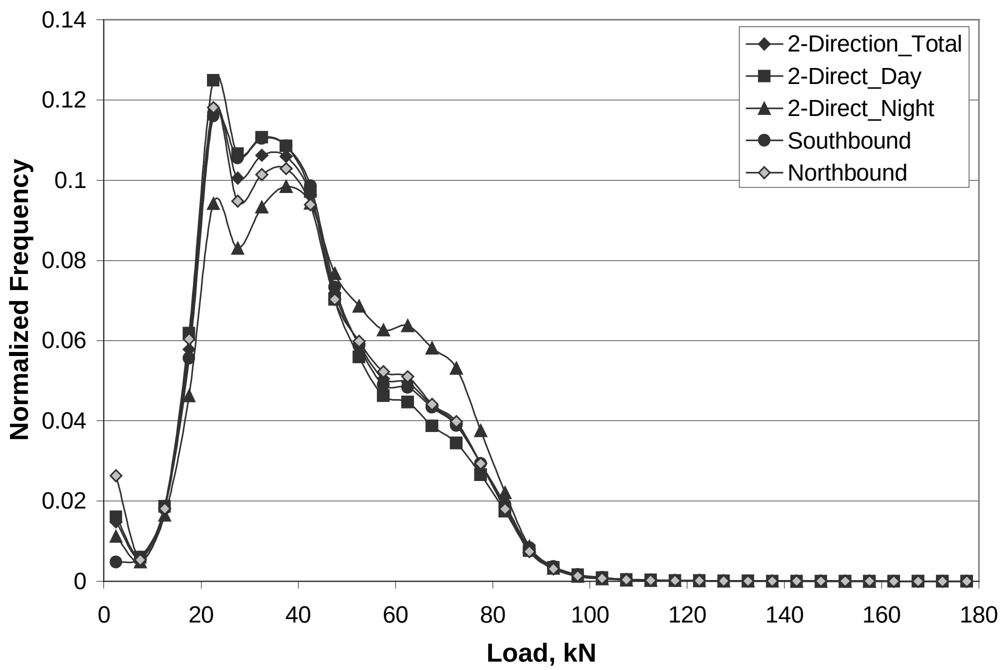
# APPENDIX A:

# AXLE LOAD SPECTRA IN TWO DIRECTIONS (WHOLE DAY, DAYTIME AND NIGHT) AND EACH DIRECTION AT 5 WIM SITES

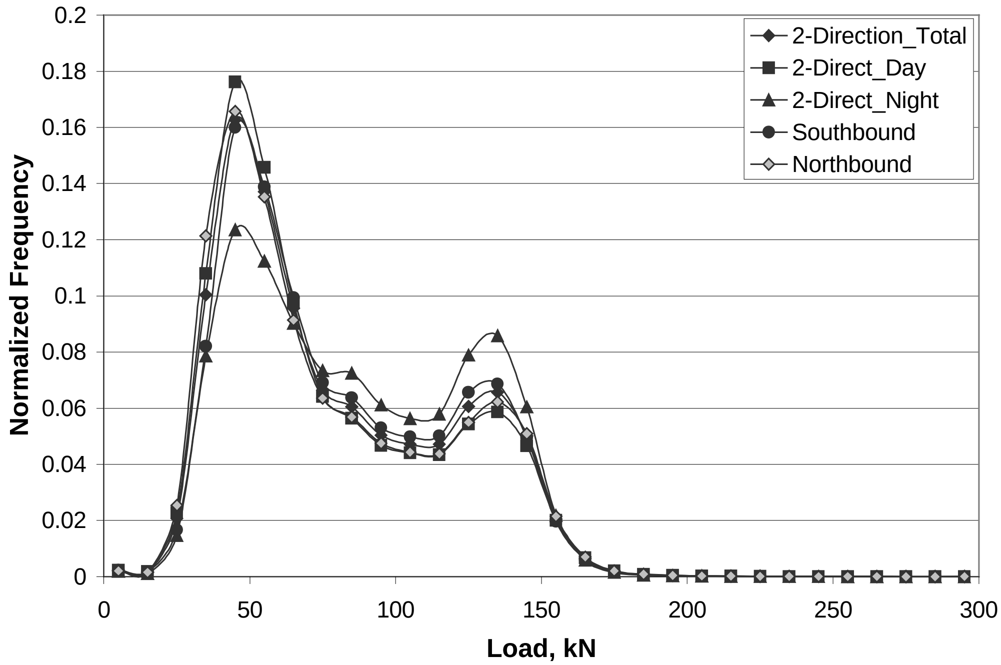
Stations 17 & 18 Hayward - Steering Axle Load Spectra



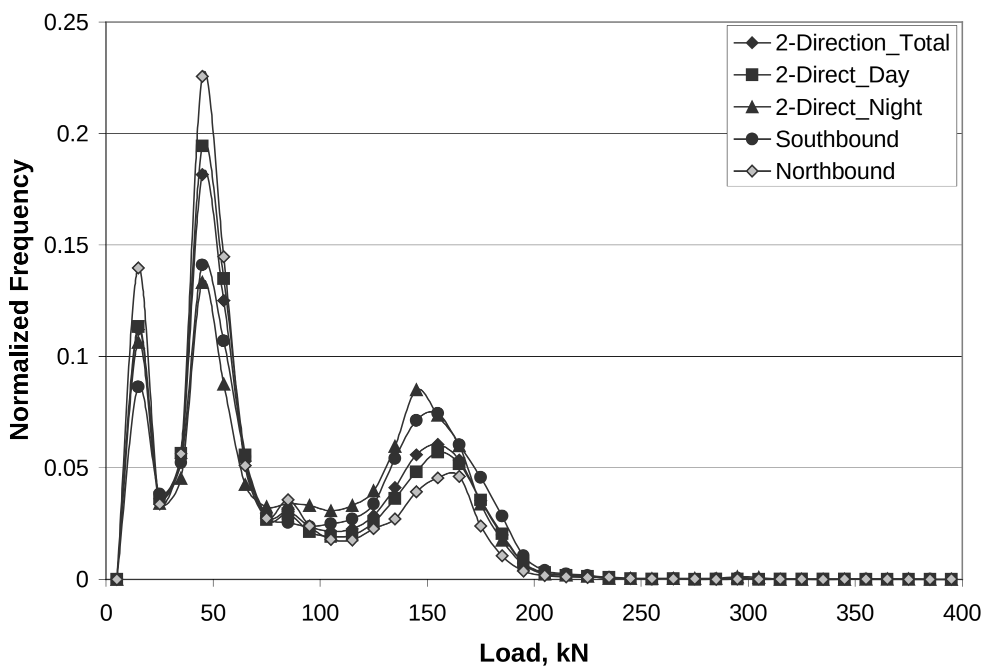

Stations 17 & 18 Hayward - Single Axle Load Spectra

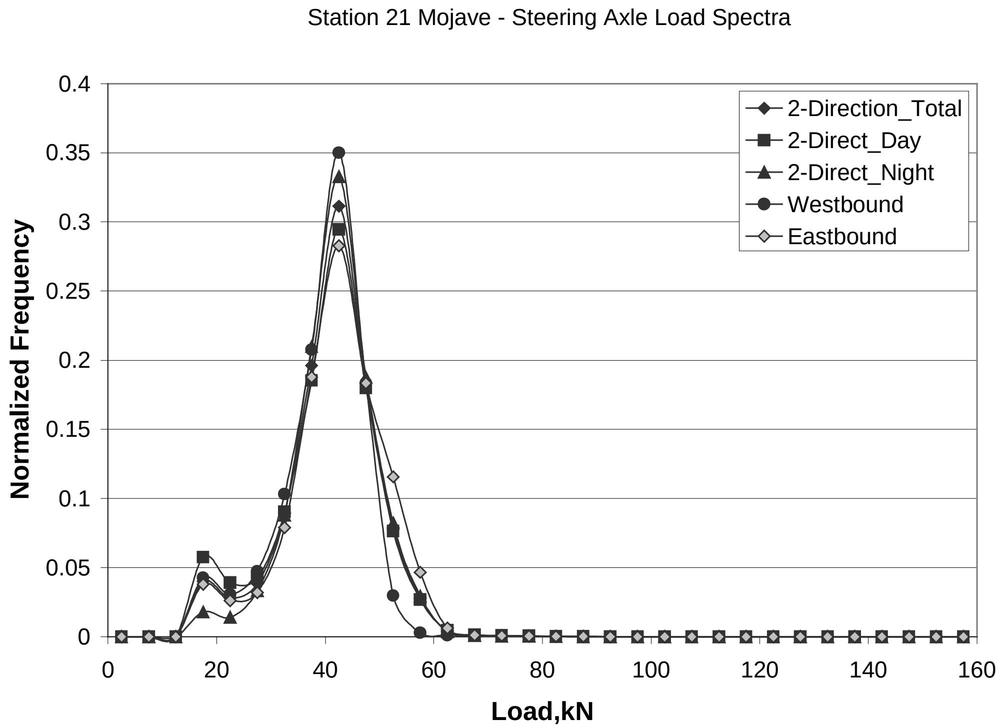


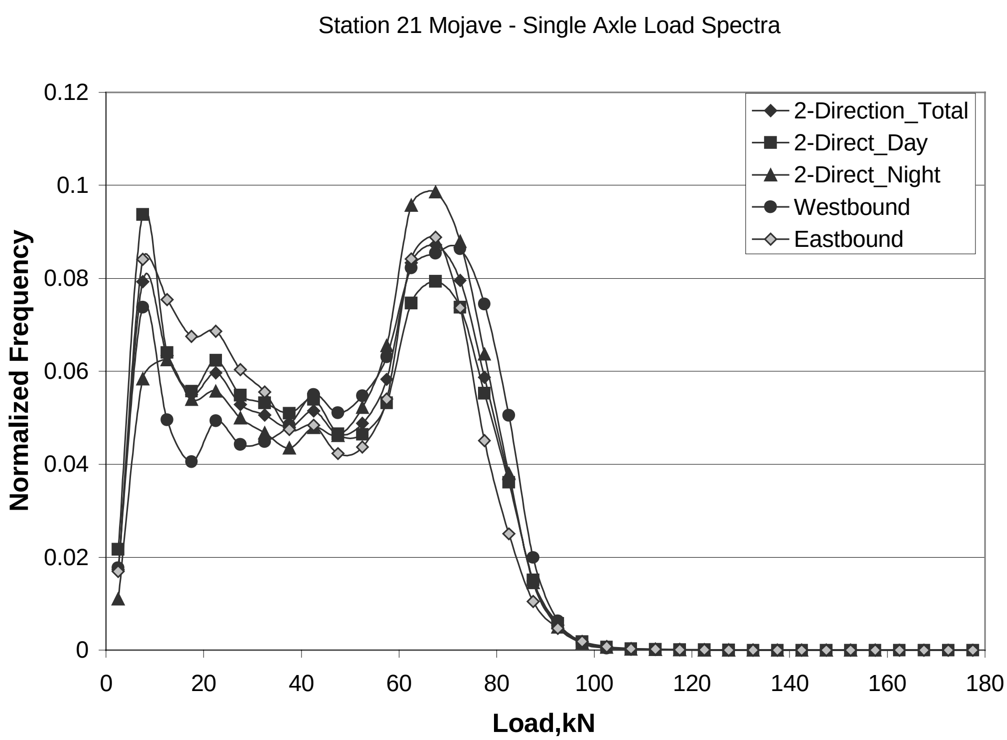
Stations 17 & 18 Hayward - Tandem Axle Load Spectra



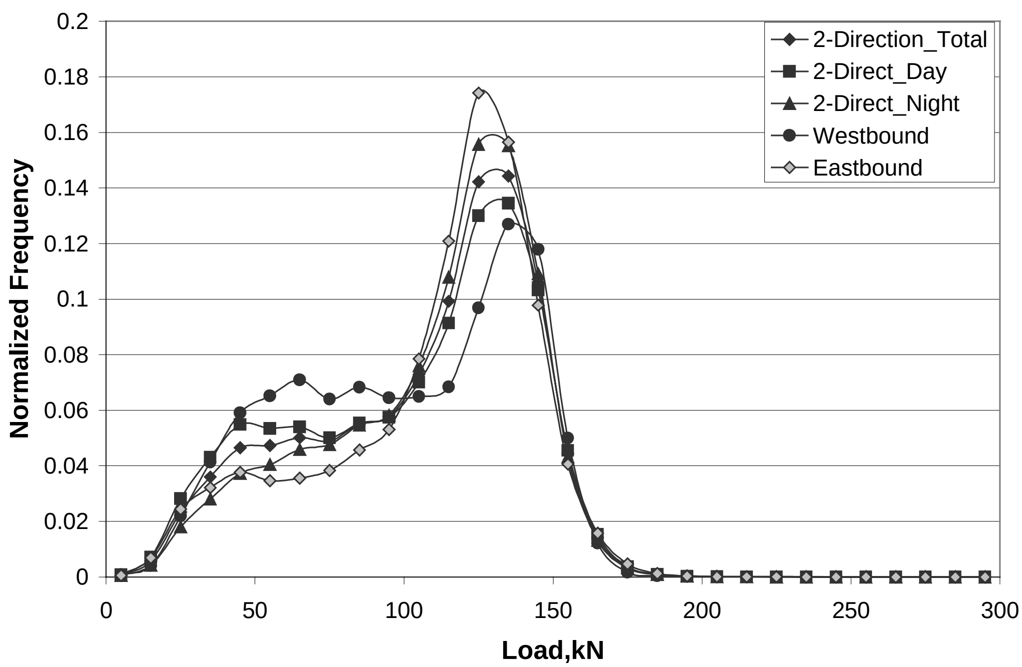

Stations 17 & 18 Hayward - Tridem Axle Load Spectra



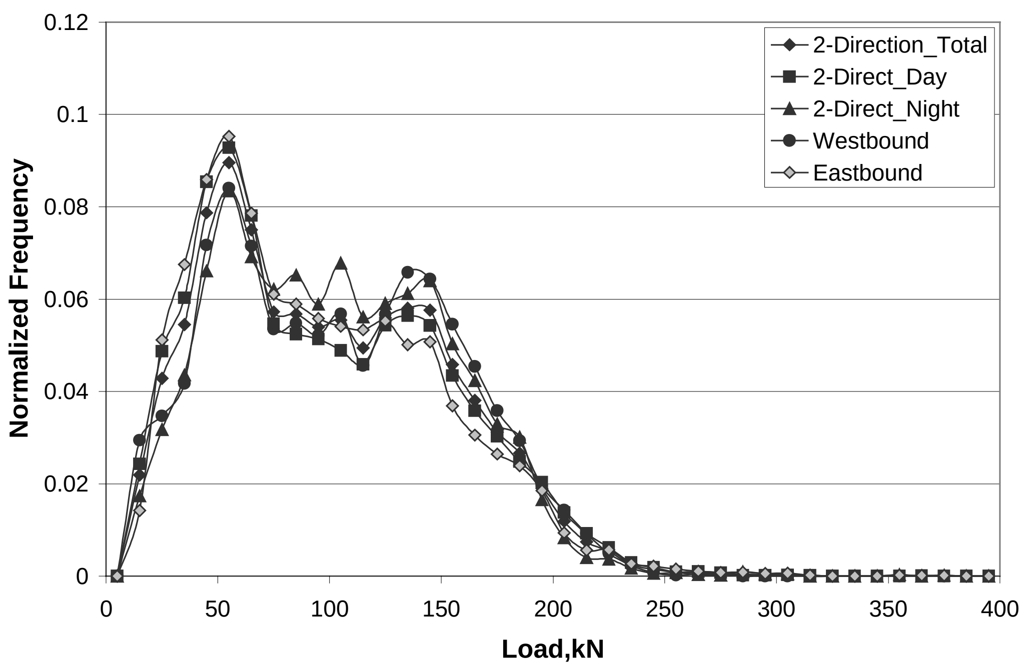

Station 21 Mojave - Steering Axle Load Spectra
Normalized Frequency
Load,kN
2-Direction_Total
2-Direct_Day
2-Direct_Night
Westbound
Eastbound
0
0.05
0.1
0.15
0.2
0.25
0.3
0.35
0.4
0
20
40
60
80
100
120
140
160


Station 21 Mojave - Single Axle Load Spectra
Normalized Frequency
Load,kN
2-Direction_Total
2-Direct_Day
2-Direct_Night
Westbound
Eastbound
0
0.02
0.04
0.06
0.08
0.1
0.12
0
20
40
60
80
100
120
140
160
180

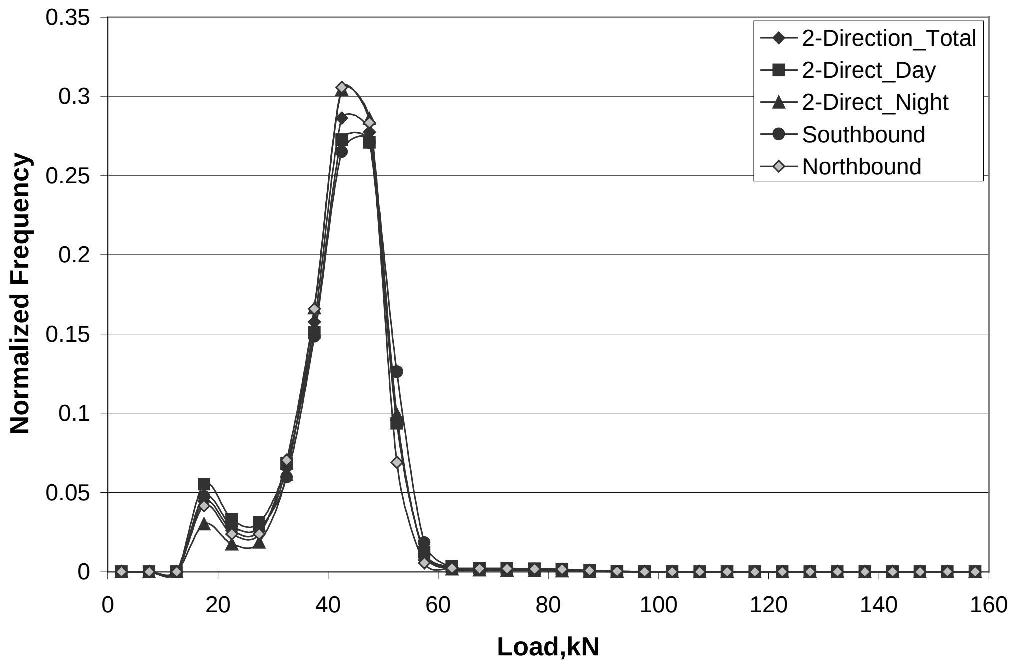
Station 21 Mojave - Tandem Axle Load Spectra



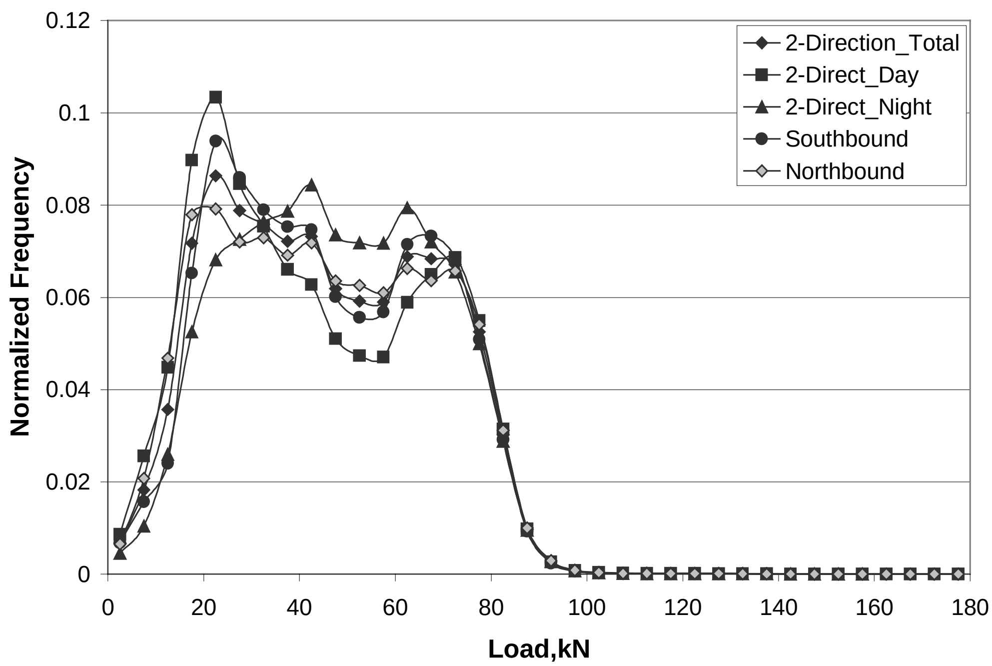

Station 21 Mojave - Tridem Axle Load Spectra



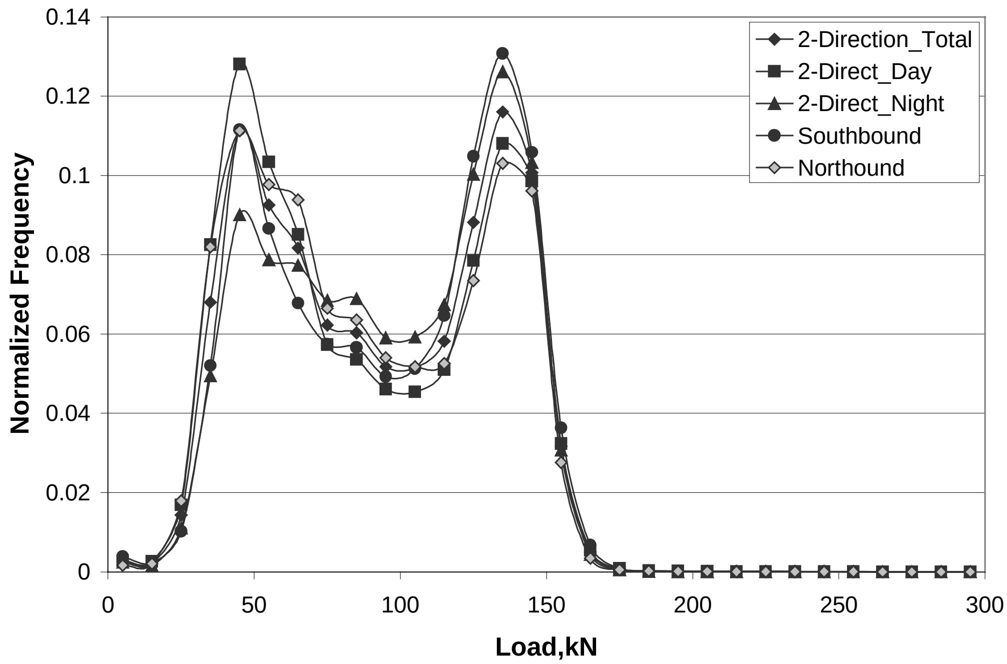
Stations 47 & 48 Castaic - Steering Axle Load Spectra



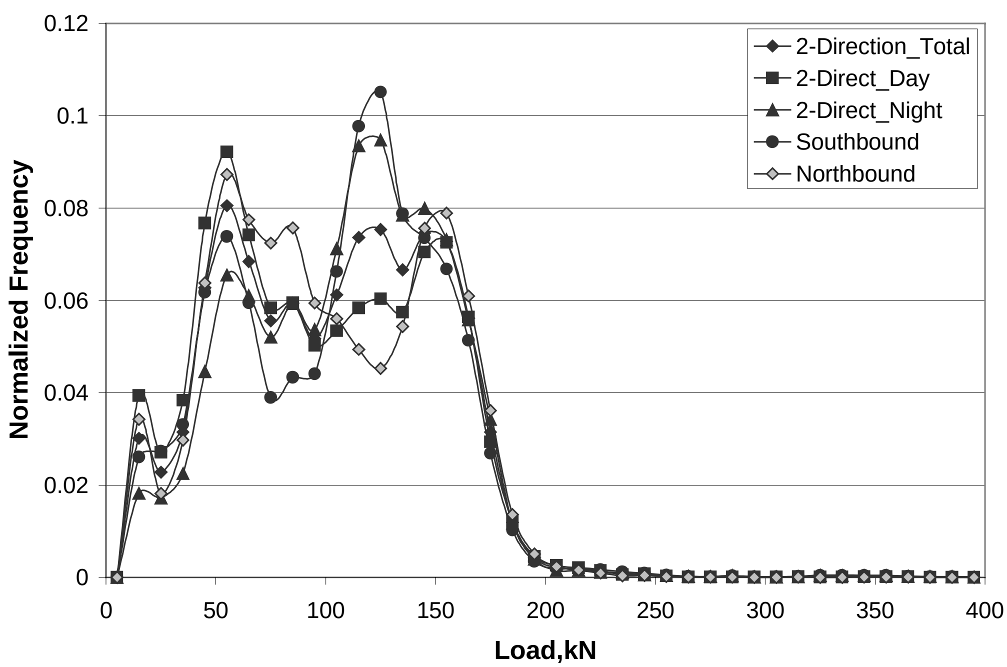

Stations 47 & 48 Castaic - Single Axle Load Spectra



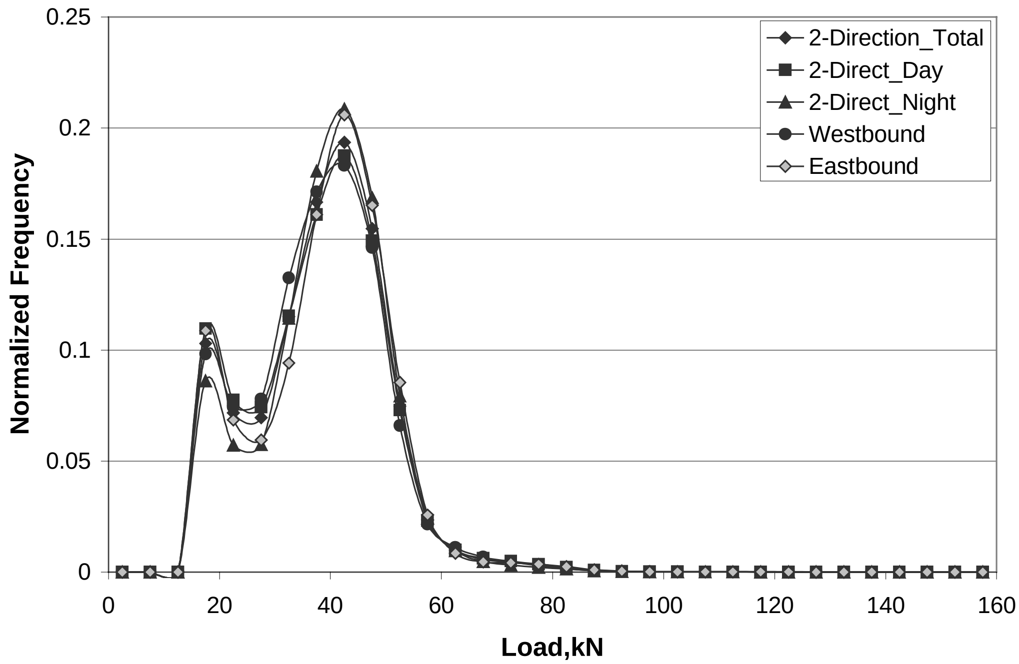
Stations 47 & 48 Castaic - Tandem Axle Load Spectra



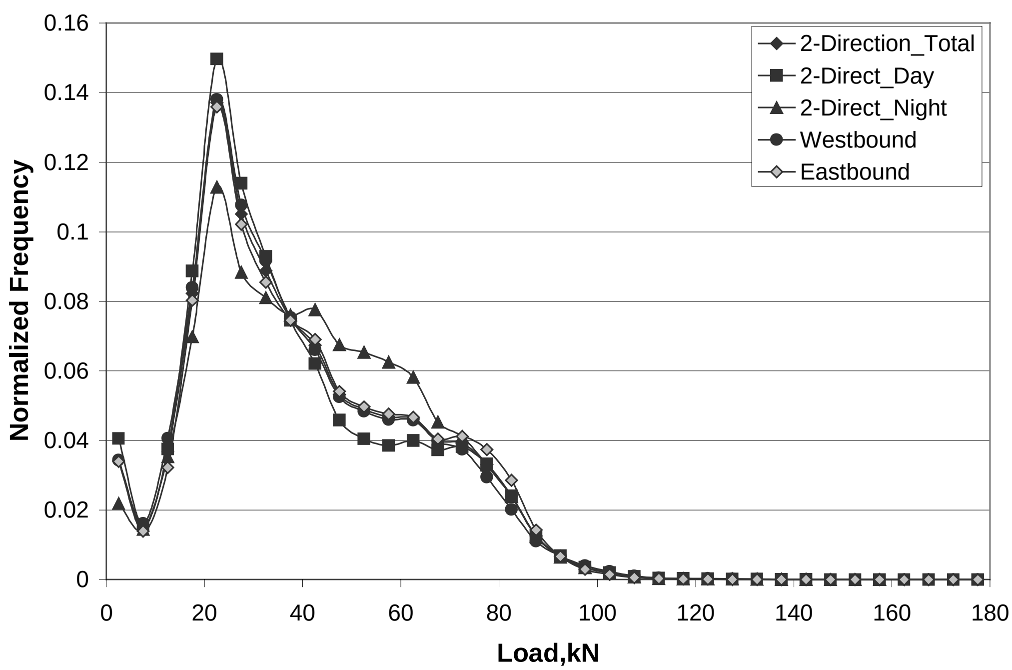

Stations 47 & 48 Castaic - Tridem Axle Load Spectra



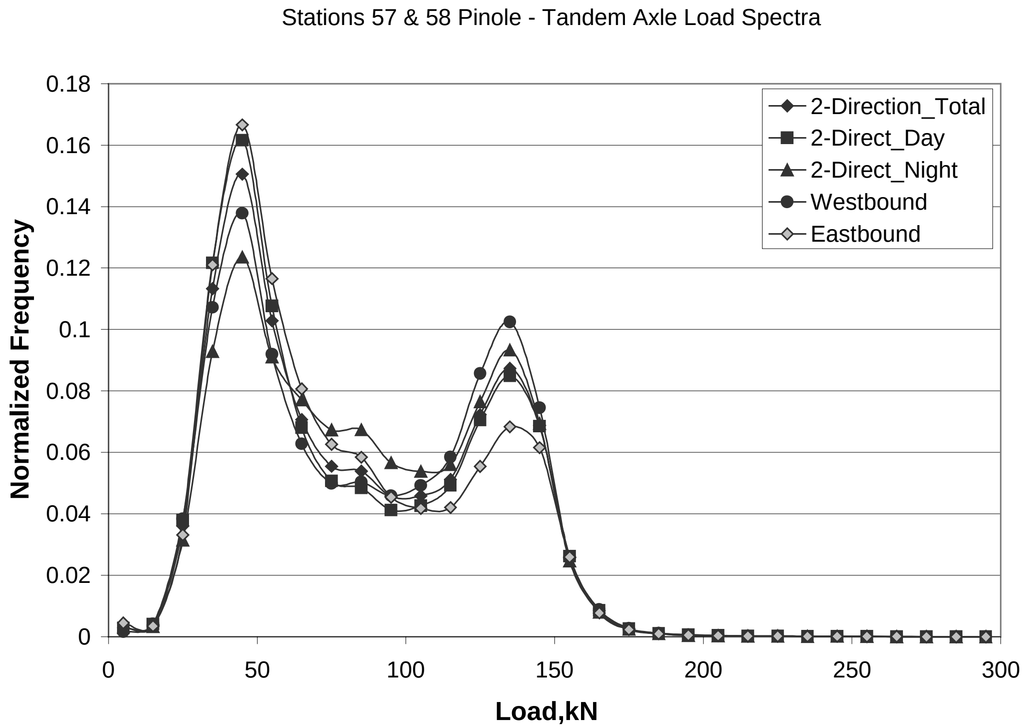
Stations 57 & 58 Pinole - Steering Axle Load Spectra

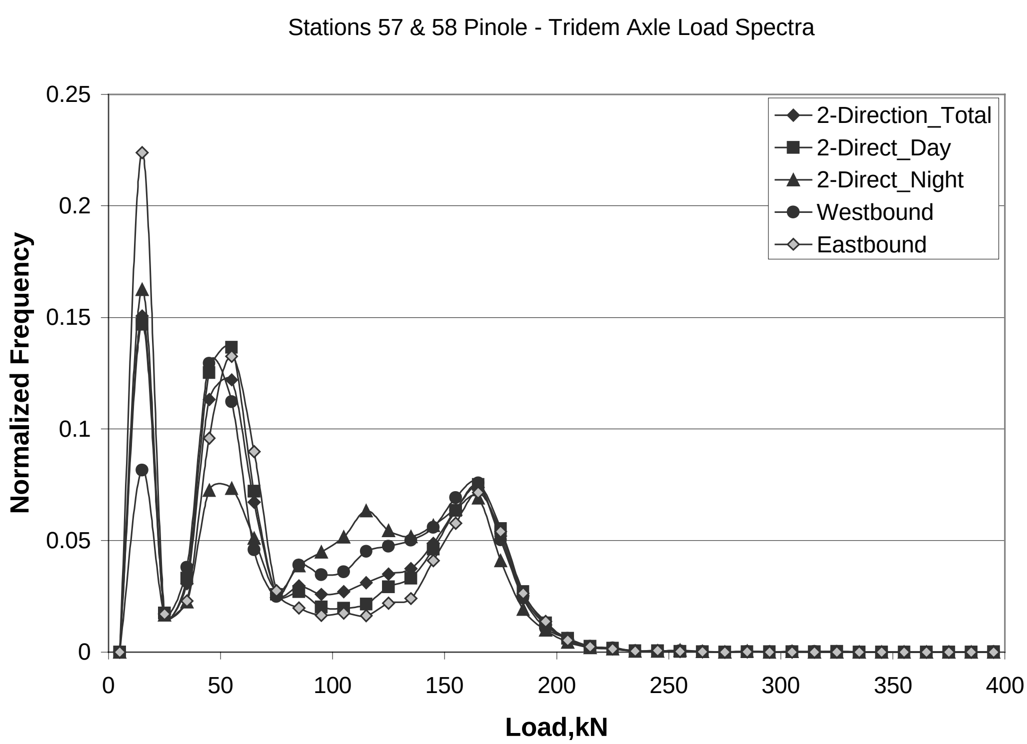


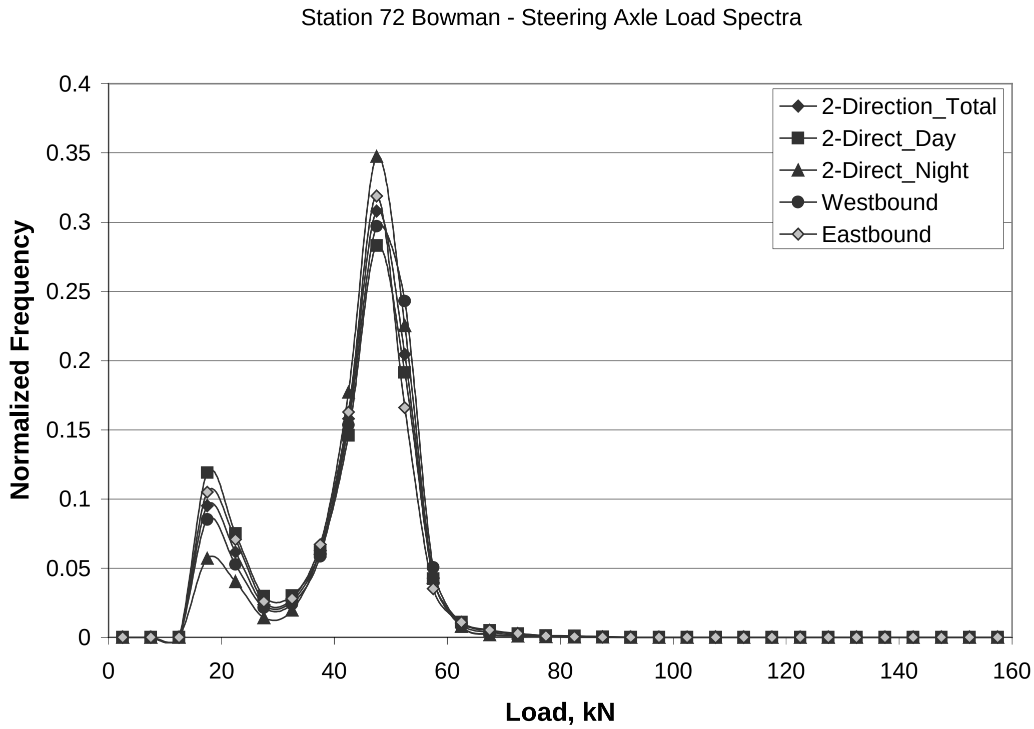

Stations 57 & 58 Pinole - Single Axle Load Spectra

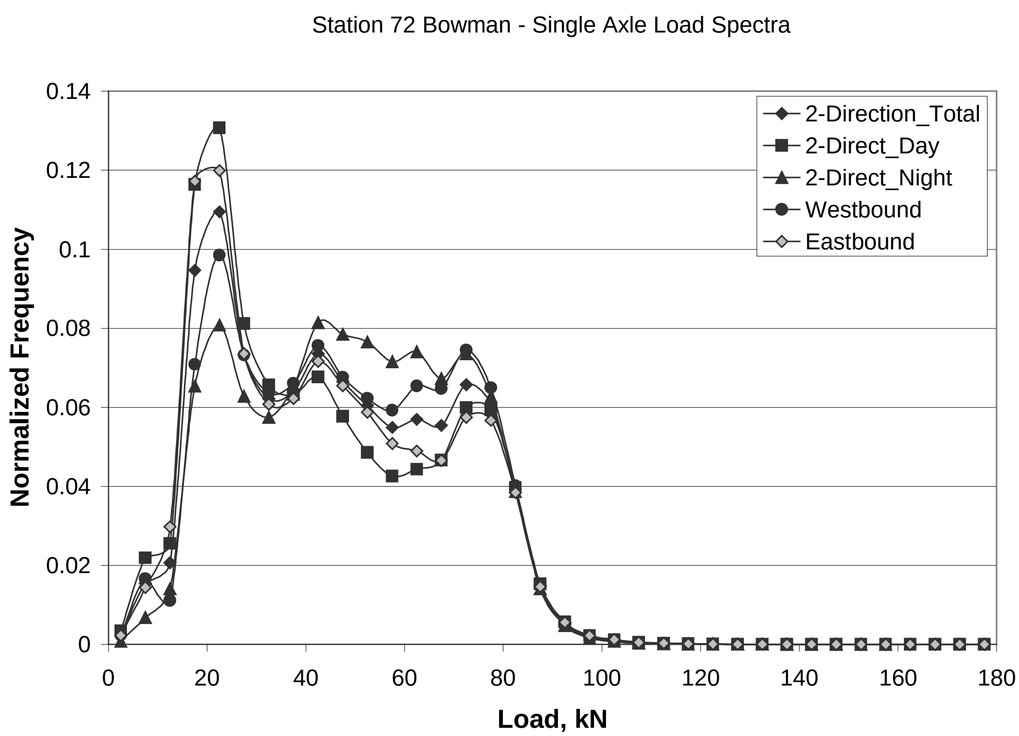



\

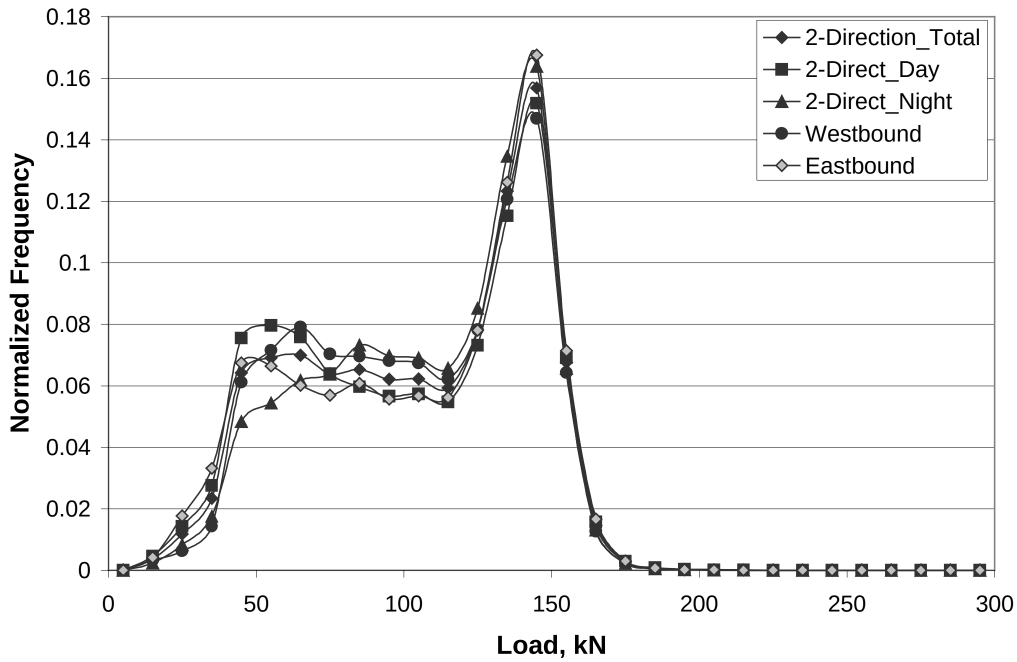

Stations 57 & 58 Pinole - Tandem Axle Load Spectra
Normalized Frequency
Load,kN
2-Direction_Total
2-Direct_Day
2-Direct_Night
Westbound
Eastbound


Stations 57 & 58 Pinole - Tridem Axle Load Spectra
Normalized Frequency
Load,kN
2-Direction_Total
2-Direct_Day
2-Direct_Night
Westbound
Eastbound

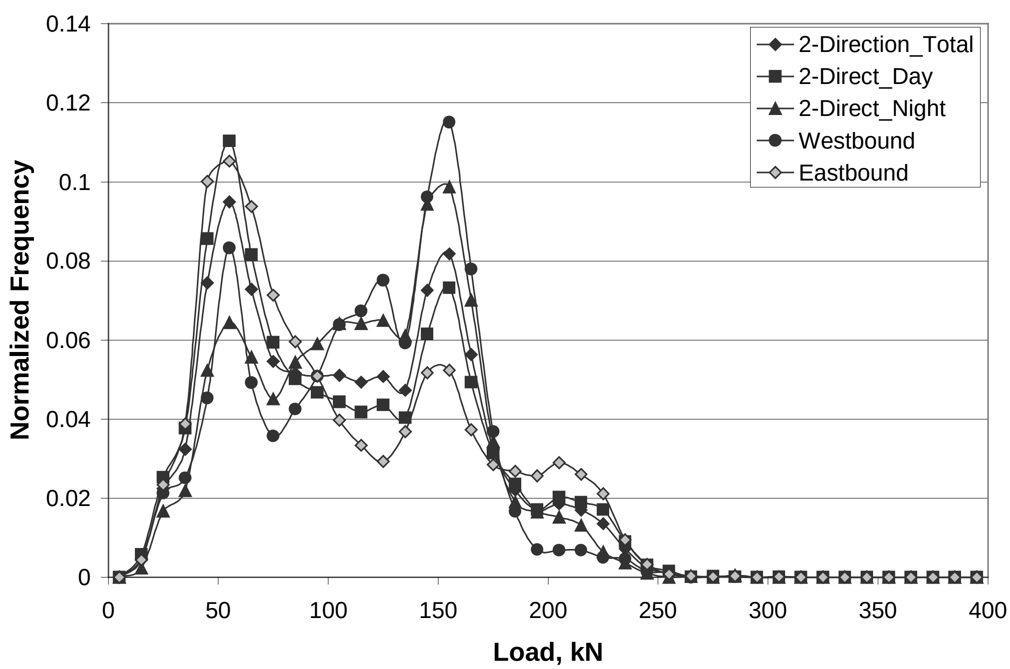

Station 72 Bowman - Steering Axle Load Spectra
Normalized Frequency
0.4
0.35
0.3
0.25
0.2
0.15
0.1
0.05
0
0
20
40
60
80
100
120
140
160
Load, kN
2-Direction_Total
2-Direct_Day
2-Direct_Night
Westbound
Eastbound


Station 72 Bowman - Single Axle Load Spectra
Normalized Frequency
0.14
0.12
0.1
0.08
0.06
0.04
0.02
0
0
20
40
60
80
100
120
140
160
180
Load, kN
2-Direction_Total
2-Direct_Day
2-Direct_Night
Westbound
Eastbound

Station 72 Bowman - Tandem Axle Load Spectra

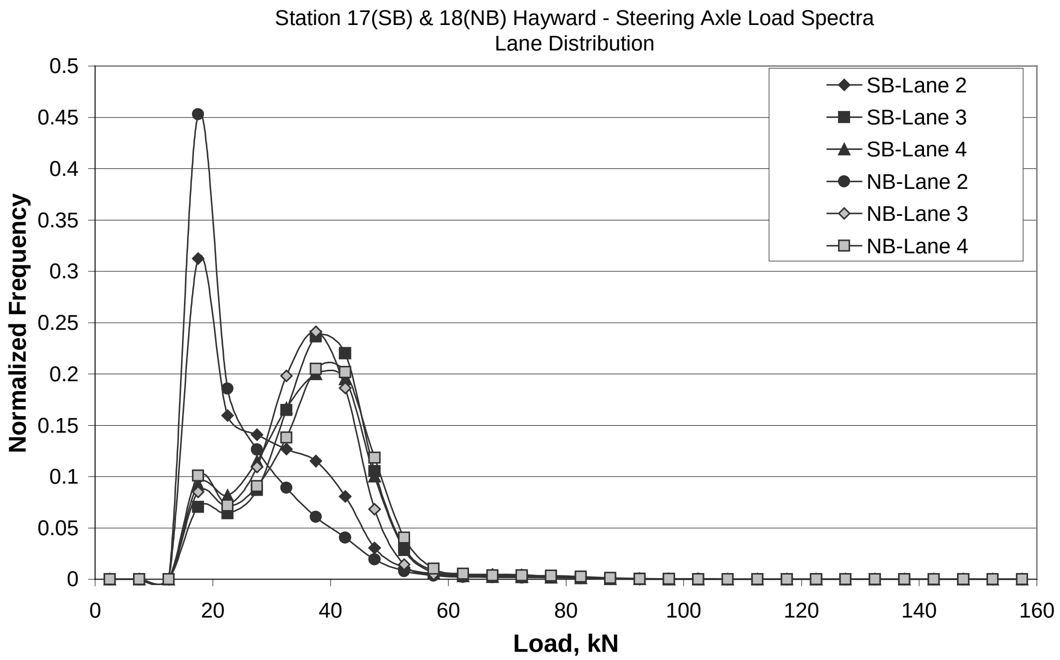



Station 72 Bowman - Tridem Axle Load Spectra

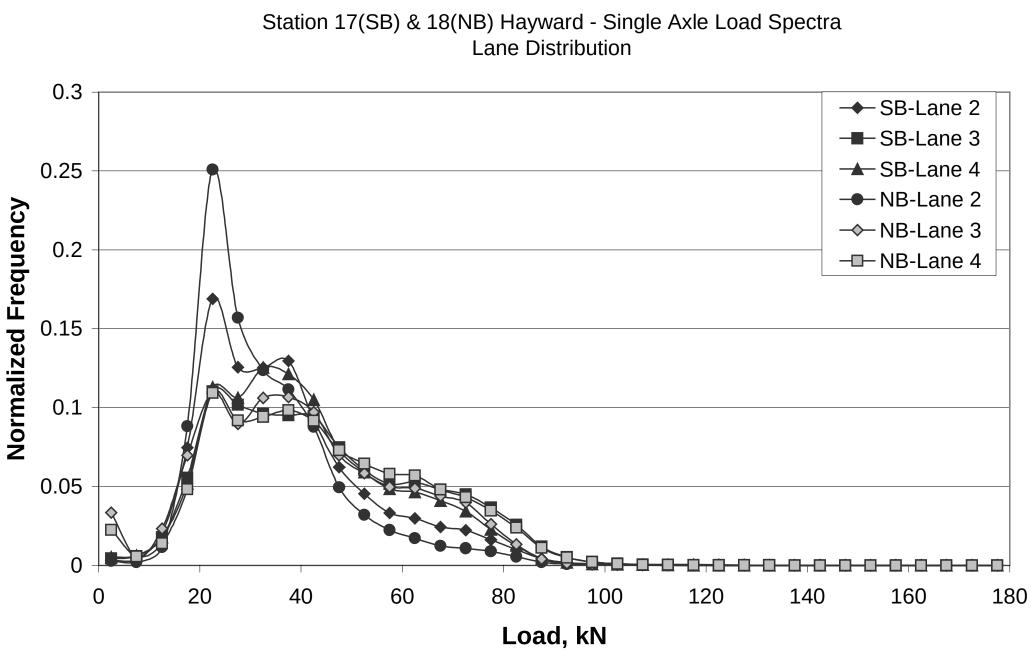


# APPENDIX B:

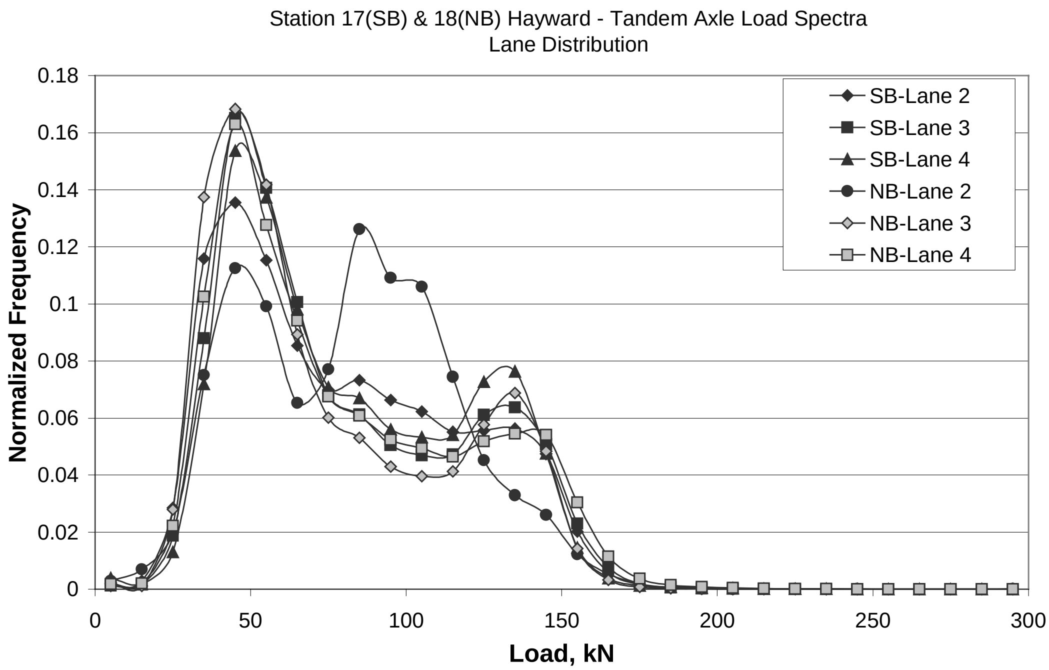
# LANEWISE AXLE LOAD SPECTRA AT 5 WIM SITES

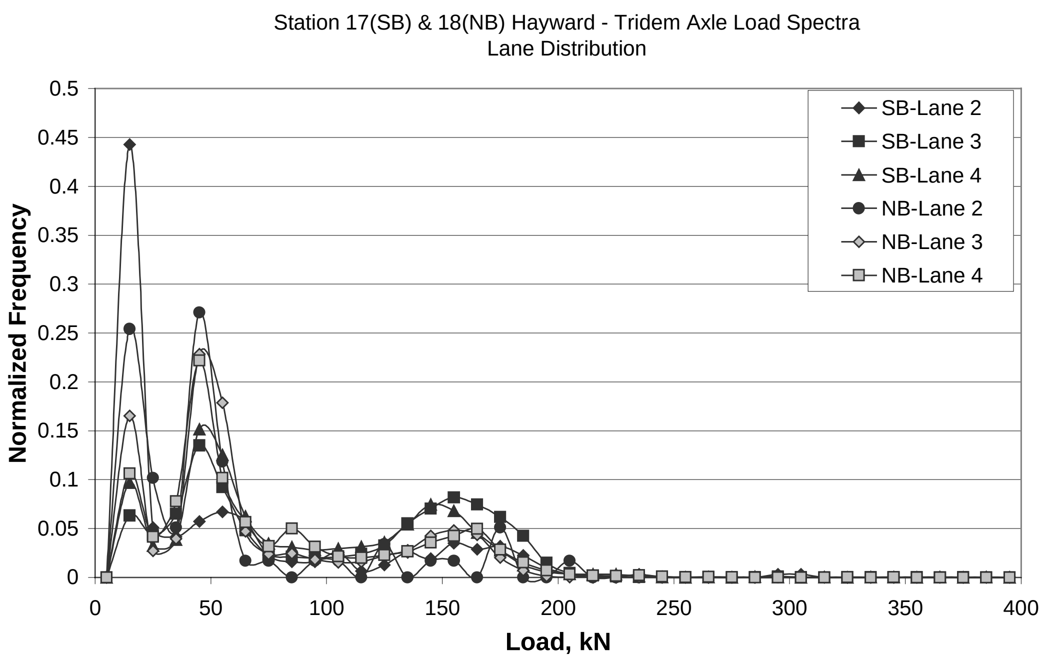


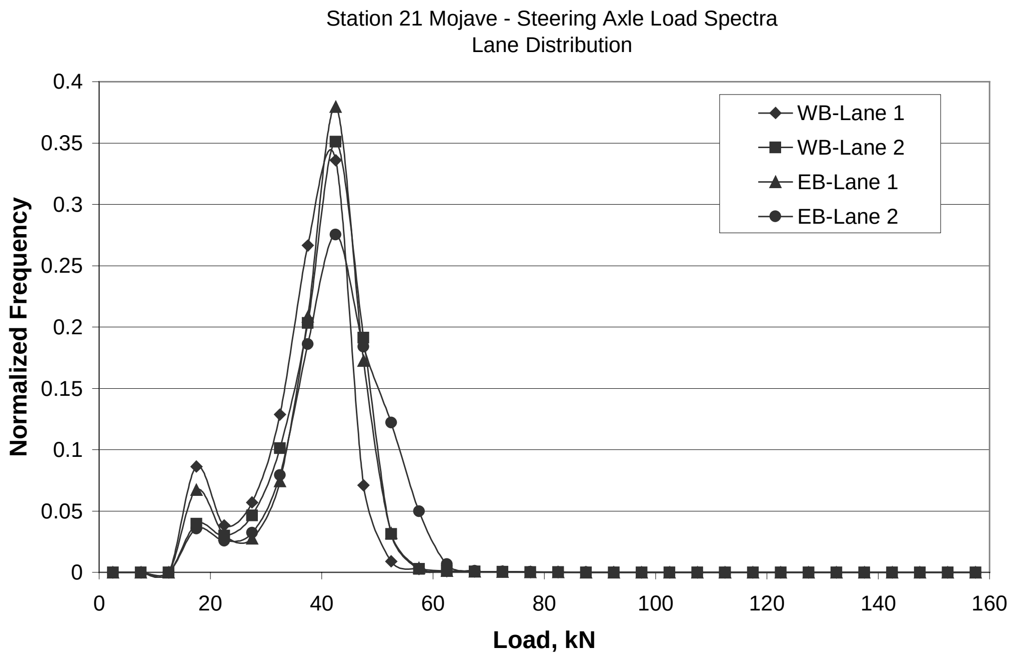
Station 17(SB) & 18(NB) Hayward - Steering Axle Load Spectra
Lane Distribution
Normalized Frequency
Load, kN
SB-Lane 2
SB-Lane 3
SB-Lane 4
NB-Lane 2
NB-Lane 3
NB-Lane 4
0
0.05
0.1
0.15
0.2
0.25
0.3
0.35
0.4
0.45
0.5
0
20
40
60
80
100
120
140
160

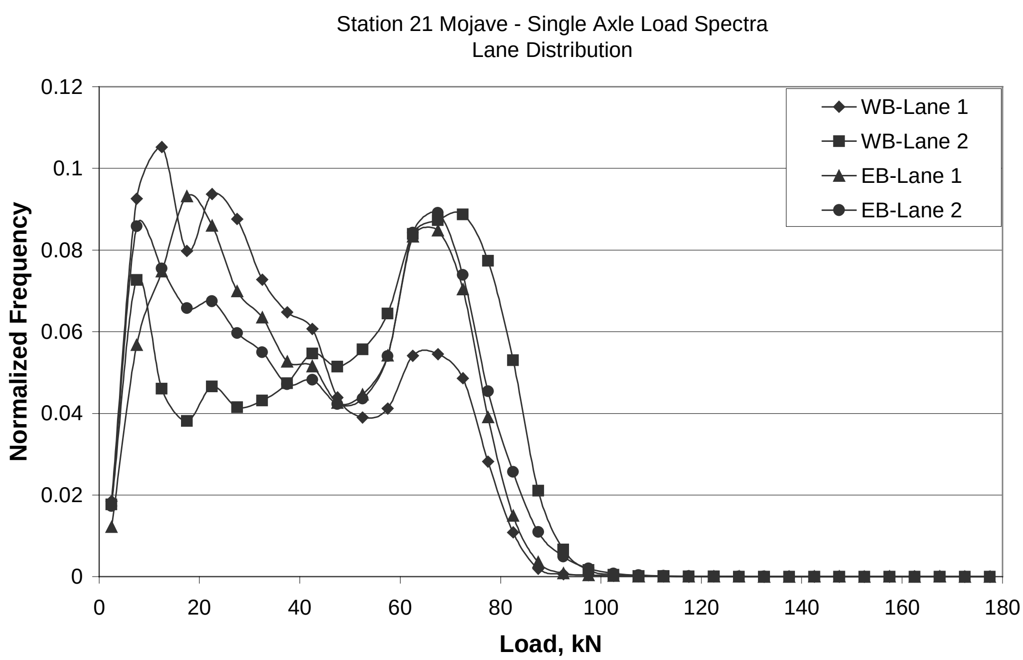



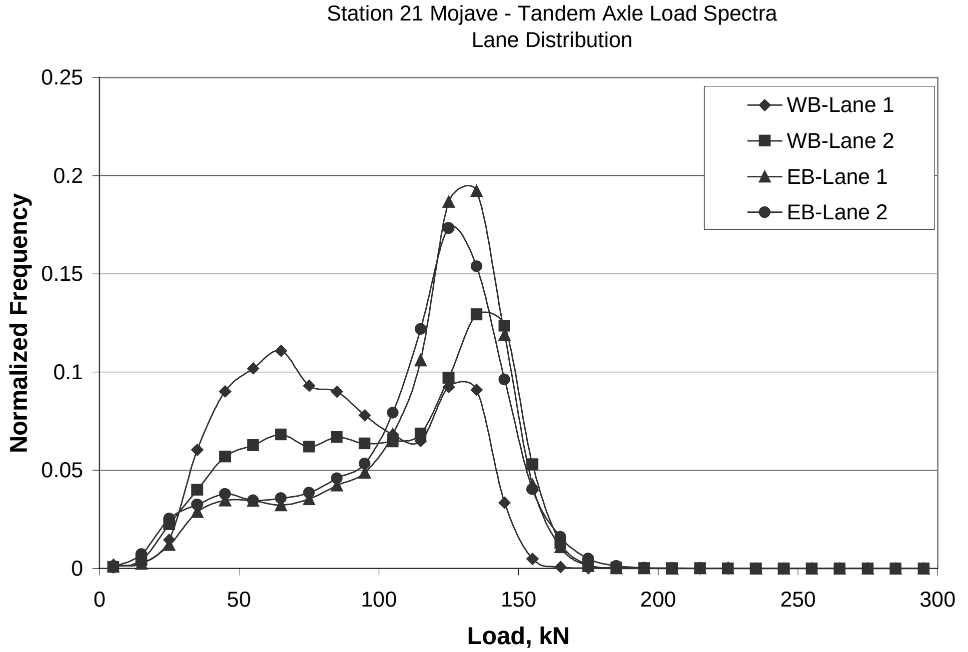
Station 17(SB) & 18(NB) Hayward - Single Axle Load Spectra
Lane Distribution
Normalized Frequency
Load, kN
SB-Lane 2
SB-Lane 3
SB-Lane 4
NB-Lane 2
NB-Lane 3
NB-Lane 4
0
0.05
0.1
0.15
0.2
0.25
0.3
0
20
40
60
80
100
120
140
160
180

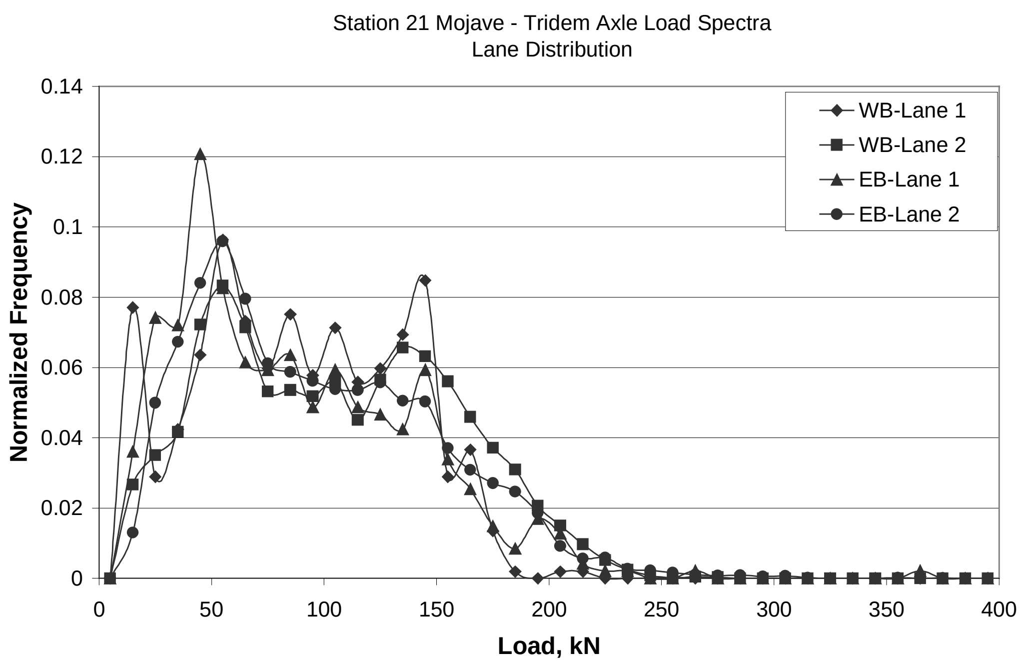

Station 17(SB) & 18(NB) Hayward - Tandem Axle Load Spectra
Lane Distribution
Normalized Frequency
Load, kN
SB-Lane 2
SB-Lane 3
SB-Lane 4
NB-Lane 2
NB-Lane 3
NB-Lane 4
0
0.02
0.04
0.06
0.08
0.1
0.12
0.14
0.16
0.18
0
50
100
150
200
250
300

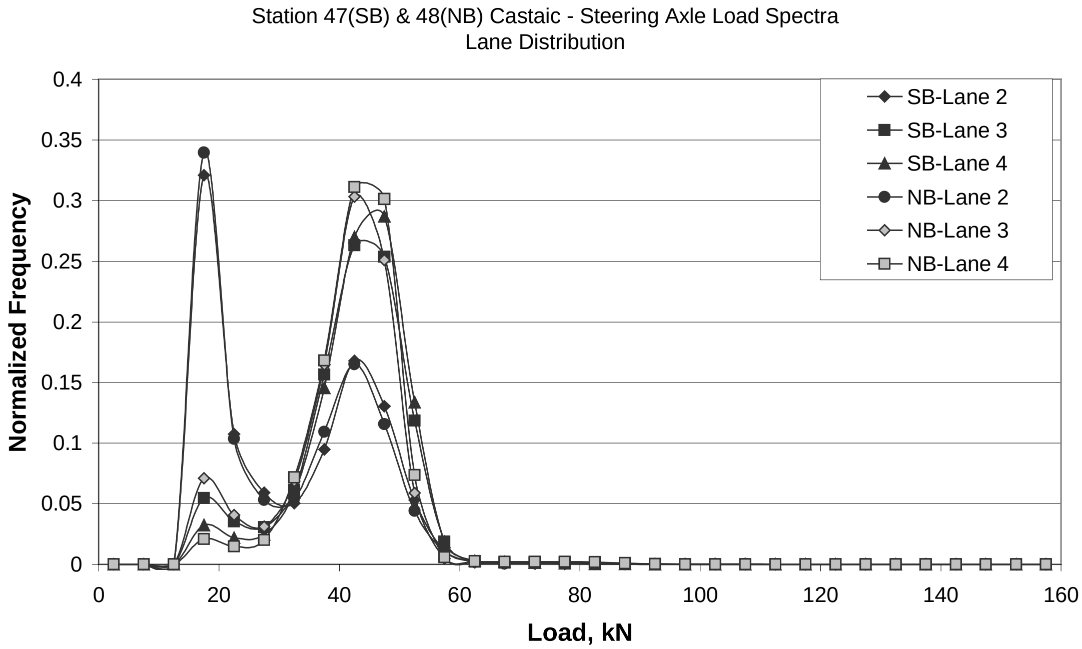

Station 17(SB) & 18(NB) Hayward - Tridem Axle Load Spectra
Lane Distribution
Normalized Frequency
Load, kN
SB-Lane 2
SB-Lane 3
SB-Lane 4
NB-Lane 2
NB-Lane 3
NB-Lane 4
0
0.05
0.1
0.15
0.2
0.25
0.3
0.35
0.4
0.45
0.5
0
50
100
150
200
250
300
350
400

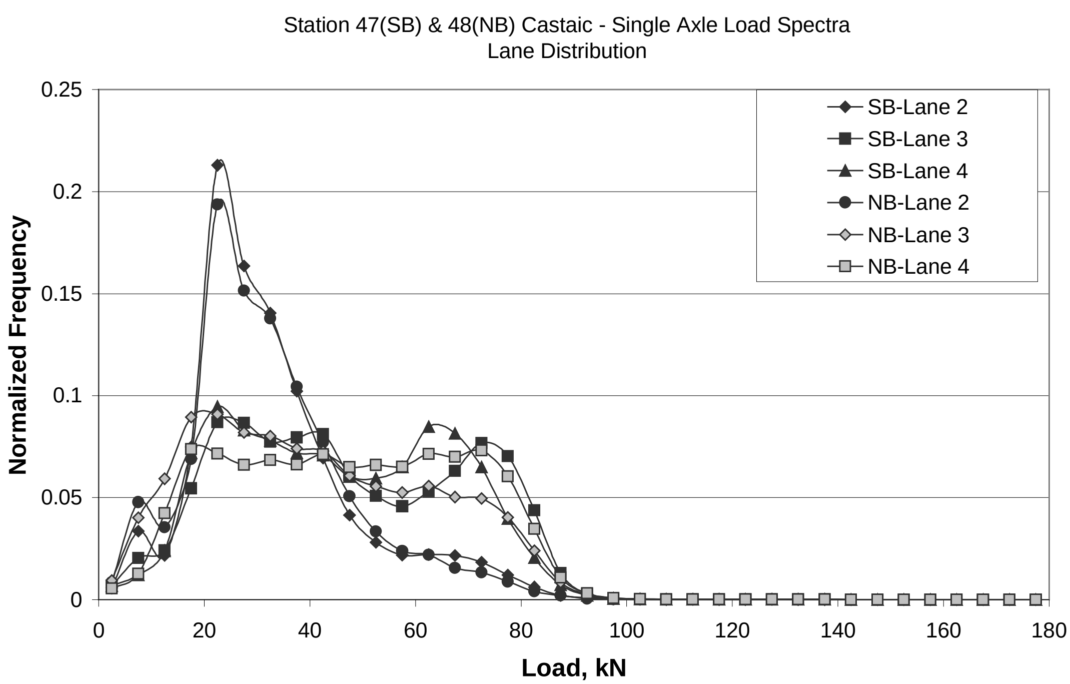

Station 21 Mojave - Steering Axle Load Spectra
Lane Distribution
0.4
0.35
0.3
0.25
0.2
0.15
0.1
0.05
0
Normalized Frequency
0
20
40
60
80
100
120
140
160
Load, kN
WB-Lane 1
WB-Lane 2
EB-Lane 1
EB-Lane 2

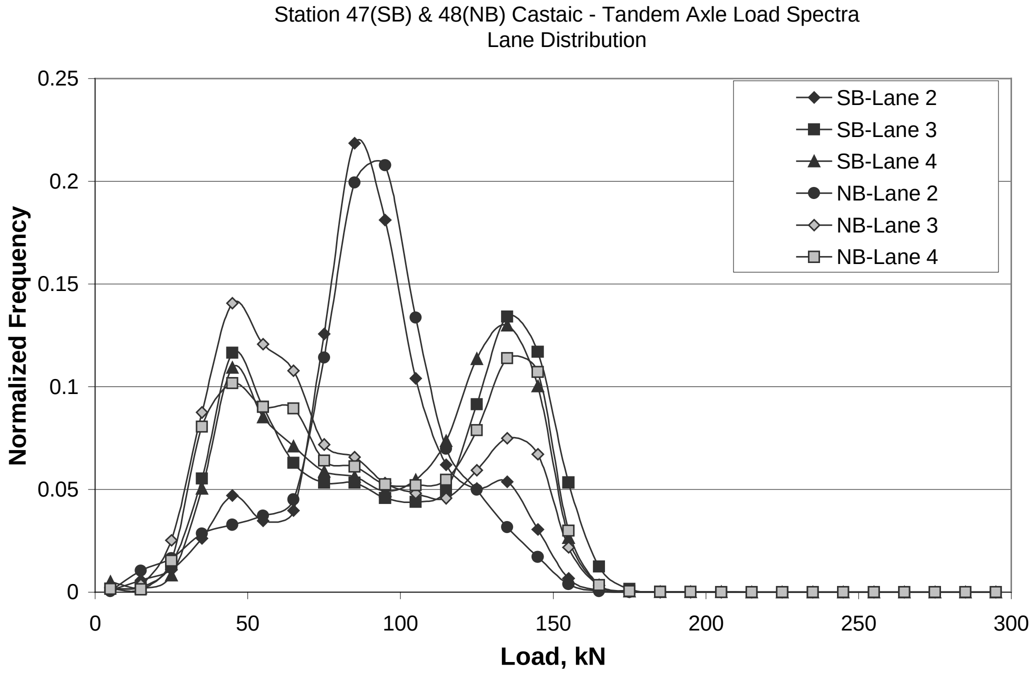

Station 21 Mojave - Single Axle Load Spectra
Lane Distribution
0.12
0.1
0.08
0.06
0.04
0.02
0
Normalized Frequency
0
20
40
60
80
100
120
140
160
180
Load, kN
WB-Lane 1
WB-Lane 2
EB-Lane 1
EB-Lane 2


Station 21 Mojave - Tandem Axle Load Spectra
Lane Distribution
Normalized Frequency
Load, kN
WB-Lane 1
WB-Lane 2
EB-Lane 1
EB-Lane 2
0.25
0.2
0.15
0.1
0.05
0
0
50
100
150
200
250
300

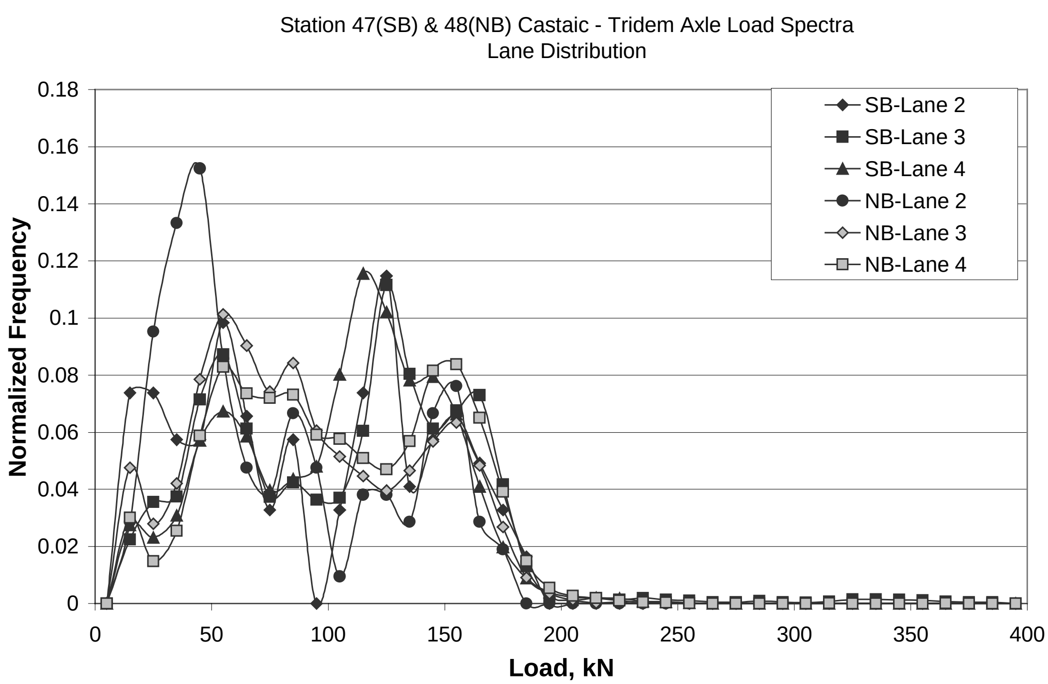

Station 21 Mojave - Tridem Axle Load Spectra
Lane Distribution
Normalized Frequency
Load, kN
WB-Lane 1
WB-Lane 2
EB-Lane 1
EB-Lane 2
0.14
0.12
0.1
0.08
0.06
0.04
0.02
0
0
50
100
150
200
250
300
350
400


Station 47(SB) & 48(NB) Castaic - Steering Axle Load Spectra
Lane Distribution
Normalized Frequency
Load, kN
SB-Lane 2
SB-Lane 3
SB-Lane 4
NB-Lane 2
NB-Lane 3
NB-Lane 4
0.4
0.35
0.3
0.25
0.2
0.15
0.1
0.05
0
0
20
40
60
80
100
120
140
160


Station 47(SB) & 48(NB) Castaic - Single Axle Load Spectra
Lane Distribution
Normalized Frequency
Load, kN
SB-Lane 2
SB-Lane 3
SB-Lane 4
NB-Lane 2
NB-Lane 3
NB-Lane 4
0.25
0.2
0.15
0.1
0.05
0
0
20
40
60
80
100
120
140
160
180

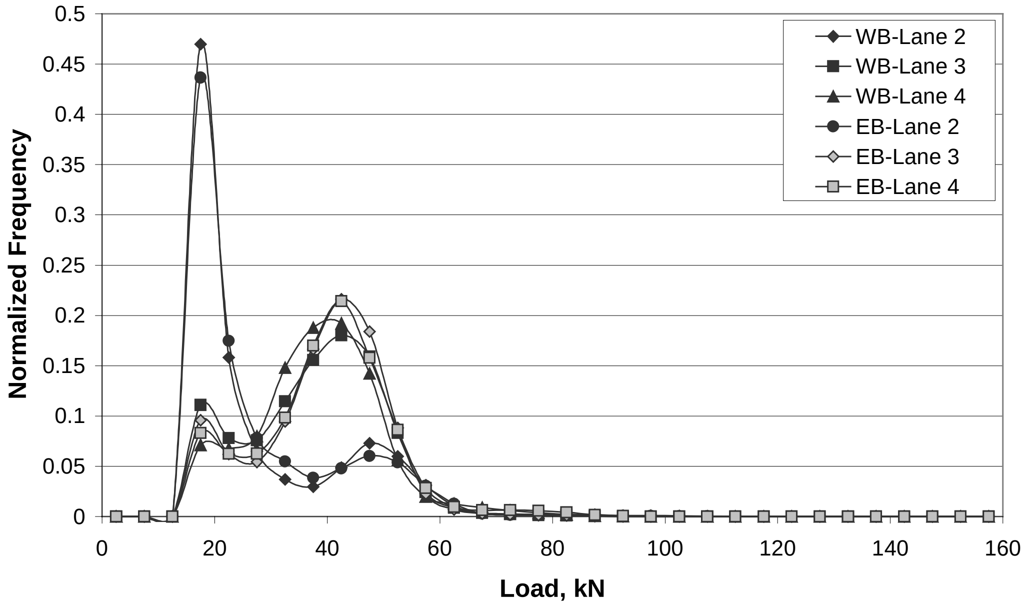


Station 47(SB) & 48(NB) Castaic - Tandem Axle Load Spectra
Lane Distribution
Normalized Frequency
Load, kN
SB-Lane 2
SB-Lane 3
SB-Lane 4
NB-Lane 2
NB-Lane 3
NB-Lane 4

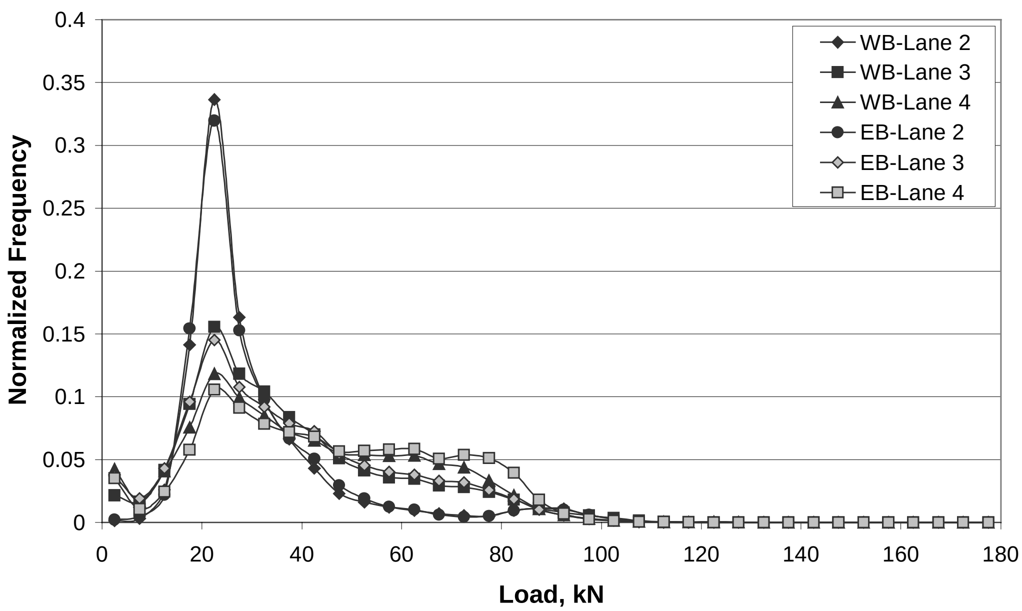



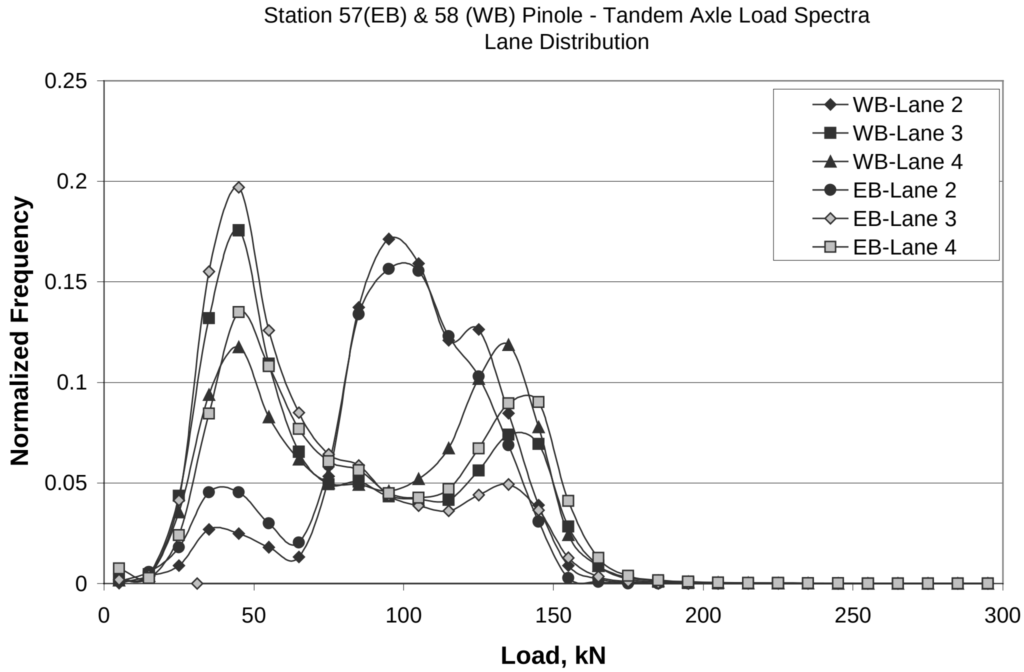
Station 47(SB) & 48(NB) Castaic - Tridem Axle Load Spectra
Lane Distribution
Normalized Frequency
Load, kN
SB-Lane 2
SB-Lane 3
SB-Lane 4
NB-Lane 2
NB-Lane 3
NB-Lane 4

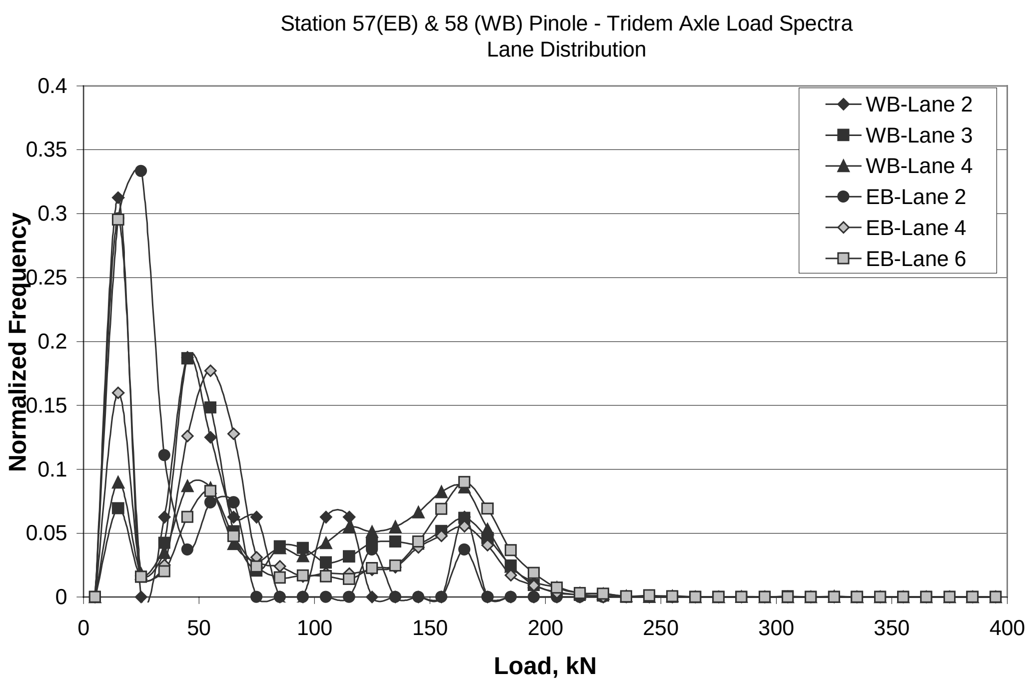
Station 57(EB) & 58 (WB) Pinole - Steering Axle Load Spectra
Lane Distribution

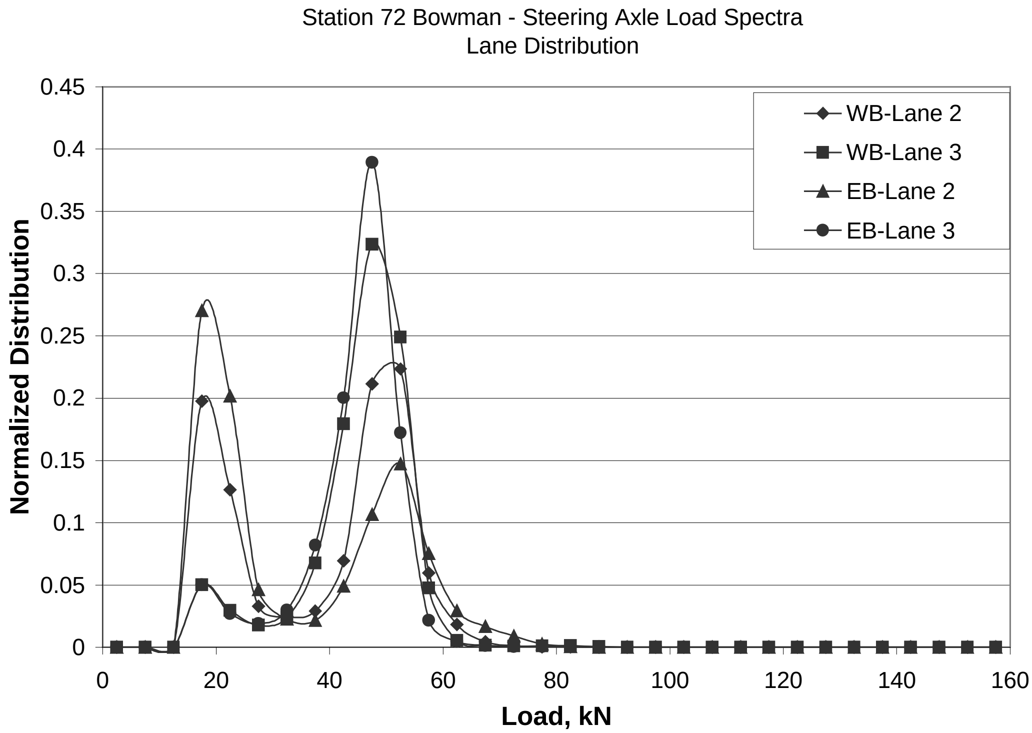


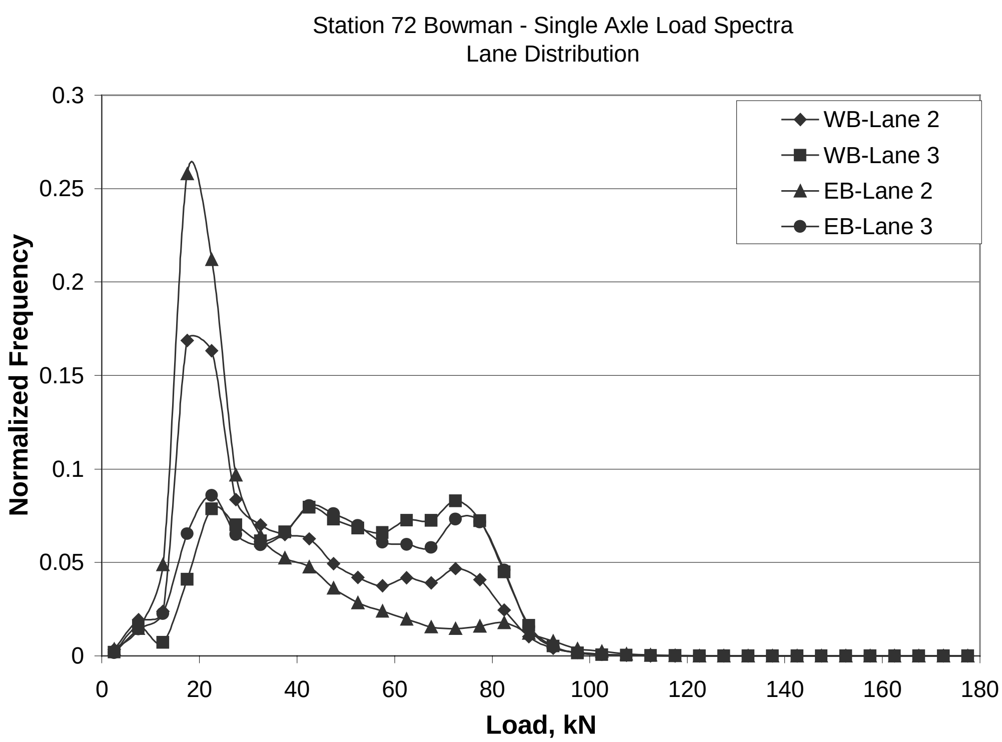

Station 57(EB) & 58 (WB) Pinole - Single Axle Load Spectra
Lane Distribution



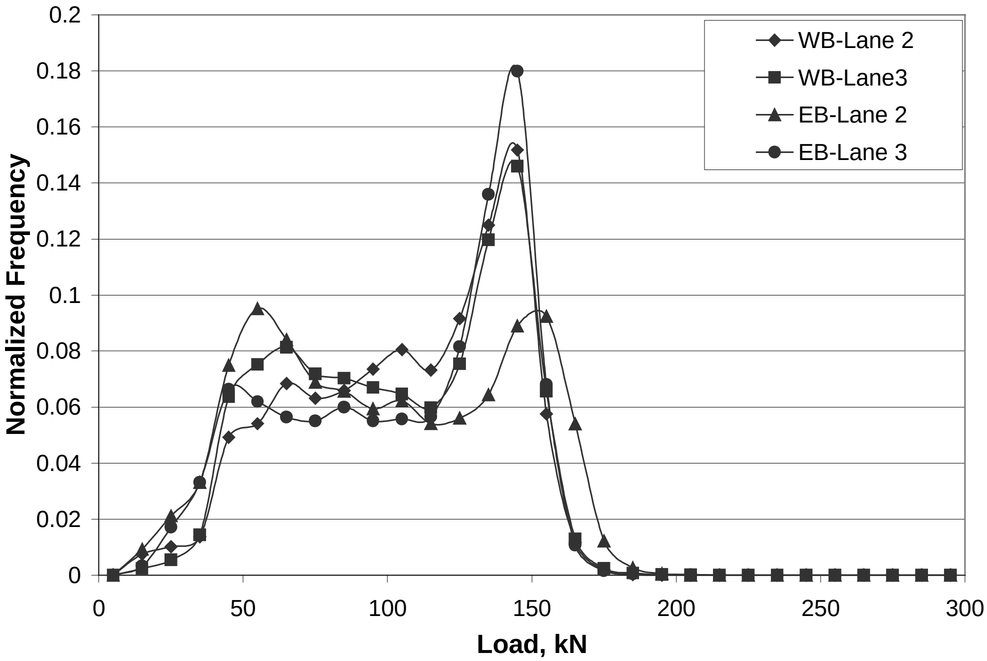

Station 57(EB) & 58 (WB) Pinole - Tandem Axle Load Spectra
Lane Distribution
Normalized Frequency
Load, kN
WB-Lane 2
WB-Lane 3
WB-Lane 4
EB-Lane 2
EB-Lane 3
EB-Lane 4
0.25
0.2
0.15
0.1
0.05
0
0
50
100
150
200
250
300


Station 57(EB) & 58 (WB) Pinole - Tridem Axle Load Spectra
Lane Distribution
Normalized Frequency
Load, kN
WB-Lane 2
WB-Lane 3
WB-Lane 4
EB-Lane 2
EB-Lane 4
EB-Lane 6
0.4
0.35
0.3
0.25
0.2
0.15
0.1
0.05
0
0
50
100
150
200
250
300
350
400

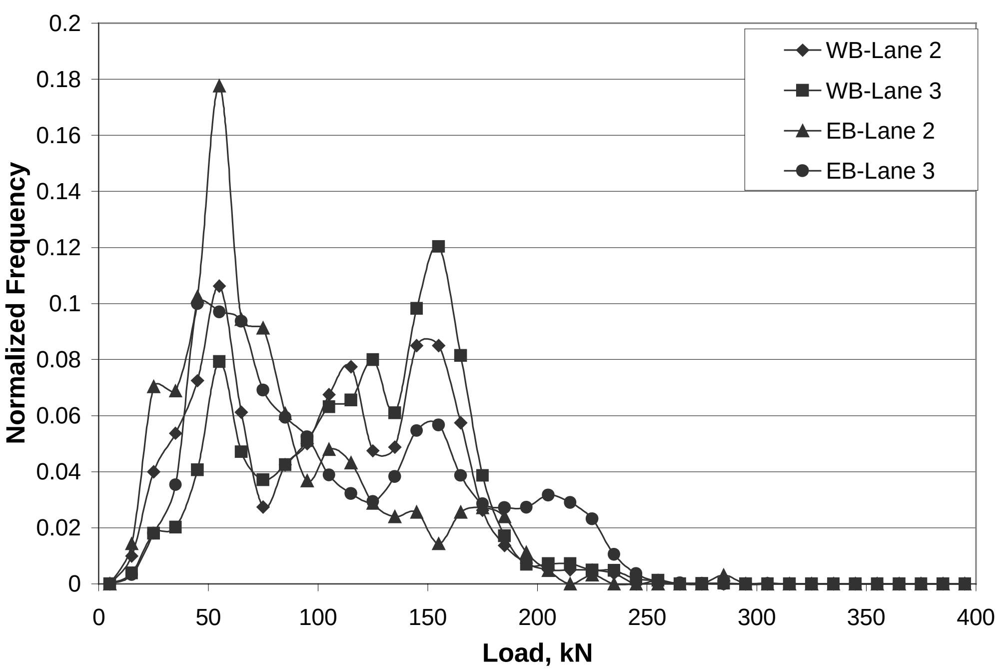

Station 72 Bowman - Steering Axle Load Spectra
Lane Distribution
Normalized Distribution
Load, kN
WB-Lane 2
WB-Lane 3
EB-Lane 2
EB-Lane 3
0.45
0.4
0.35
0.3
0.25
0.2
0.15
0.1
0.05
0
0
20
40
60
80
100
120
140
160


Station 72 Bowman - Single Axle Load Spectra
Lane Distribution
Normalized Frequency
Load, kN
WB-Lane 2
WB-Lane 3
EB-Lane 2
EB-Lane 3
0.3
0.25
0.2
0.15
0.1
0.05
0
0
20
40
60
80
100
120
140
160
180

Station 72 Bowman - Tandem Axle Load Spectra
Lane Distribution




Station 72 Bowman - Tridem Axle Load Spectra
Lane Distribution

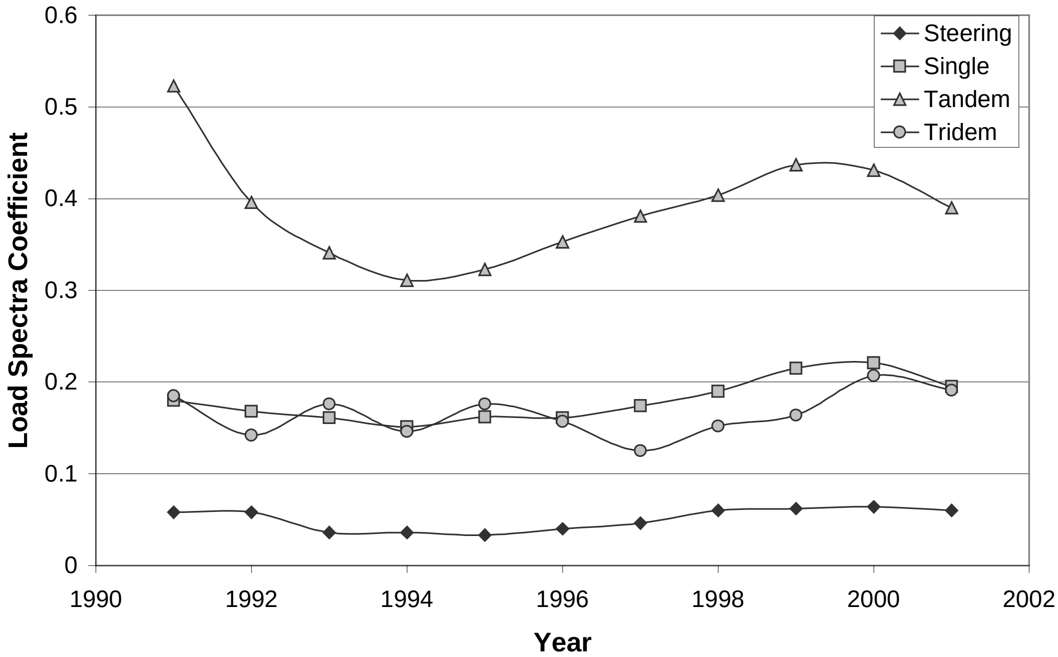


# APPENDIX C:

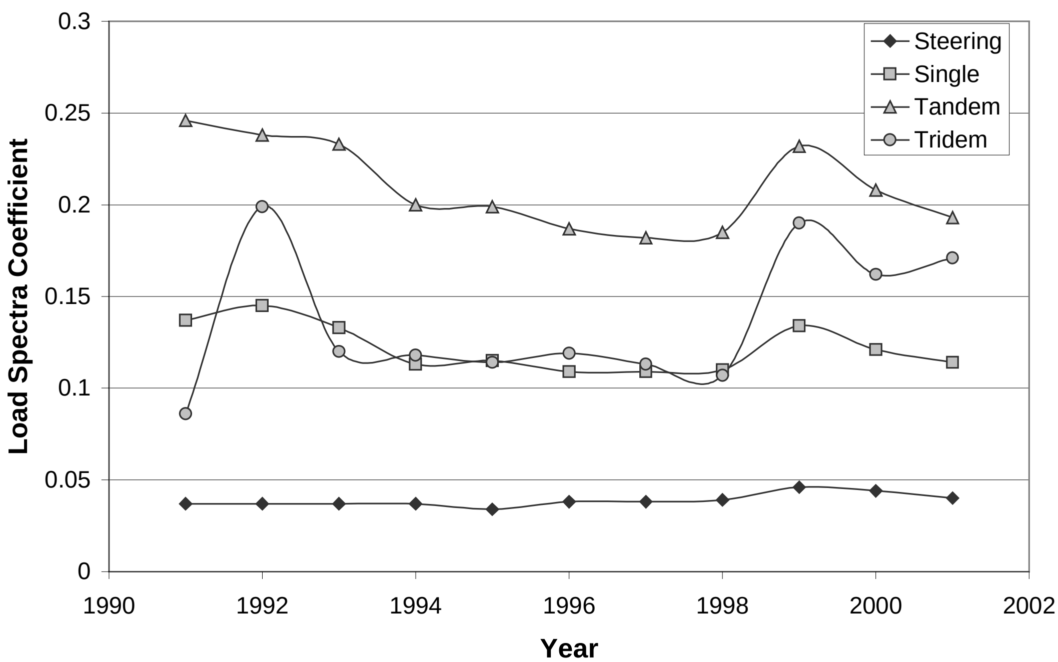
# LOAD SPECTRA COEFFICIENTS IN EACH YEAR AT

# 5 WIM SITES

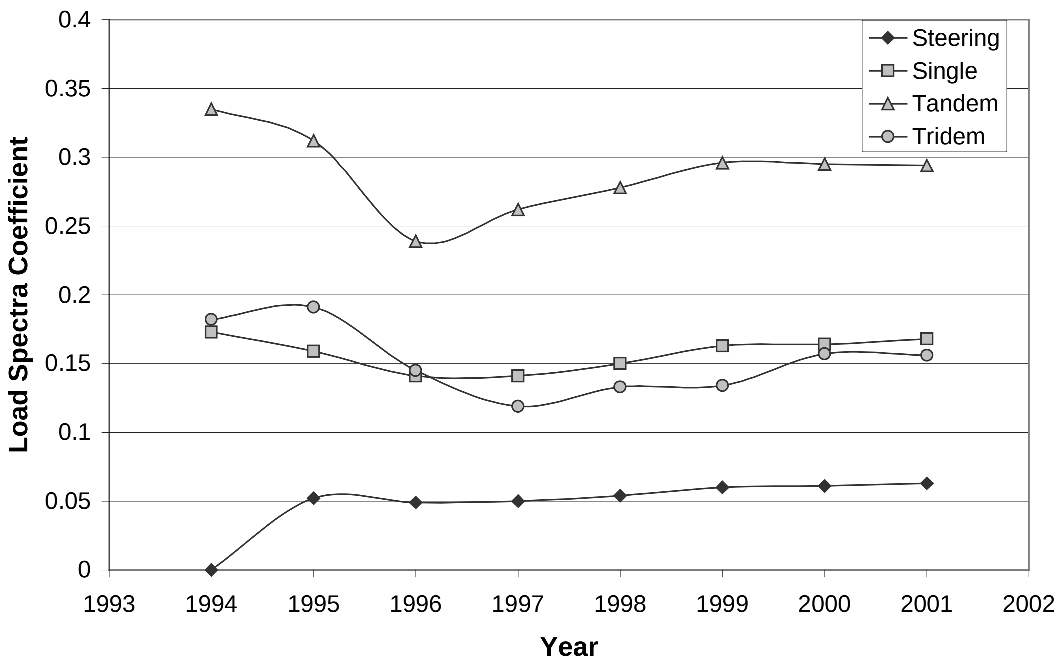
Load Spectra Coefficients in Each Year at Station 21



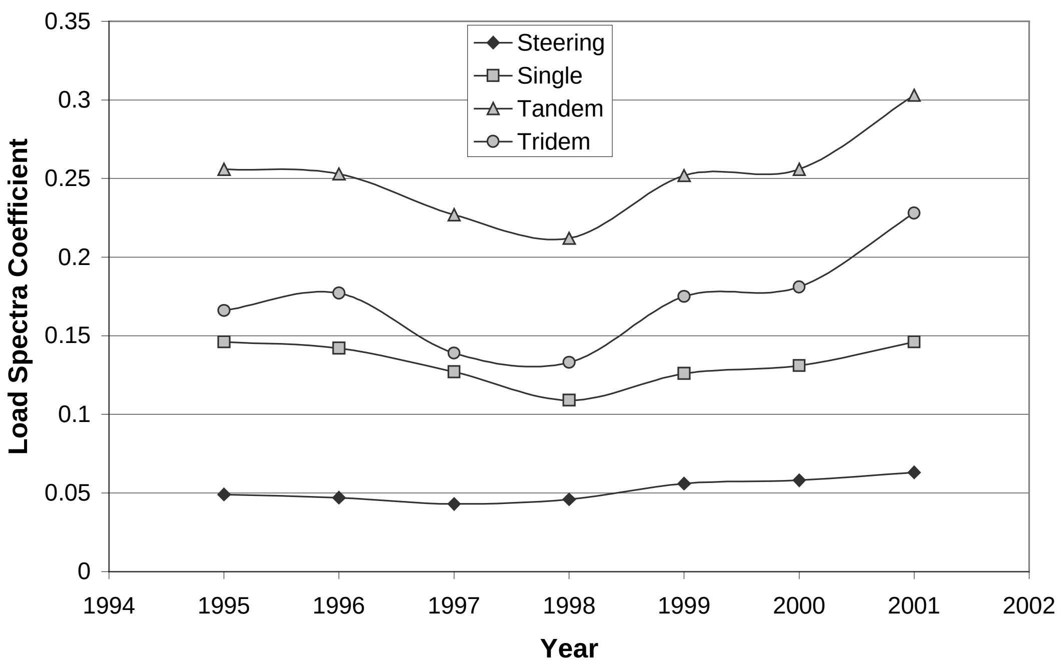

Load Spectra Coefficients in Each Year at Stations 17&18



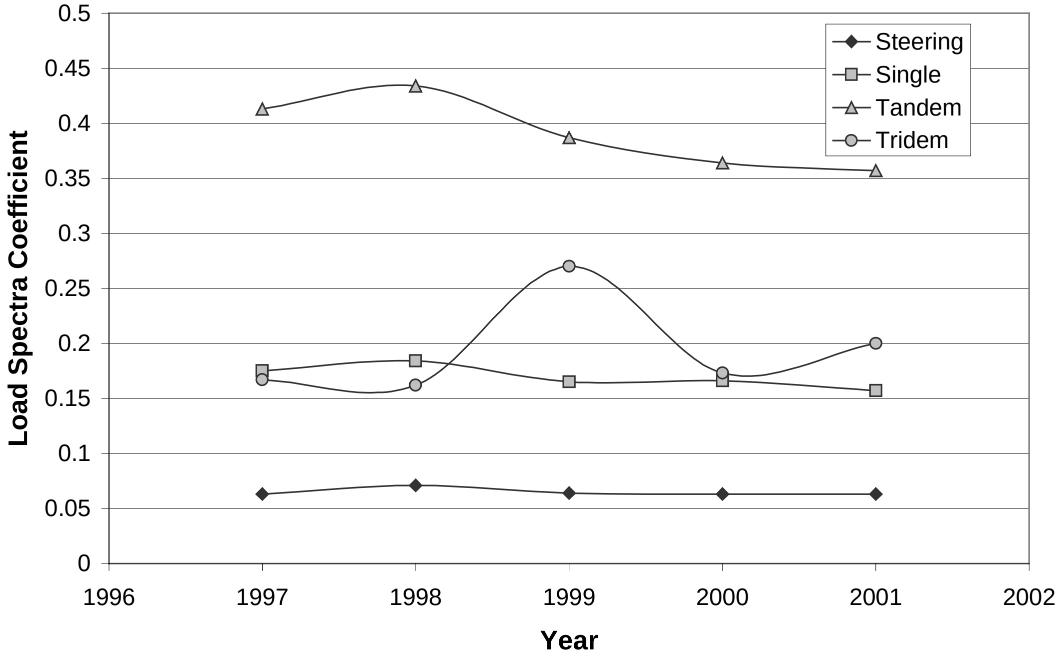
Load Spectra Coefficients in Each Year at Stations 47&48




Load Spectra Coefficients in Each Year at Stations 57&58

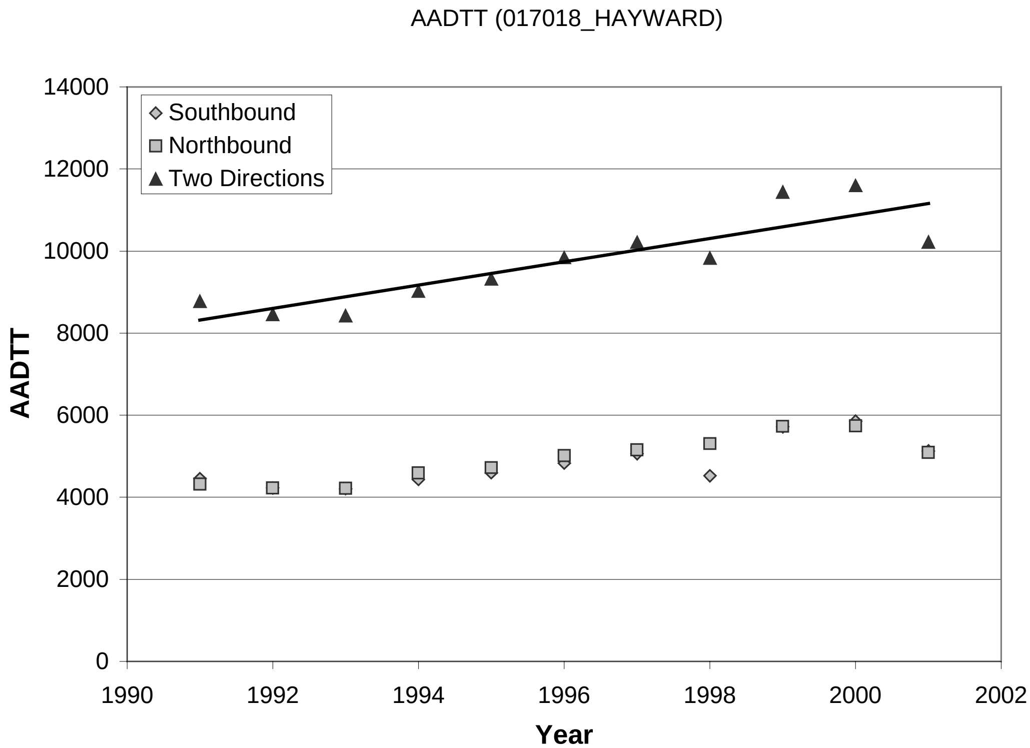


Load Spectra Coefficients in Each Year at Station 72

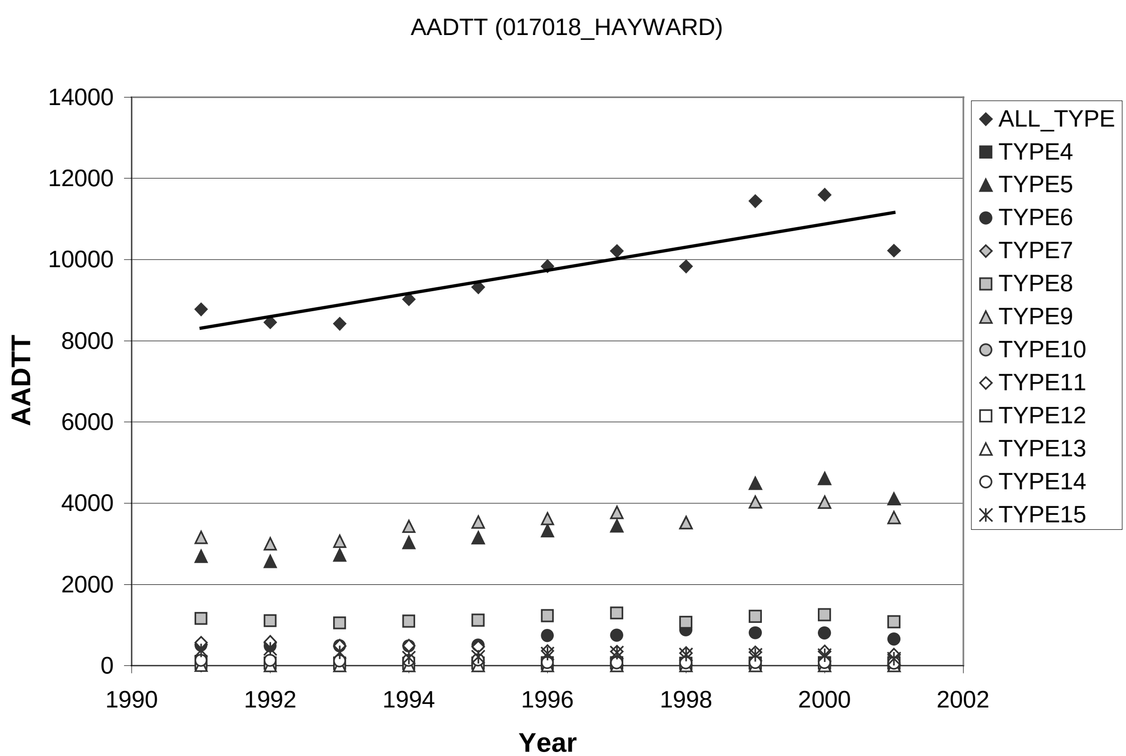


# APPENDIX D:

# AADTT OF 5 WIM SITES

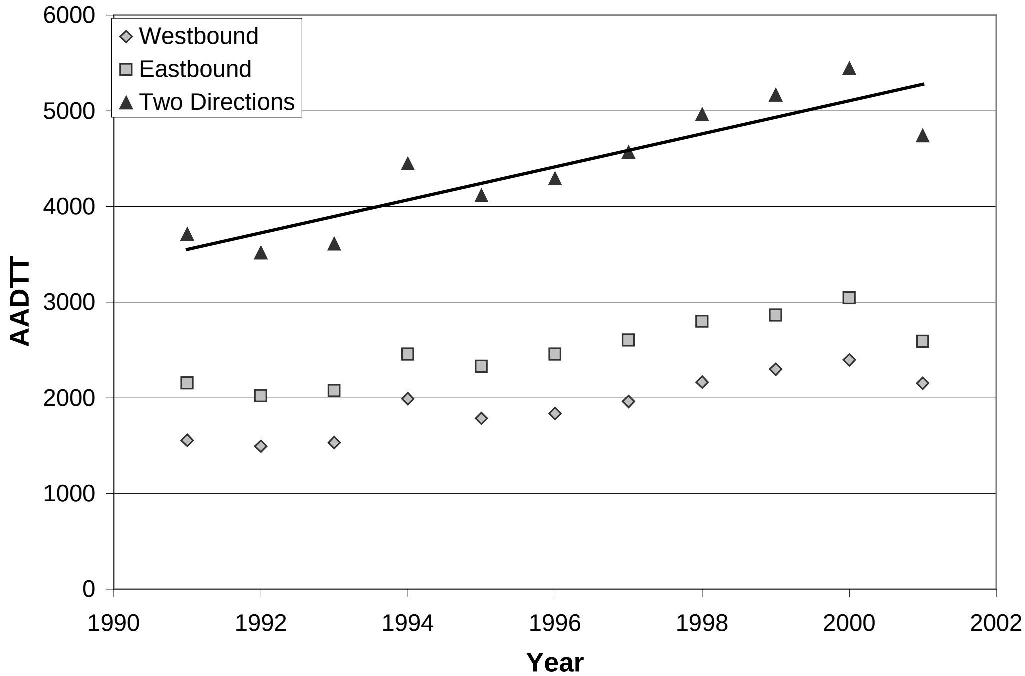


AADTT (017018_HAYWARD)
Southbound
Northbound
Two Directions
AADTT
Year
0
2000
4000
6000
8000
10000
12000
14000
1990
1992
1994
1996
1998
2000
2002

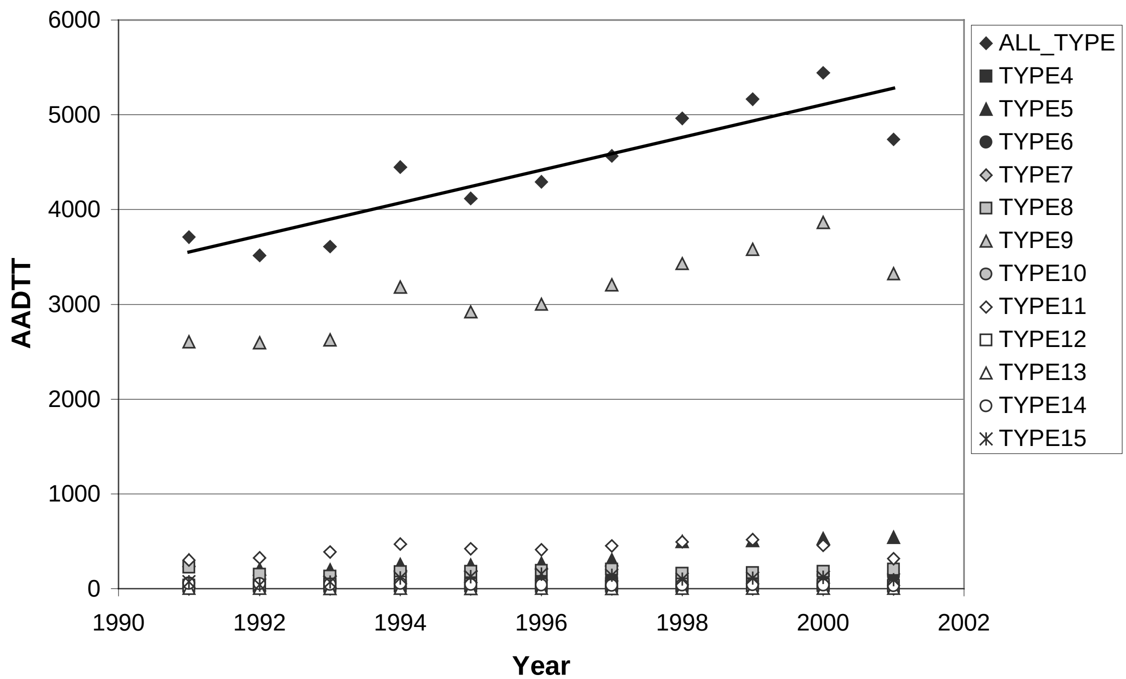



AADTT (017018_HAYWARD)
ALL_TYPE
TYPE4
TYPE5
TYPE6
TYPE7
TYPE8
TYPE9
TYPE10
TYPE11
TYPE12
TYPE13
TYPE14
TYPE15
AADTT
Year
0
2000
4000
6000
8000
10000
12000
14000
1990
1992
1994
1996
1998
2000
2002

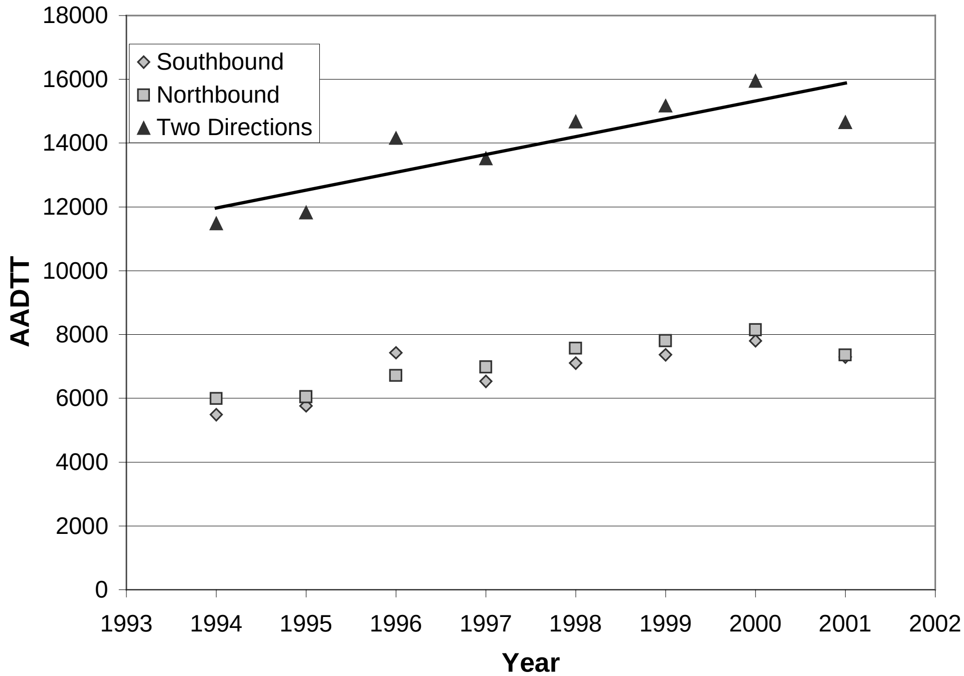
AADTT (021_MOJAVE)



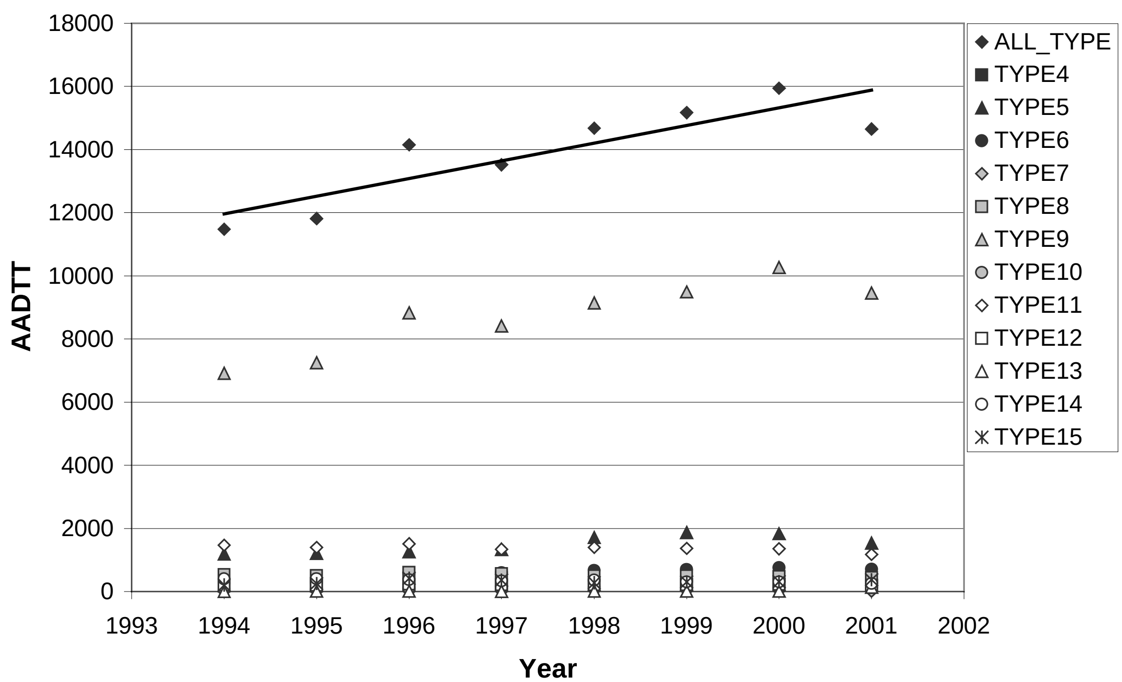

AADTT (021_MOJAVE)



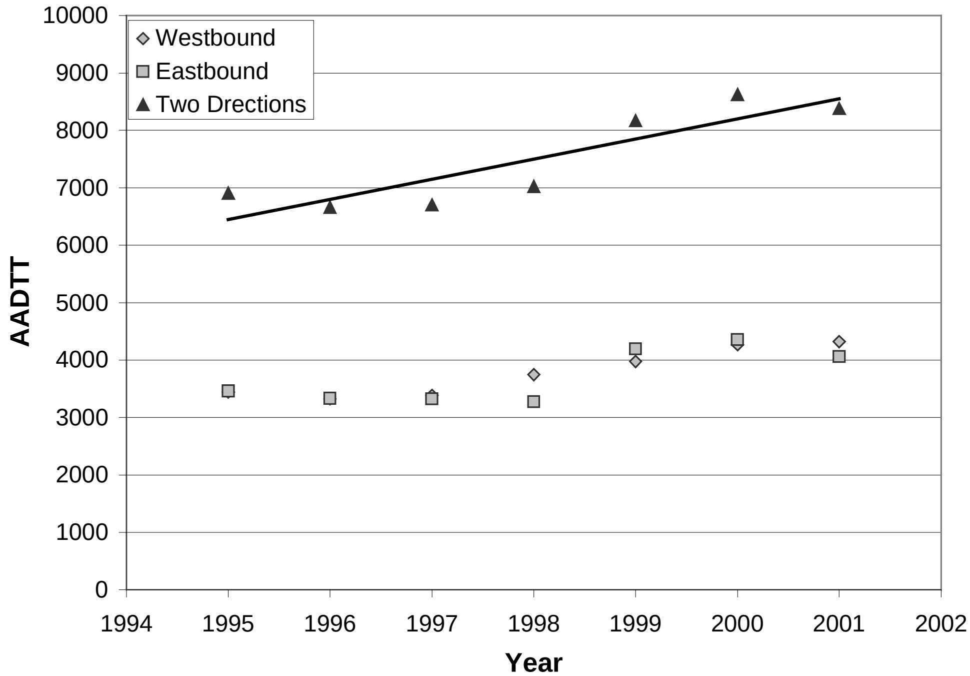
AADTT (047048_CASTAIC)



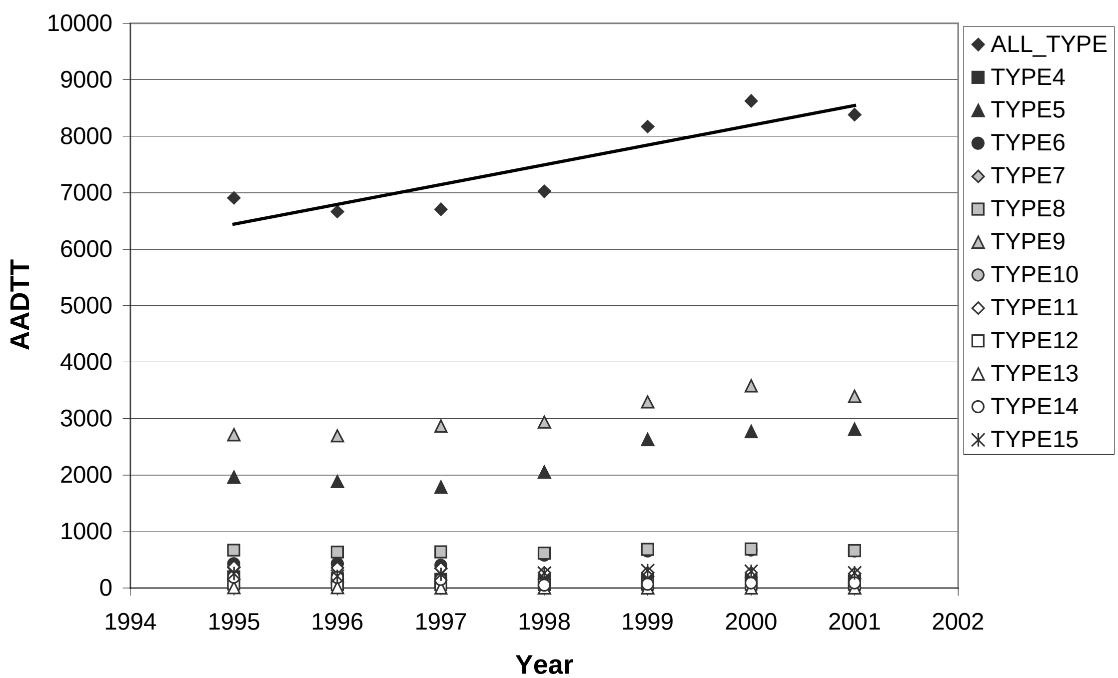

AADTT (047048_CASTAIC)

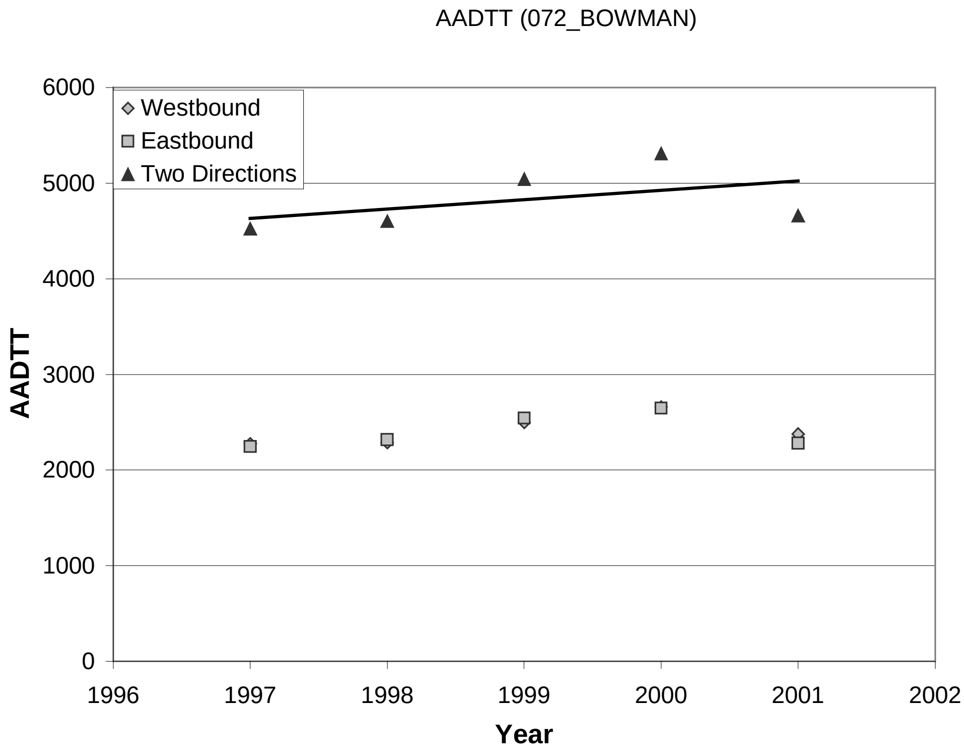


AADTT (057058_PINOLE)

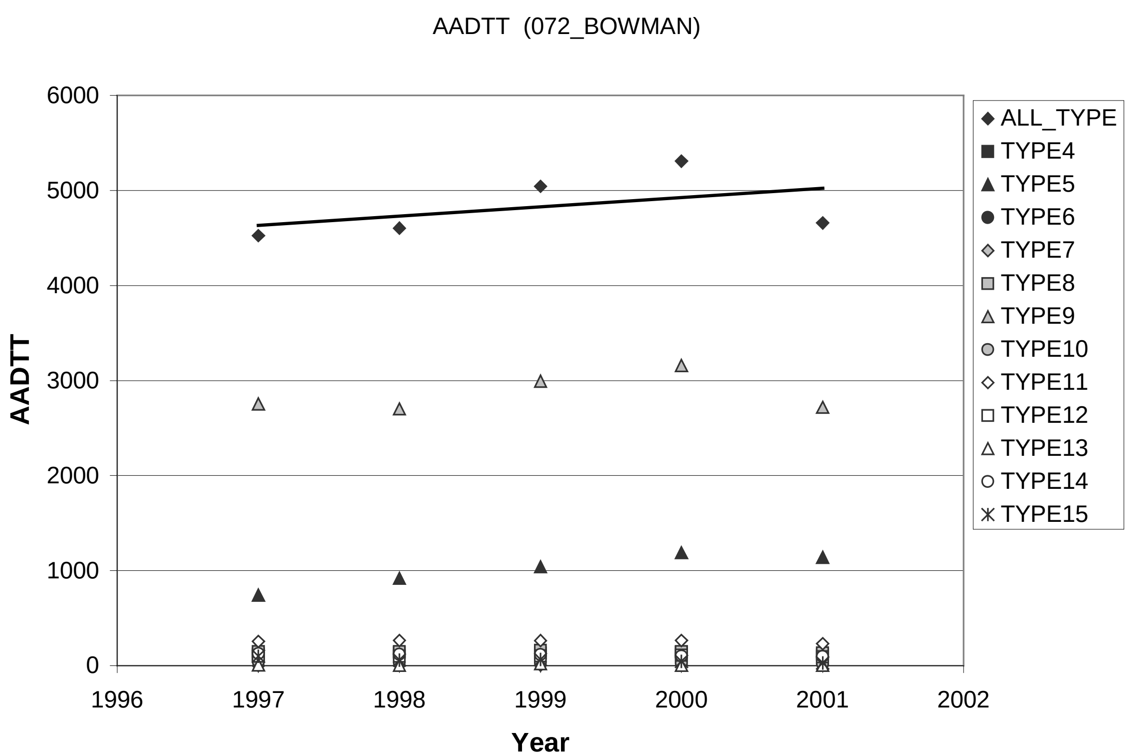



AADTT (057058_PINOLE)





AADTT (072_BOWMAN)
Westbound
Eastbound
Two Directions
AADTT
Year
6000
5000
4000
3000
2000
1000
0
1996
1997
1998
1999
2000
2001
2002

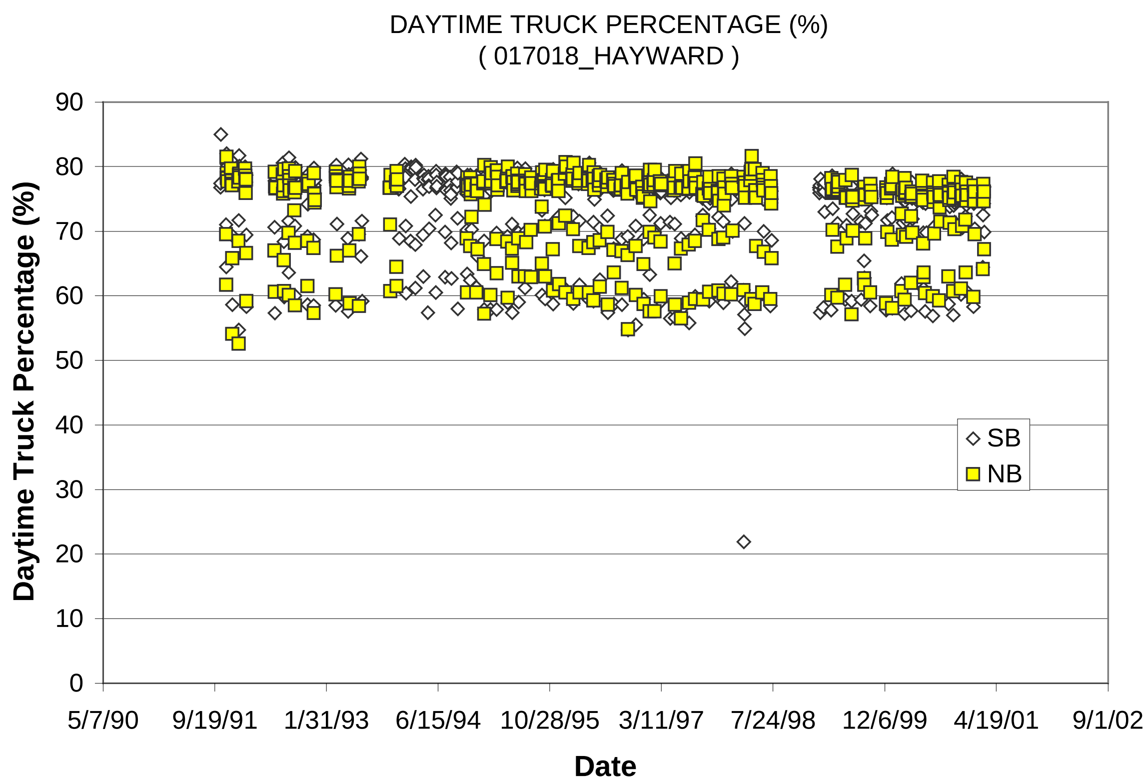



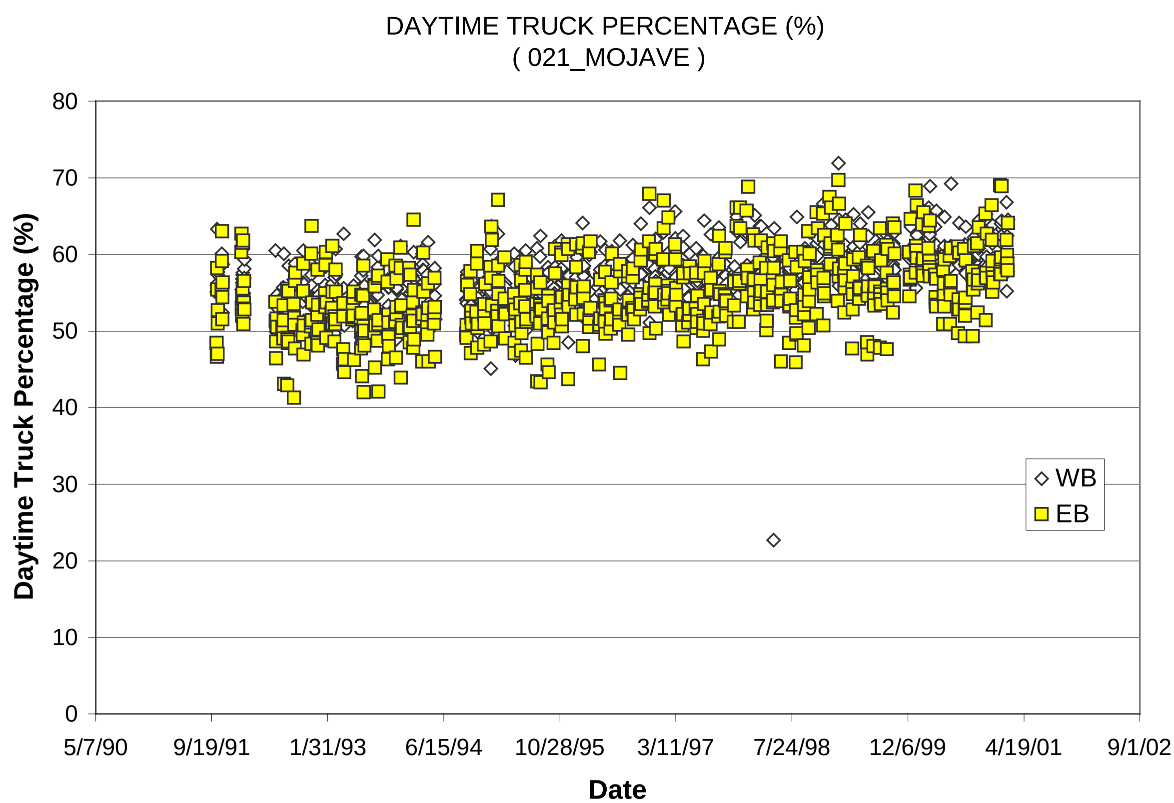
AADTT (072_BOWMAN)
ALL_TYPE
TYPE4
TYPE5
TYPE6
TYPE7
TYPE8
TYPE9
TYPE10
TYPE11
TYPE12
TYPE13
TYPE14
TYPE15
AADTT
Year
6000
5000
4000
3000
2000
1000
0
1996
1997
1998
1999
2000
2001
2002

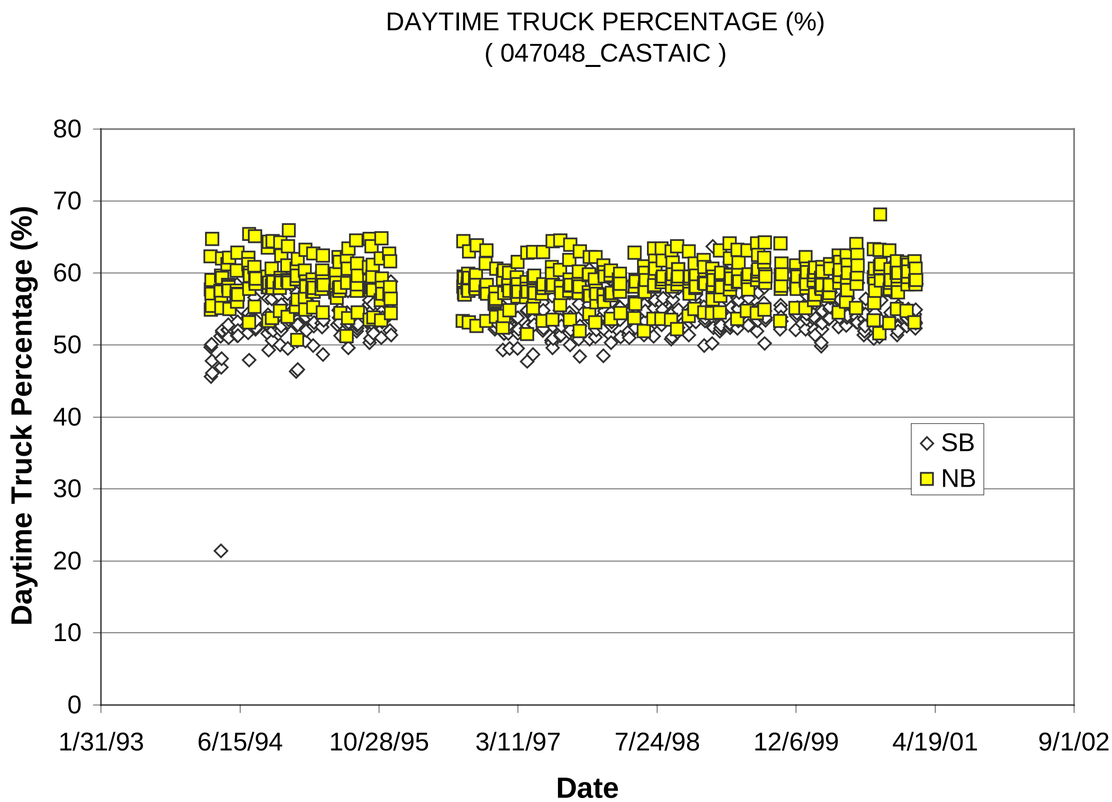
# APPENDIX E:

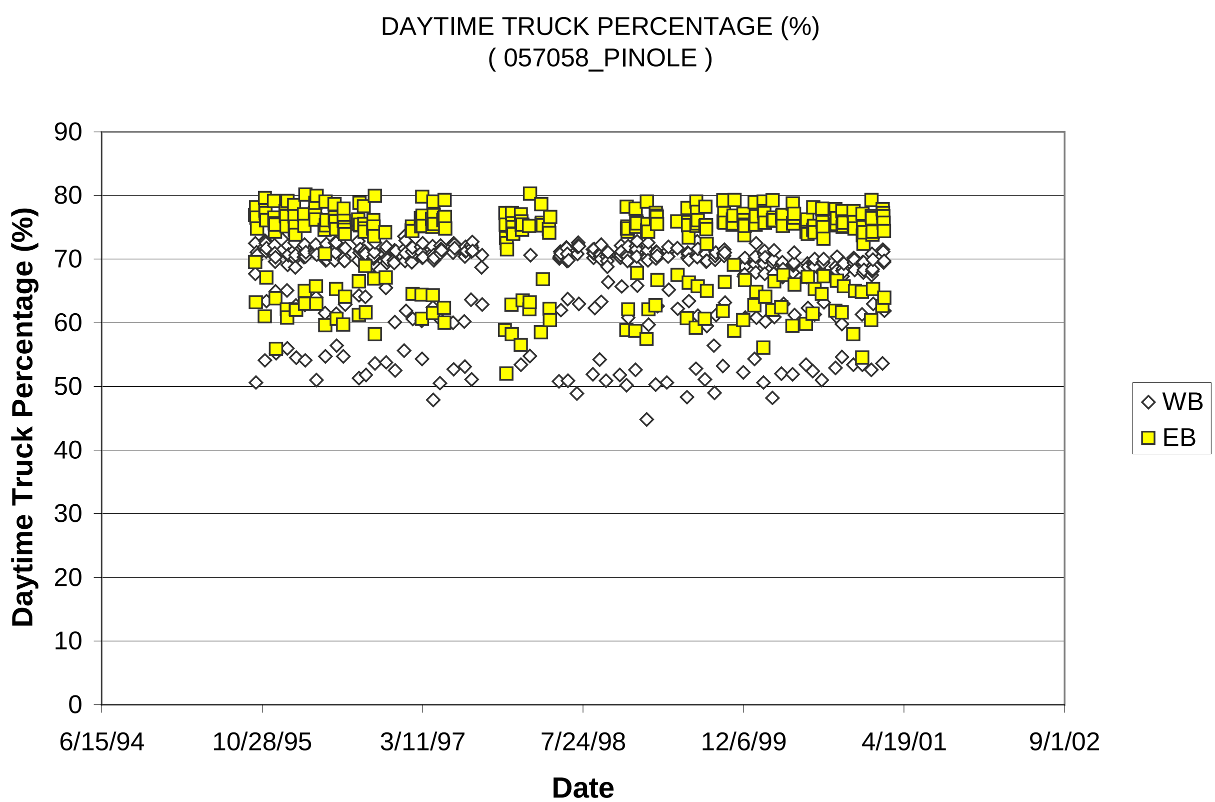
# DAYTIME TRUCK PERCENTAGE OF

# EACH SAMPLED DAY AT 5 WIM SITES

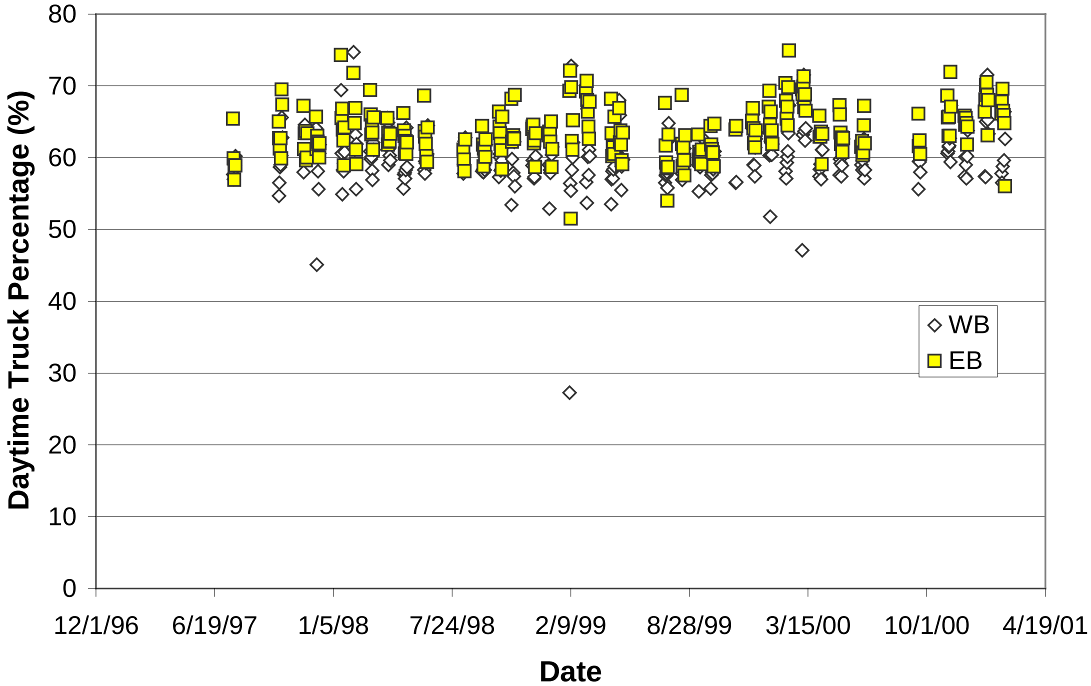

DAYTIME TRUCK PERCENTAGE (%)
( 017018_HAYWARD )
Daytime Truck Percentage (%)
90
80
70
60
50
40
30
20
10
0
5/7/90
9/19/91
1/31/93
6/15/94
10/28/95
3/11/97
7/24/98
12/6/99
4/19/01
9/1/02
Date
SB
NB


DAYTIME TRUCK PERCENTAGE (%)
( 021_MOJAVE )
Daytime Truck Percentage (%)
80
70
60
50
40
30
20
10
0
5/7/90
9/19/91
1/31/93
6/15/94
10/28/95
3/11/97
7/24/98
12/6/99
4/19/01
9/1/02
Date
WB
EB


DAYTIME TRUCK PERCENTAGE (%)
( 047048_CASTAIC )
Daytime Truck Percentage (%)
80
70
60
50
40
30
20
10
0
1/31/93
6/15/94
10/28/95
3/11/97
7/24/98
12/6/99
4/19/01
9/1/02
Date
SB
NB

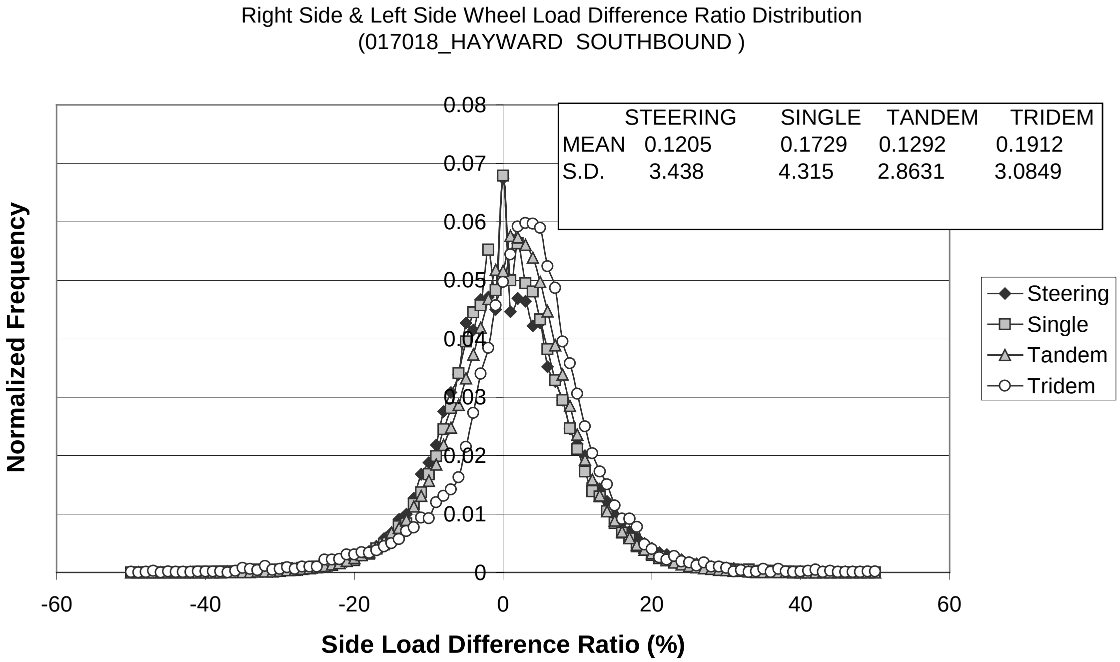

DAYTIME TRUCK PERCENTAGE (%)
( 057058_PINOLE )
Daytime Truck Percentage (%)
90
80
70
60
50
40
30
20
10
0
6/15/94
10/28/95
3/11/97
7/24/98
12/6/99
4/19/01
9/1/02
Date
WB
EB

DAYTIME TRUCK PERCENTAGE (%)
( 072_BOWMAN )

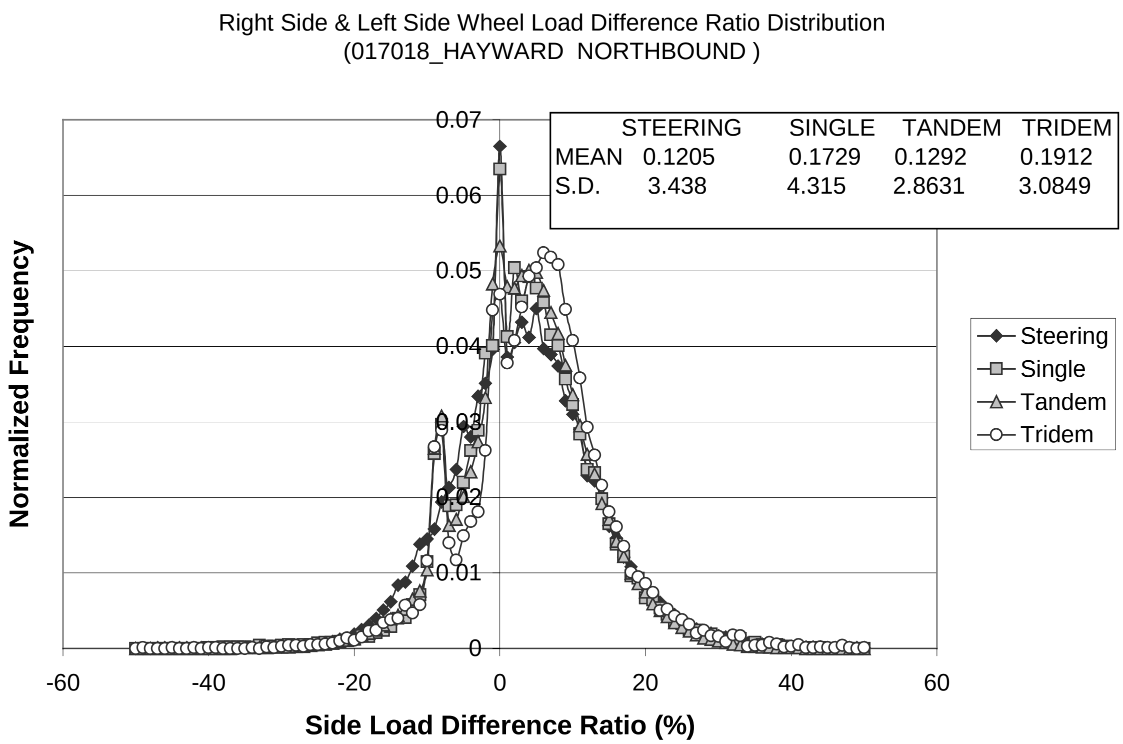


# APPENDIX F:

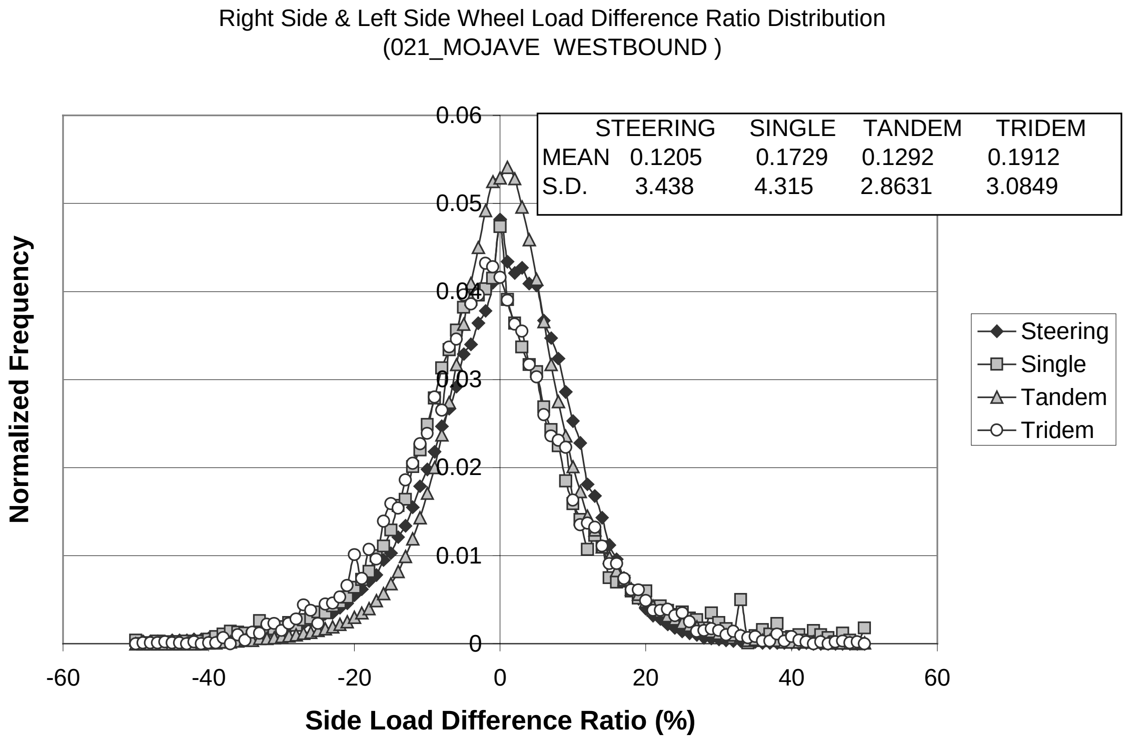
# SIDE WHEEL LOAD DIFFERENCE RATIO DISTRIBUTION AT 5 WIM SITES

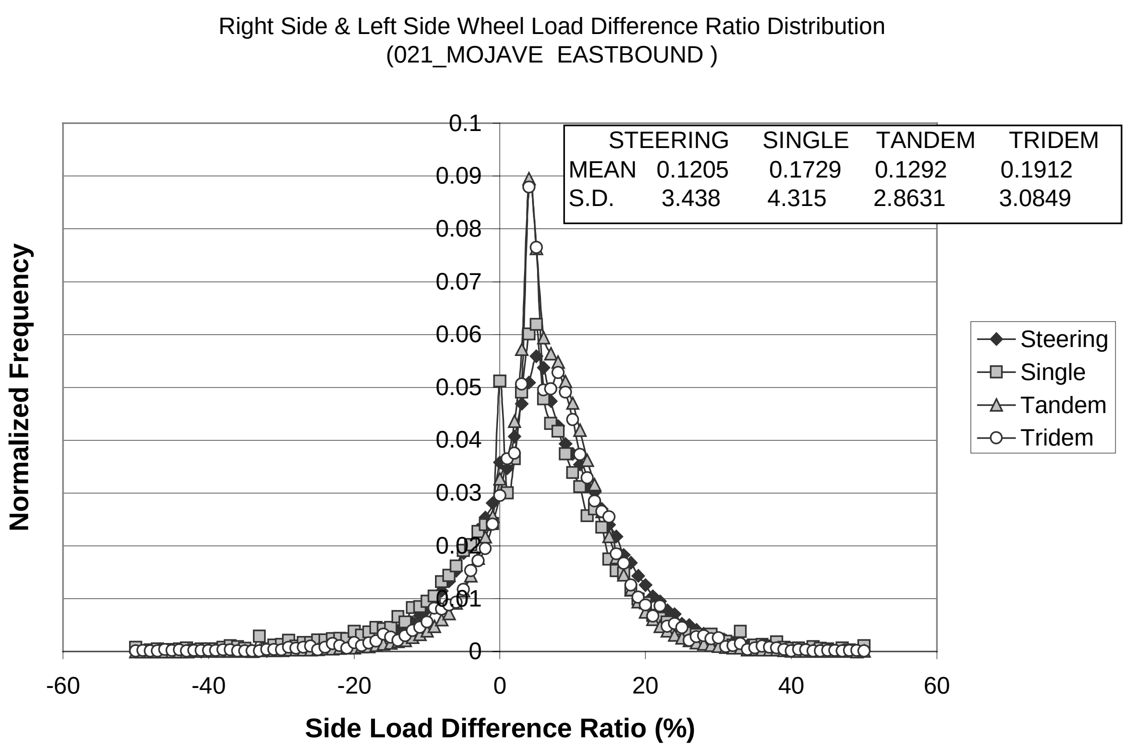


Right Side & Left Side Wheel Load Difference Ratio Distribution
(017018_HAYWARD SOUTHBOUND )
STEERING SINGLE TANDEM TRIDEM
MEAN 0.1205 0.1729 0.1292 0.1912
S.D. 3.438 4.315 2.8631 3.0849
Steering
Single
Tandem
Tridem
Normalized Frequency
Side Load Difference Ratio (%)

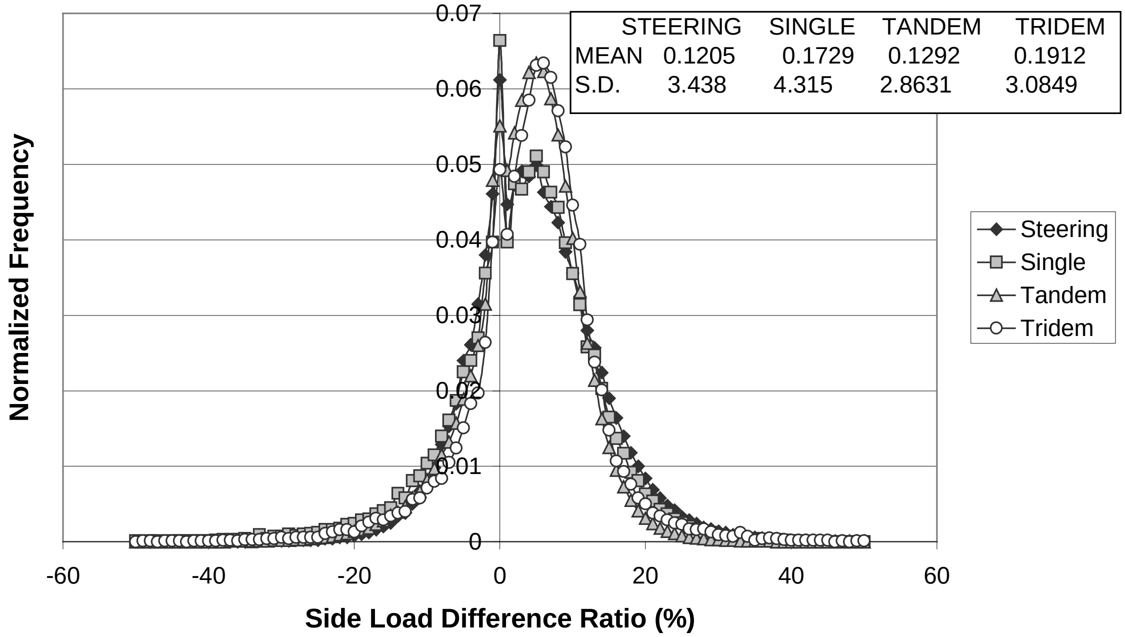



Right Side & Left Side Wheel Load Difference Ratio Distribution
(017018_HAYWARD NORTHBOUND )
STEERING SINGLE TANDEM TRIDEM
MEAN 0.1205 0.1729 0.1292 0.1912
S.D. 3.438 4.315 2.8631 3.0849
Steering
Single
Tandem
Tridem
Normalized Frequency
Side Load Difference Ratio (%)

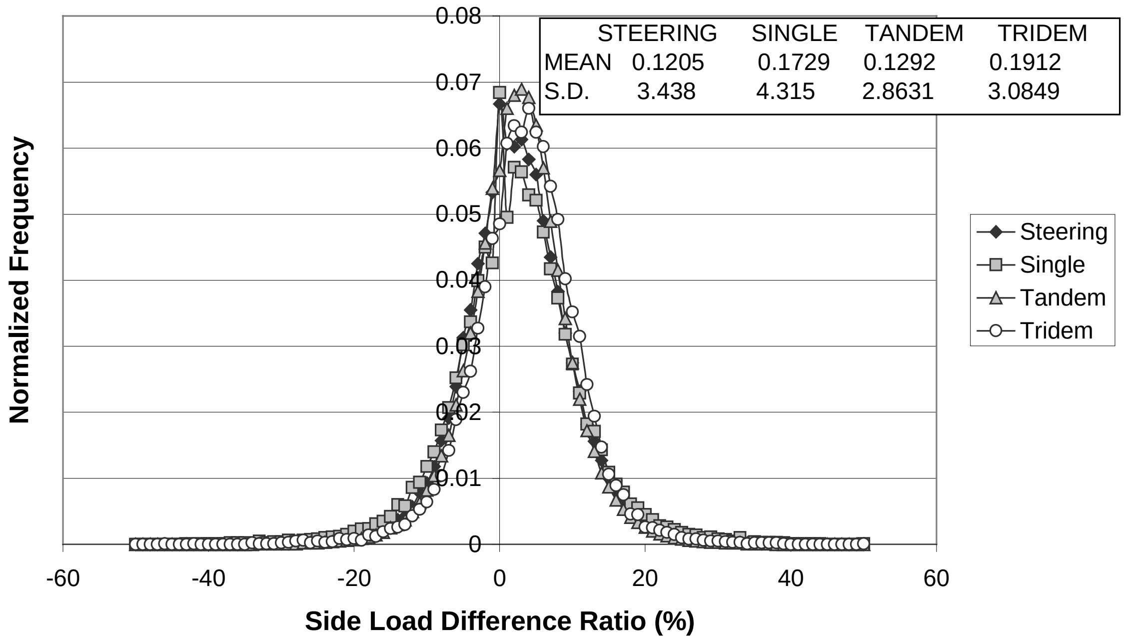

Right Side & Left Side Wheel Load Difference Ratio Distribution
(021_MOJAVE WESTBOUND )
STEERING SINGLE TANDEM TRIDEM
MEAN 0.1205 0.1729 0.1292 0.1912
S.D. 3.438 4.315 2.8631 3.0849
Steering
Single
Tandem
Tridem
Normalized Frequency
Side Load Difference Ratio (%)
0.06
0.05
0.04
0.03
0.02
0.01
0
-60
-40
-20
0
20
40
60


Right Side & Left Side Wheel Load Difference Ratio Distribution
(021_MOJAVE EASTBOUND )
STEERING SINGLE TANDEM TRIDEM
MEAN 0.1205 0.1729 0.1292 0.1912
S.D. 3.438 4.315 2.8631 3.0849
Steering
Single
Tandem
Tridem
Normalized Frequency
Side Load Difference Ratio (%)
0.1
0.09
0.08
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0
-60
-40
-20
0
20
40
60

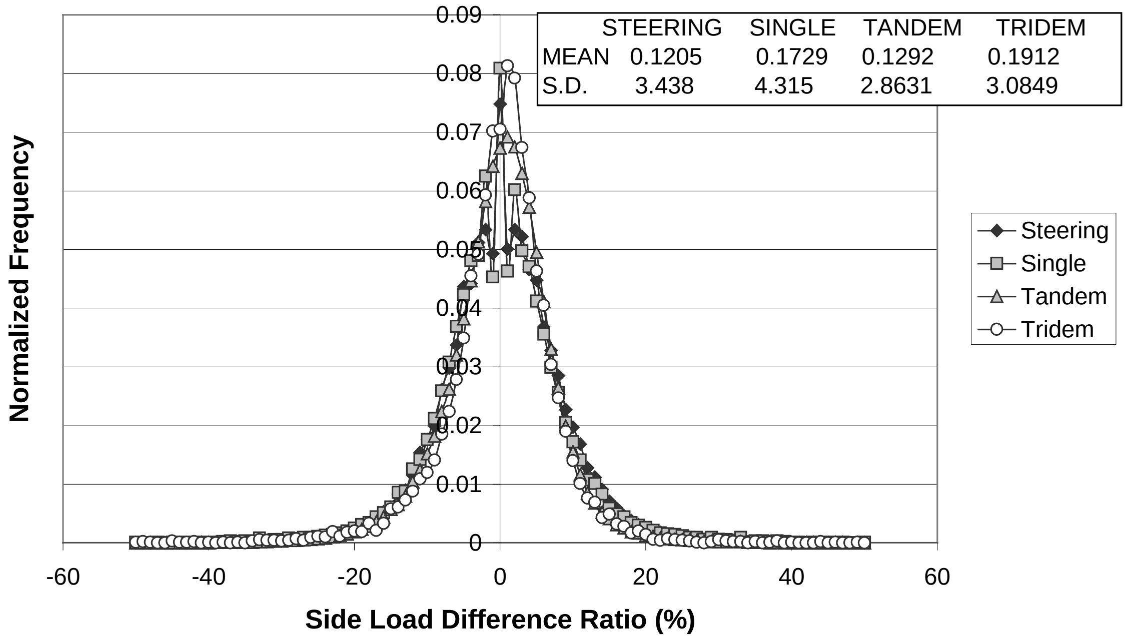
Right Side & Left Side Wheel Load Difference Ratio Distribution
(047048_CASTAIC SOUTHBOUND )



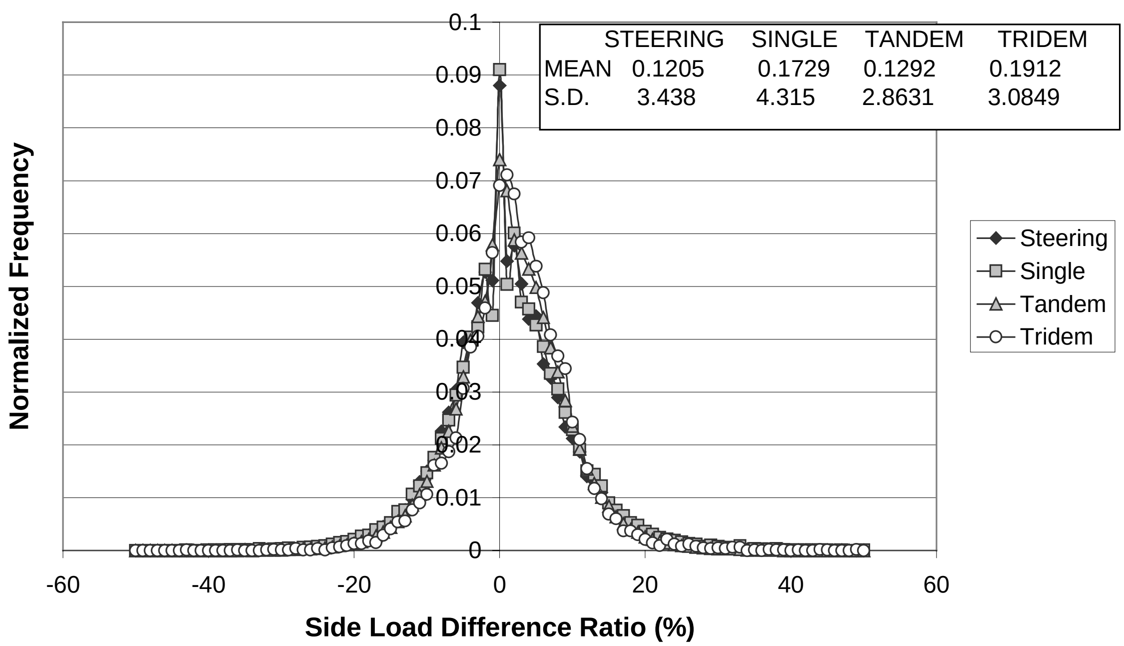

Right Side & Left Side Wheel Load Difference Ratio Distribution
(047048_CASTAIC NORTHBOUND )



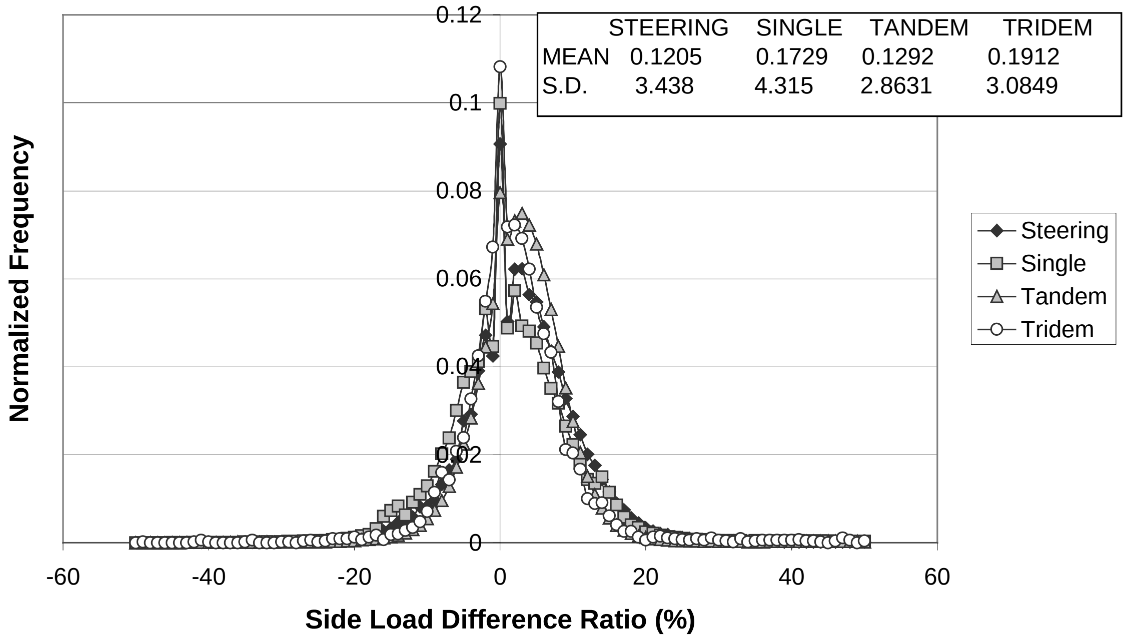
Right Side & Left Side Wheel Load Difference Ratio Distribution
(057058_PINOLE WESTBOUND )



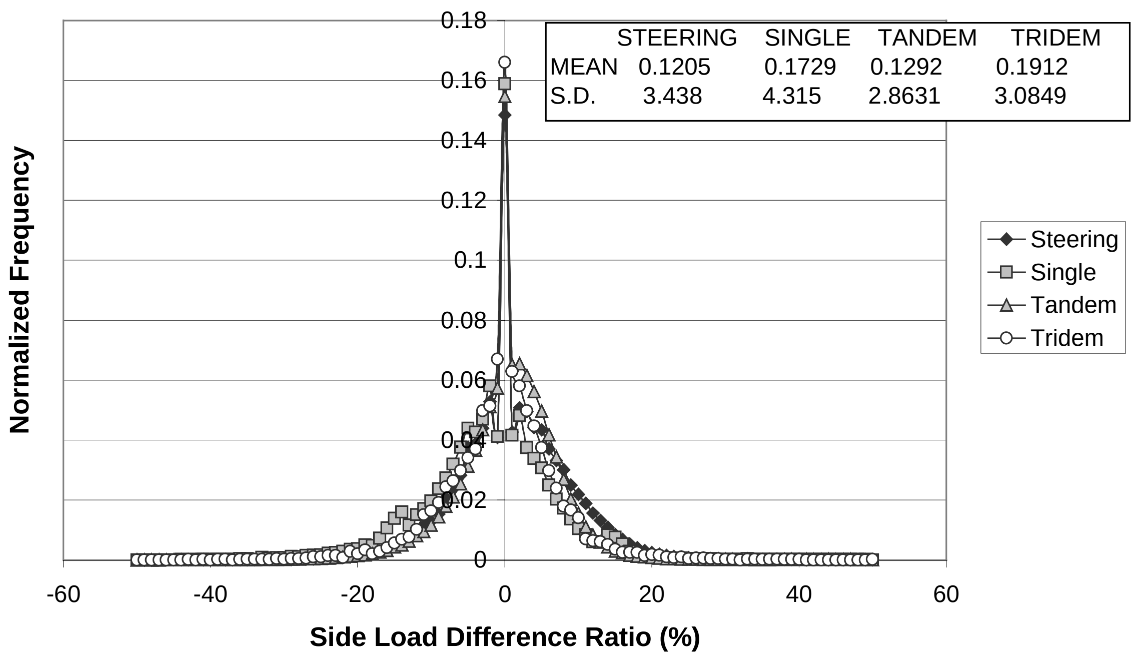

Right Side & Left Side Wheel Load Difference Ratio Distribution
(057058_PINOLE EASTBOUND )



Right Side & Left Side Wheel Load Difference Ratio Distribution
(072_BOWMAN WESTBOUND )




Right Side & Left Side Wheel Load Difference Ratio Distribution
(072_BOWMAN EASTBOUND )



# APPENDIX G:

# TRUCK AXLE RELATIONSHIP (PER 1000 TRUCKS)

# (AVERAGED OVER ALL THE WIM STATIONS IN CA FROM 1991 TO 2001)

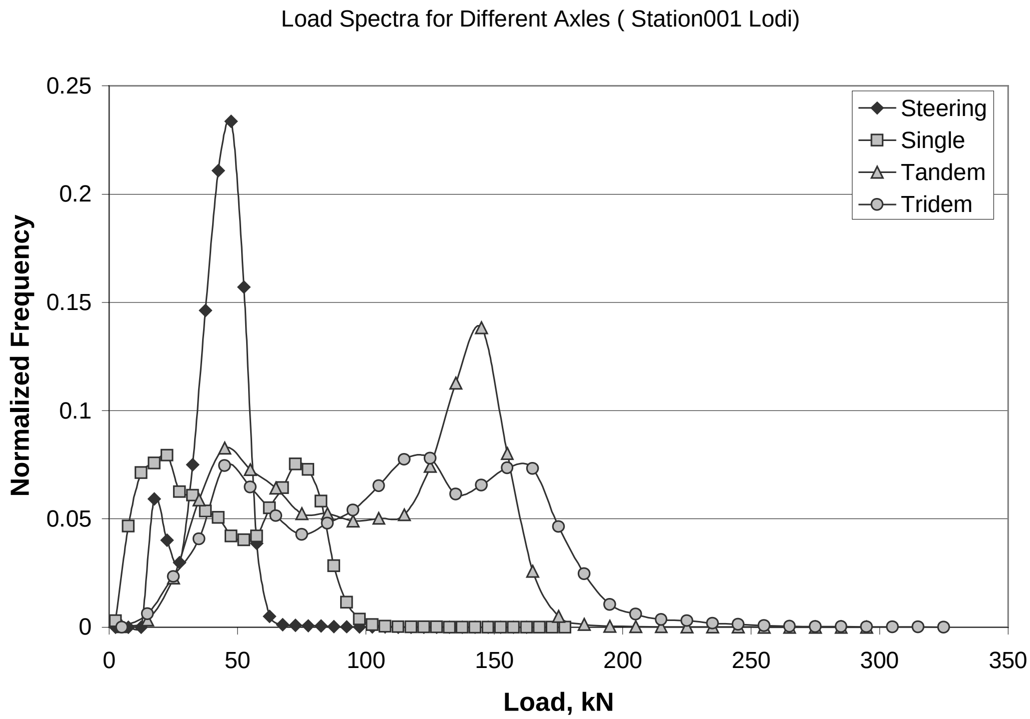
**Axle Number per 1000 Trucks**

| Axle Group | Truck Type | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **11** | **12** | **13** | **14** | **15** |
| Steering | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 | 1000 |
| Single | 342 | 1000 | 0 | 893 | 1583 | 0 | 0 | 4000 | 3000 | 1600 | 2000 | 1214 |
| Tandem | 649 | 0 | 1000 | 893 | 494 | 2000 | 1000 | 0 | 1000 | 2400 | 1000 | 577 |
| Tridem | 0 | 0 | 0 | 107 | 0 | 0 | 1000 | 0 | 0 | 200 | 0 | 143 |

# APPENDIX H:

# LOAD SPECTRA AND AADT FOR EACH STATION

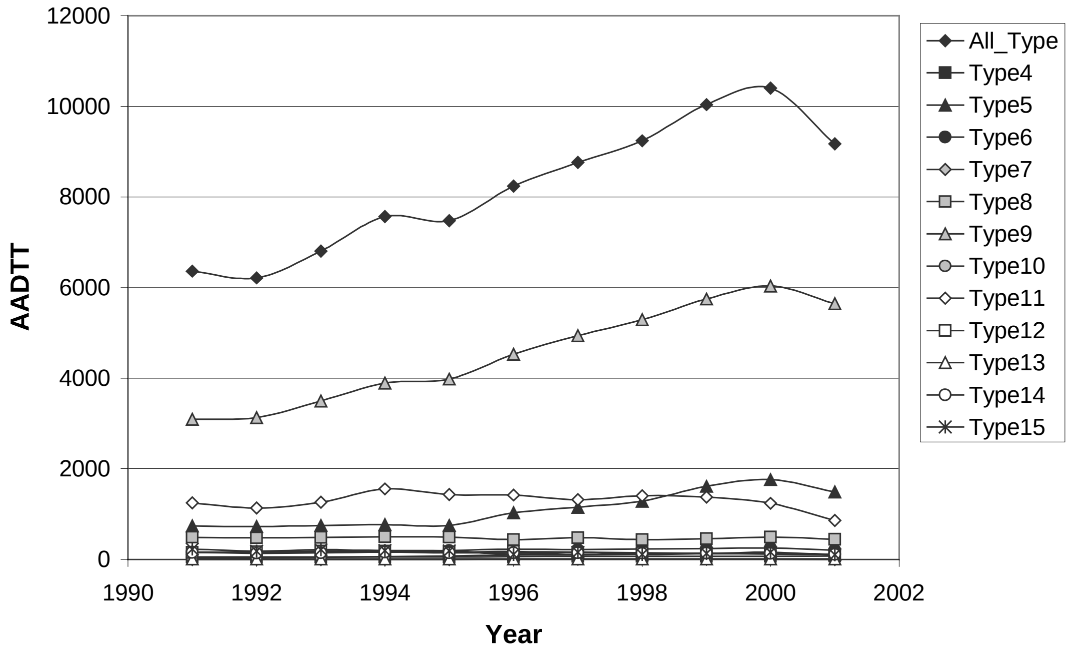
## STATION 1 LODI



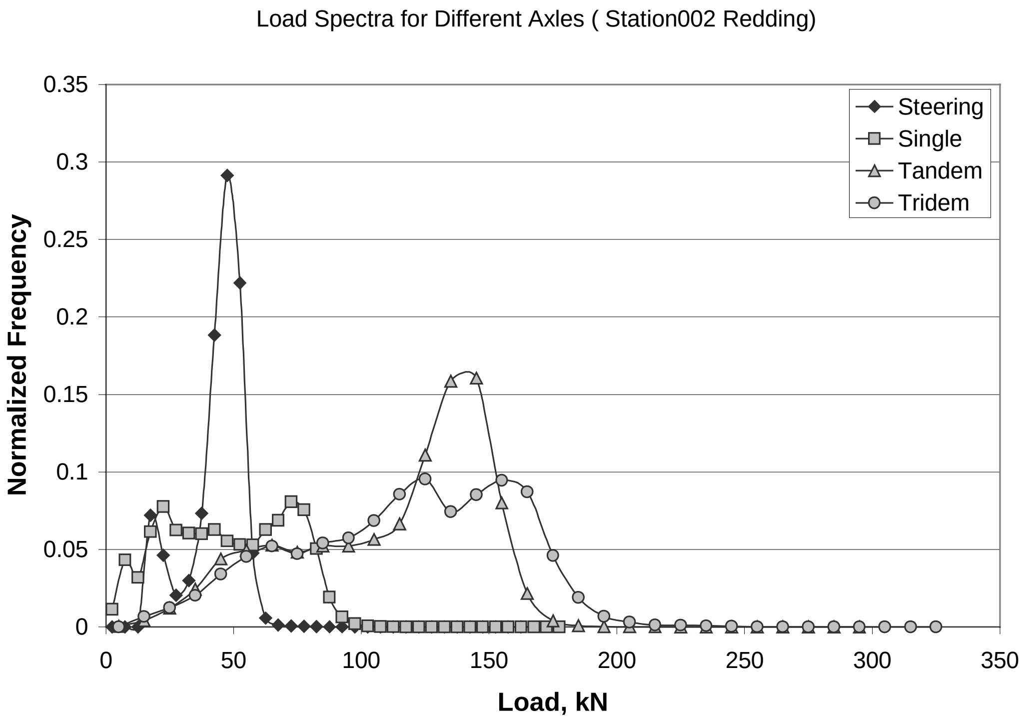

**Average Annual Daily Truck Traffic (AADTT) for Different Truck Types**

| Year | Truck Type | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **All** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **11** | **12** | **13** | **14** | **15** |
| 1991 | 6364 | 55 | 741 | 160 | 2 | 490 | 3098 | 30 | 1249 | 154 | 8 | 152 | 225 |
| 1992 | 6214 | 56 | 724 | 157 | 1 | 474 | 3132 | 39 | 1135 | 170 | 7 | 137 | 181 |
| 1993 | 6807 | 51 | 748 | 173 | 1 | 482 | 3499 | 48 | 1262 | 177 | 8 | 145 | 214 |
| 1994 | 7568 | 58 | 766 | 179 | 1 | 499 | 3896 | 62 | 1558 | 183 | 8 | 161 | 198 |
| 1995 | 7480 | 54 | 748 | 197 | 2 | 491 | 3979 | 72 | 1431 | 163 | 8 | 145 | 190 |
| 1996 | 8235 | 59 | 1030 | 225 | 3 | 435 | 4530 | 95 | 1421 | 176 | 8 | 144 | 110 |
| 1997 | 8762 | 70 | 1151 | 220 | 4 | 479 | 4942 | 101 | 1319 | 158 | 8 | 150 | 159 |
| 1998 | 9238 | 66 | 1286 | 232 | 4 | 434 | 5290 | 118 | 1405 | 145 | 10 | 136 | 112 |
| 1999 | 10037 | 65 | 1612 | 239 | 4 | 460 | 5747 | 121 | 1375 | 137 | 9 | 138 | 130 |
| 2000 | 10400 | 70 | 1763 | 251 | 3 | 491 | 6035 | 119 | 1237 | 130 | 12 | 131 | 156 |
| 2001 | 9172 | 76 | 1493 | 205 | 2 | 443 | 5643 | 113 | 859 | 111 | 9 | 111 | 106 |

Annual Average Daily Traffic For Different Truck Types ( Station 001_Lodi)

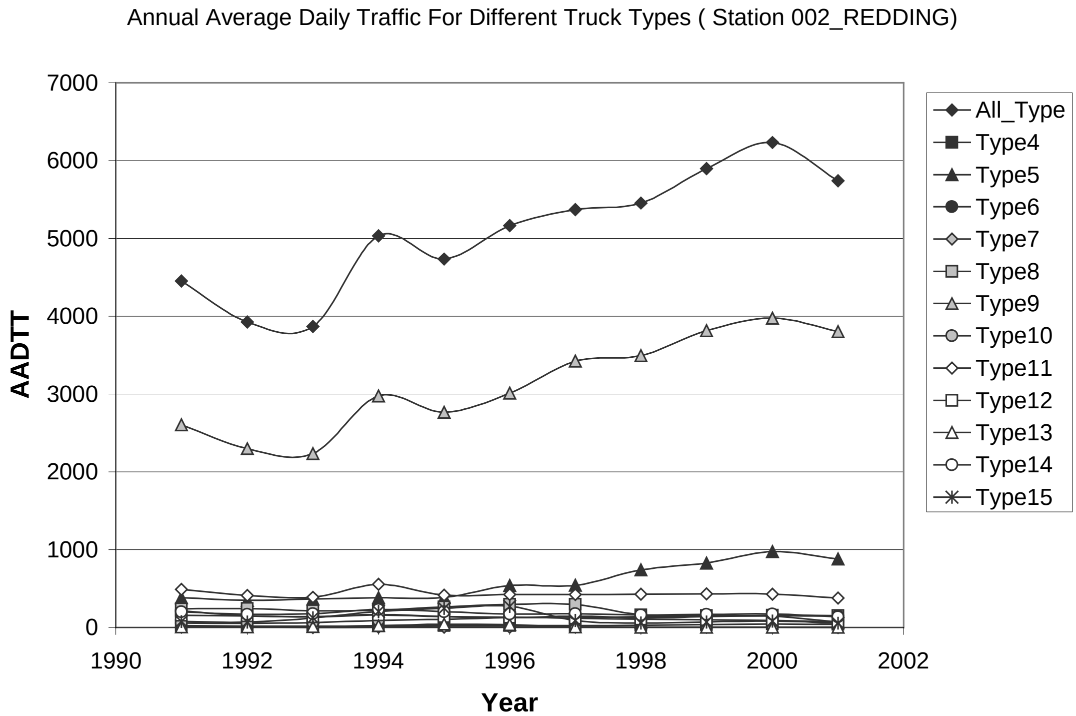


**STATION 2 REDDING**



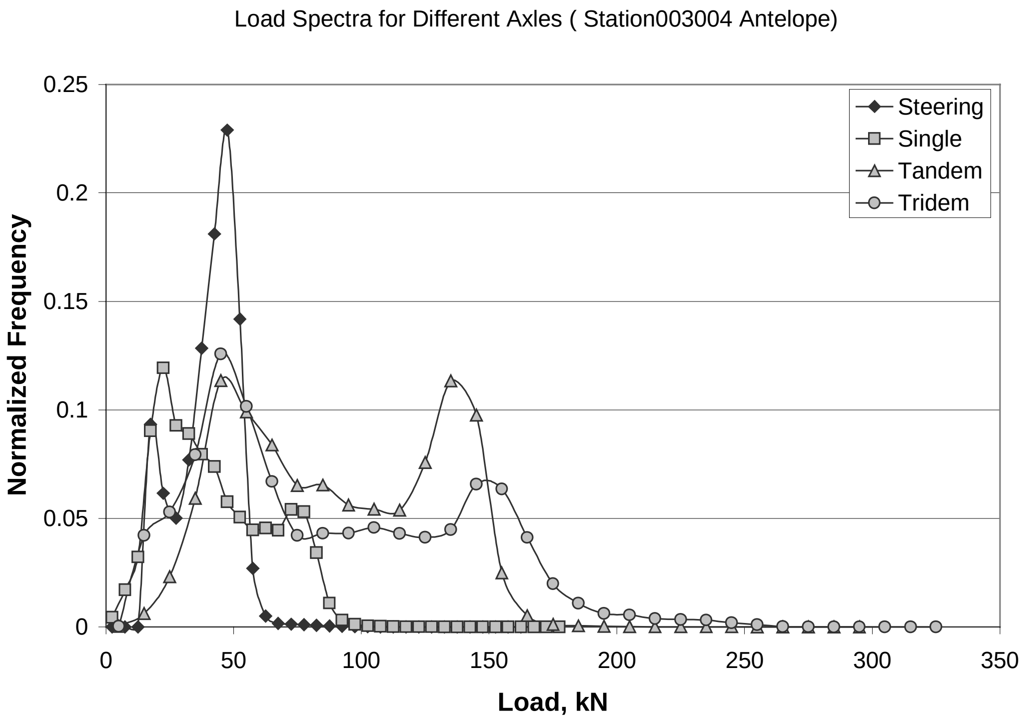

**Average Annual Daily Traffic for Different Truck Types**

| **Year** | **Truck Type** | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **All** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **11** | **12** | **13** | **14** | **15** |
| 1991 | 4454 | 26 | 385 | 214 | 2 | 238 | 2605 | 55 | 488 | 157 | 7 | 201 | 76 |
| 1992 | 3928 | 18 | 350 | 151 | 4 | 244 | 2299 | 54 | 411 | 148 | 7 | 171 | 69 |
| 1993 | 3868 | 16 | 366 | 141 | 1 | 214 | 2237 | 61 | 389 | 136 | 9 | 178 | 121 |
| 1994 | 5035 | 20 | 382 | 165 | 3 | 223 | 2977 | 91 | 554 | 159 | 23 | 231 | 207 |
| 1995 | 4737 | 23 | 387 | 140 | 2 | 265 | 2768 | 104 | 417 | 141 | 43 | 203 | 246 |
| 1996 | 5166 | 25 | 539 | 126 | 3 | 298 | 3012 | 126 | 425 | 133 | 36 | 173 | 272 |
| 1997 | 5372 | 24 | 542 | 146 | 2 | 296 | 3423 | 125 | 422 | 119 | 8 | 175 | 89 |
| 1998 | 5457 | 29 | 740 | 125 | 2 | 162 | 3495 | 141 | 431 | 108 | 6 | 160 | 58 |
| 1999 | 5898 | 37 | 828 | 139 | 3 | 153 | 3815 | 147 | 433 | 100 | 5 | 169 | 70 |
| 2000 | 6234 | 47 | 977 | 145 | 3 | 154 | 3978 | 153 | 429 | 88 | 5 | 172 | 84 |
| 2001 | 5743 | 41 | 881 | 68 | 1 | 152 | 3805 | 148 | 379 | 71 | 4 | 138 | 56 |



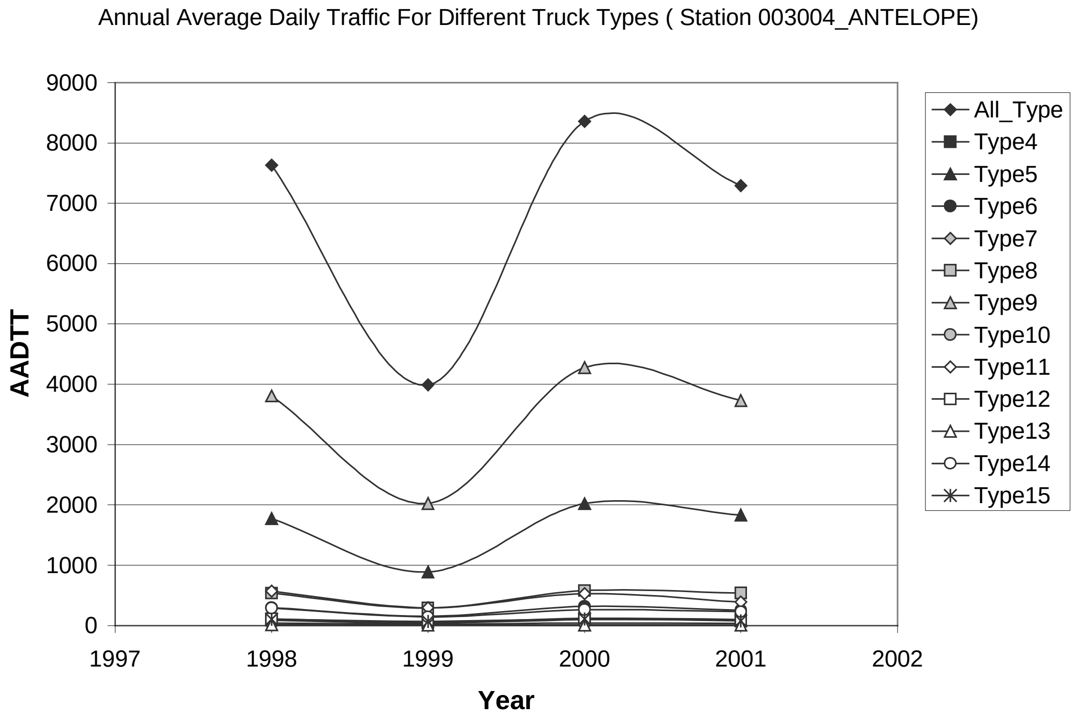
Annual Average Daily Traffic For Different Truck Types ( Station 002_REDDING)
AADTT
7000
6000
5000
4000
3000
2000
1000
0
1990
1992
1994
1996
1998
2000
2002
Year
All_Type
Type4
Type5
Type6
Type7
Type8
Type9
Type10
Type11
Type12
Type13
Type14
Type15

## STATIONS 3&4 ANTELOPE



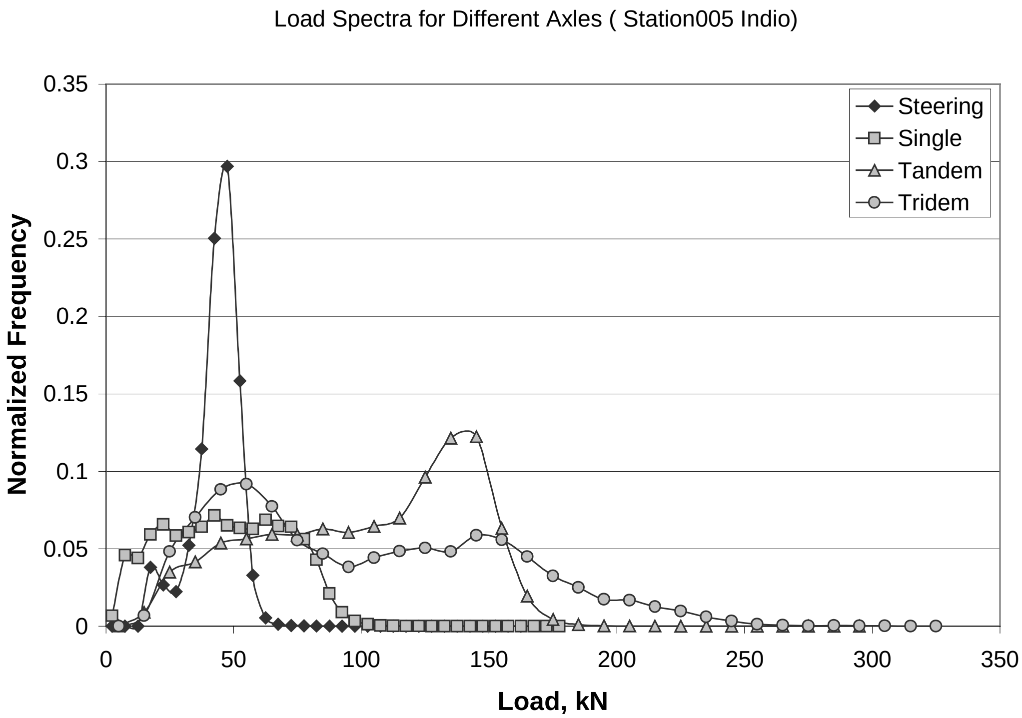

## Average Annual Daily Traffic for Different Truck Types

| Year | Truck Type | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **All** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **11** | **12** | **13** | **14** | **15** |
| 1998 | 7634 | 89 | 1774 | 297 | 7 | 537 | 3807 | 42 | 569 | 108 | 12 | 288 | 104 |
| 1999 | 3989 | 40 | 889 | 155 | 4 | 290 | 2023 | 20 | 295 | 54 | 5 | 144 | 68 |
| 2000 | 8359 | 99 | 2020 | 317 | 6 | 579 | 4273 | 41 | 530 | 118 | 9 | 260 | 107 |
| 2001 | 7292 | 93 | 1830 | 255 | 3 | 541 | 3730 | 35 | 389 | 103 | 6 | 229 | 79 |



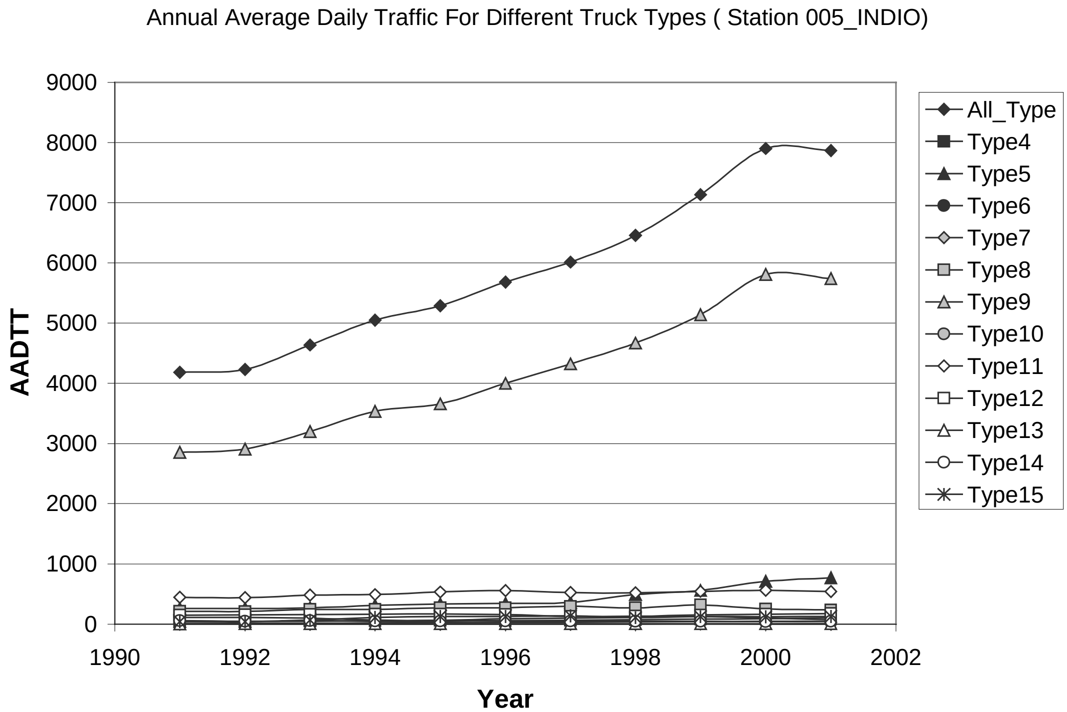
Annual Average Daily Traffic For Different Truck Types ( Station 003004_ANTELOPE)
AADTT
9000
8000
7000
6000
5000
4000
3000
2000
1000
0
1997
1998
1999
2000
2001
2002
Year
All_Type
Type4
Type5
Type6
Type7
Type8
Type9
Type10
Type11
Type12
Type13
Type14
Type15

## STATION 5 INDIO

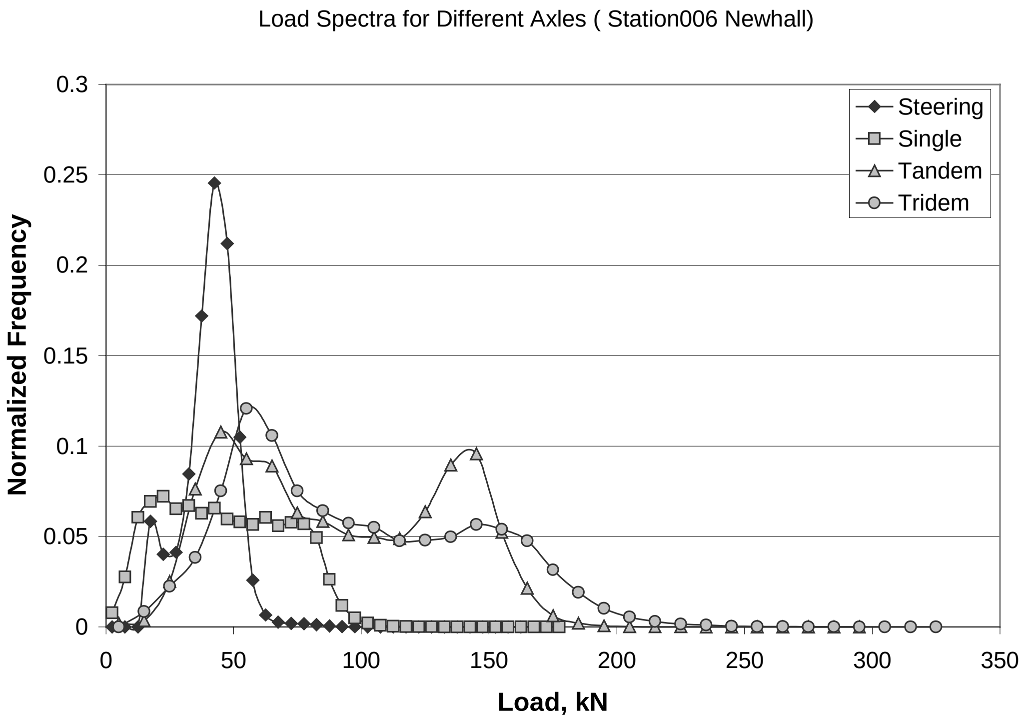



### Average Annual Daily Traffic for Different Truck Types

| Year | Truck Type | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **All** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **11** | **12** | **13** | **14** | **15** |
| 1991 | 4182 | 41 | 258 | 111 | 1 | 213 | 2855 | 10 | 444 | 146 | 4 | 59 | 41 |
| 1992 | 4232 | 45 | 263 | 108 | 0 | 210 | 2908 | 12 | 438 | 153 | 5 | 45 | 44 |
| 1993 | 4636 | 48 | 269 | 98 | 1 | 241 | 3200 | 13 | 482 | 158 | 6 | 55 | 65 |
| 1994 | 5049 | 57 | 310 | 65 | 0 | 245 | 3534 | 19 | 490 | 165 | 5 | 50 | 110 |
| 1995 | 5289 | 63 | 332 | 63 | 1 | 269 | 3658 | 23 | 533 | 166 | 5 | 48 | 129 |
| 1996 | 5685 | 60 | 342 | 87 | 1 | 271 | 4000 | 28 | 556 | 158 | 5 | 51 | 127 |
| 1997 | 6013 | 62 | 359 | 100 | 1 | 295 | 4323 | 32 | 524 | 127 | 6 | 48 | 137 |
| 1998 | 6458 | 71 | 491 | 110 | 1 | 268 | 4669 | 36 | 520 | 132 | 7 | 46 | 107 |
| 1999 | 7137 | 83 | 560 | 125 | 2 | 318 | 5140 | 40 | 542 | 149 | 7 | 46 | 125 |
| 2000 | 7900 | 92 | 709 | 99 | 1 | 253 | 5808 | 45 | 564 | 163 | 7 | 39 | 120 |
| 2001 | 7869 | 105 | 768 | 75 | 1 | 235 | 5740 | 49 | 539 | 174 | 9 | 46 | 128 |

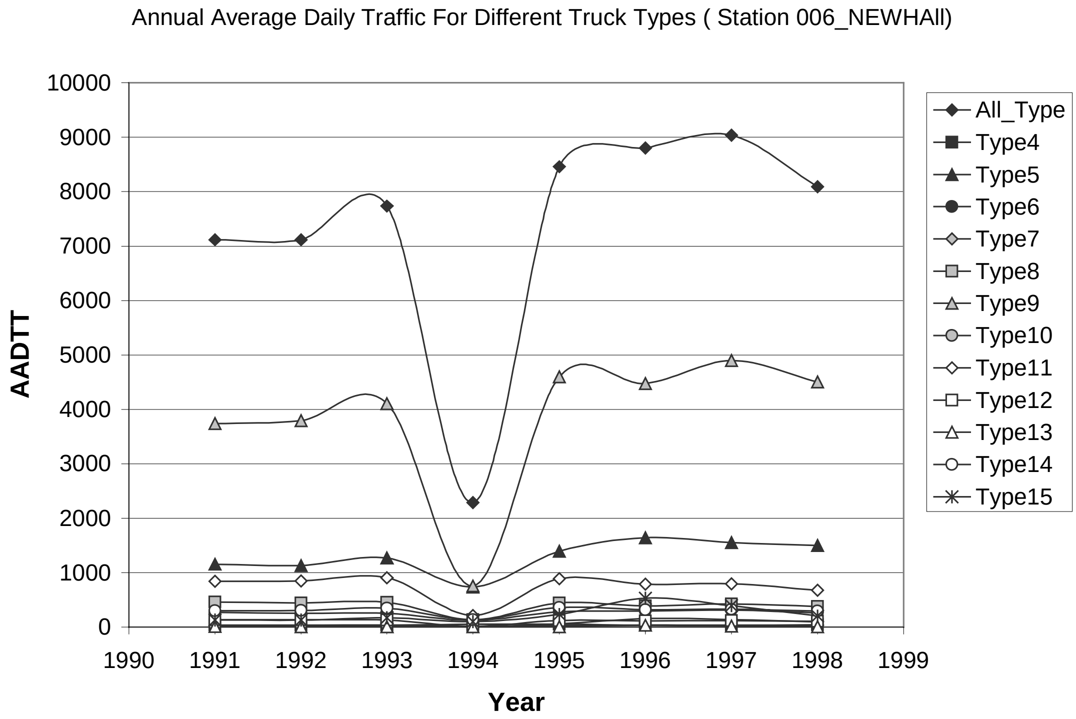

Annual Average Daily Traffic For Different Truck Types ( Station 005_INDIO)
9000
8000
7000
6000
5000
4000
3000
2000
1000
0
AADTT
1990
1992
1994
1996
1998
2000
2002
Year
All_Type
Type4
Type5
Type6
Type7
Type8
Type9
Type10
Type11
Type12
Type13
Type14
Type15

**STATION 6 NEWHALL**



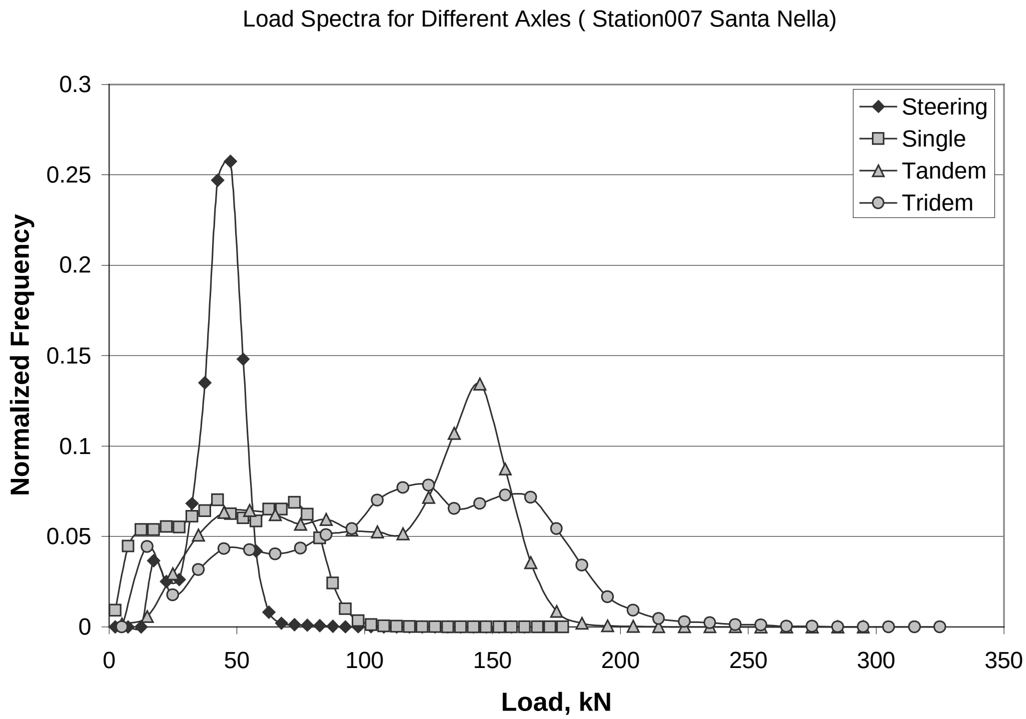

**Average Annual Daily Traffic for Different Truck Types**

| **Year** | **Truck Type** | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **All** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **11** | **12** | **13** | **14** | **15** |
| 1991 | 7120 | 37 | 1157 | 270 | 21 | 460 | 3738 | 26 | 838 | 133 | 10 | 302 | 130 |
| 1992 | 7117 | 32 | 1129 | 251 | 20 | 444 | 3794 | 28 | 845 | 133 | 9 | 305 | 127 |
| 1993 | 7737 | 36 | 1269 | 250 | 24 | 456 | 4106 | 38 | 906 | 127 | 8 | 346 | 172 |
| 1994 | 2291 | 51 | 738 | 122 | 10 | 135 | 755 | 8 | 216 | 16 | 4 | 136 | 99 |
| 1995 | 8459 | 53 | 1392 | 280 | 26 | 443 | 4598 | 59 | 885 | 121 | 8 | 359 | 234 |
| 1996 | 8806 | 34 | 1642 | 295 | 28 | 389 | 4477 | 156 | 789 | 112 | 31 | 321 | 532 |
| 1997 | 9037 | 34 | 1551 | 313 | 27 | 424 | 4900 | 138 | 795 | 117 | 19 | 328 | 392 |
| 1998 | 8094 | 39 | 1499 | 261 | 32 | 377 | 4503 | 94 | 677 | 104 | 9 | 296 | 203 |



Annual Average Daily Traffic For Different Truck Types ( Station 006_NEWHAll)
AADTT
Year
0
1000
2000
3000
4000
5000
6000
7000
8000
9000
10000
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
All_Type
Type4
Type5
Type6
Type7
Type8
Type9
Type10
Type11
Type12
Type13
Type14
Type15

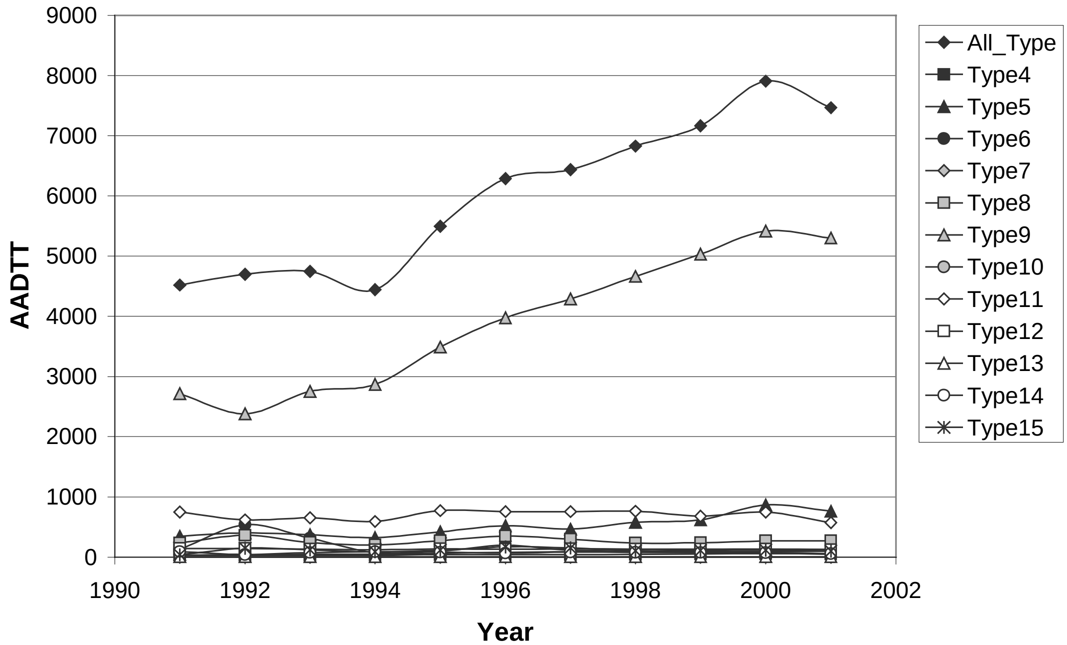
## STATION 7 SANTA NELLA



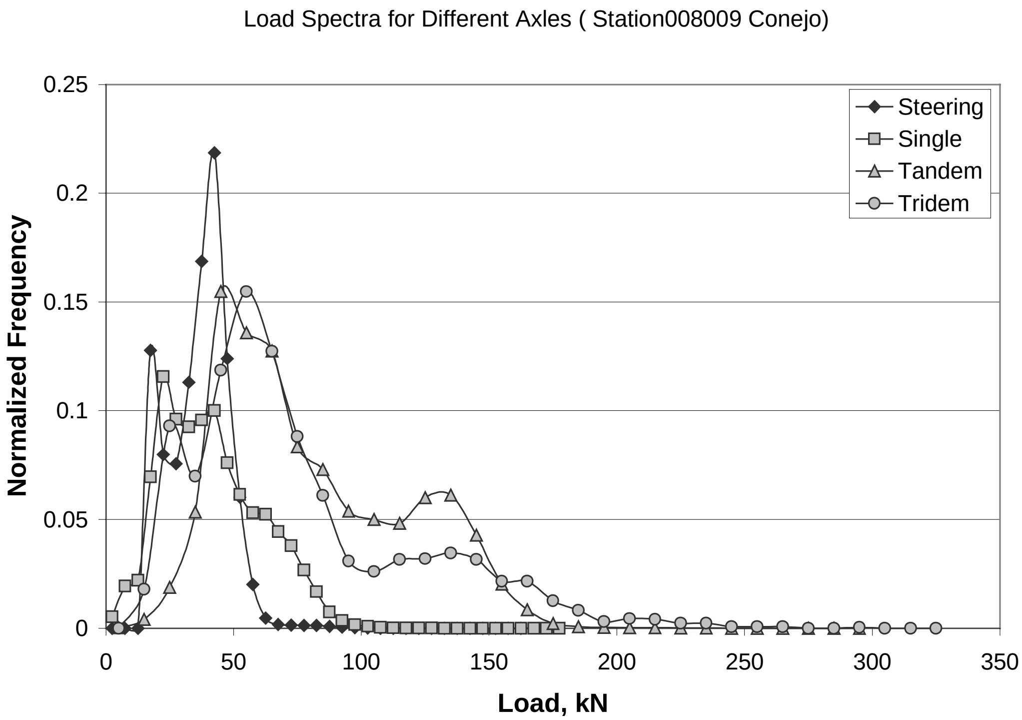

### Average Annual Daily Traffic for Different Truck Types

| Year | Truck Type | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **All** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **11** | **12** | **13** | **14** | **15** |
| 1991 | 4518 | 33 | 346 | 126 | 1 | 231 | 2715 | 33 | 750 | 145 | 7 | 93 | 39 |
| 1992 | 4701 | 29 | 403 | 535 | 1 | 362 | 2381 | 38 | 618 | 140 | 7 | 41 | 146 |
| 1993 | 4744 | 31 | 370 | 315 | 1 | 243 | 2755 | 45 | 652 | 132 | 6 | 74 | 121 |
| 1994 | 4444 | 29 | 325 | 74 | 1 | 204 | 2869 | 47 | 591 | 120 | 5 | 89 | 89 |
| 1995 | 5496 | 41 | 419 | 98 | 1 | 270 | 3491 | 63 | 772 | 137 | 7 | 82 | 115 |
| 1996 | 6288 | 38 | 519 | 195 | 1 | 351 | 3976 | 78 | 755 | 131 | 6 | 67 | 170 |
| 1997 | 6437 | 40 | 465 | 116 | 1 | 296 | 4289 | 90 | 755 | 138 | 6 | 86 | 154 |
| 1998 | 6827 | 46 | 578 | 126 | 1 | 231 | 4662 | 98 | 761 | 135 | 7 | 77 | 106 |
| 1999 | 7164 | 51 | 618 | 127 | 1 | 239 | 5032 | 90 | 681 | 133 | 7 | 74 | 111 |
| 2000 | 7907 | 58 | 866 | 132 | 1 | 268 | 5416 | 92 | 746 | 131 | 8 | 72 | 116 |
| 2001 | 7465 | 50 | 762 | 126 | 1 | 273 | 5300 | 98 | 572 | 123 | 6 | 56 | 100 |

Annual Average Daily Traffic For Different Truck Types ( Station 007_SANTA_NELLA)



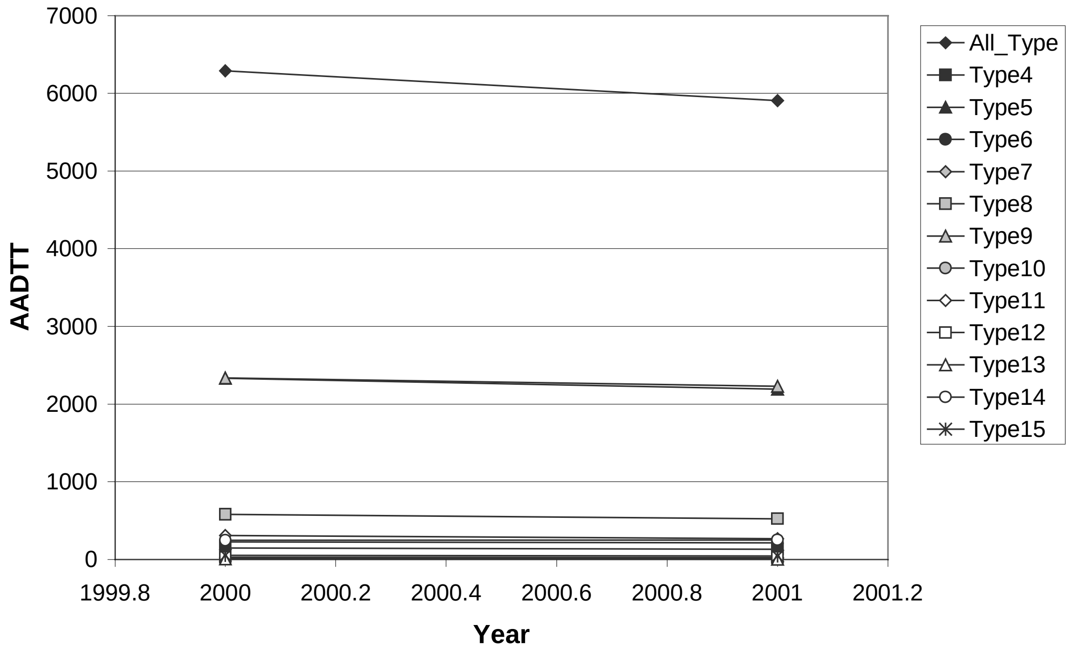
## STATIONS 8&9 CONEJO



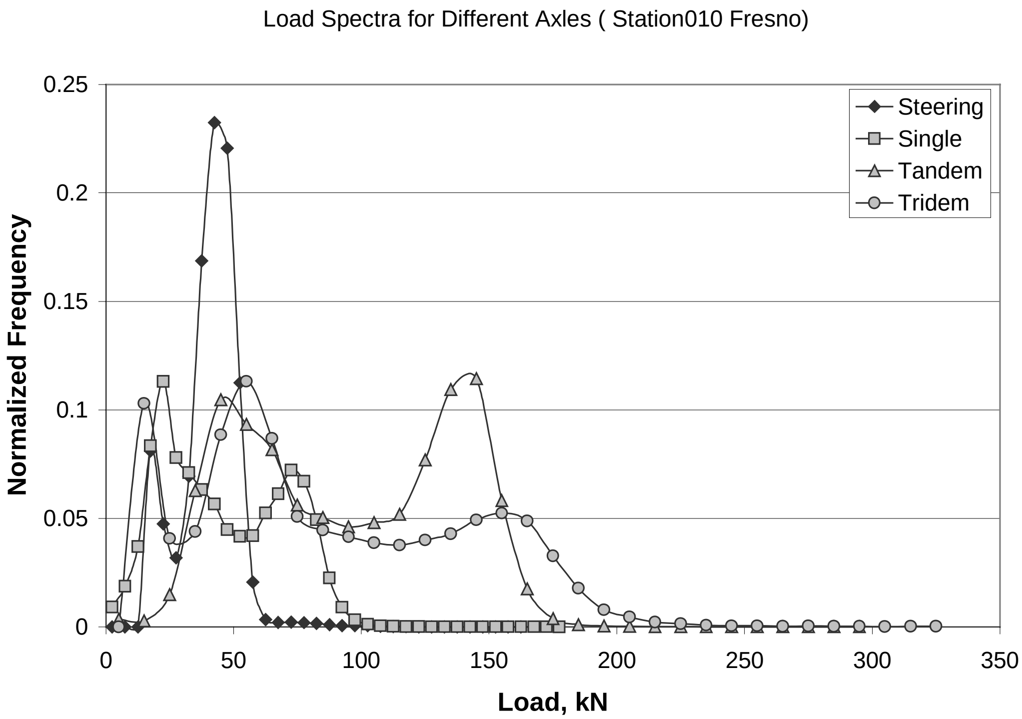

### Average Annual Daily Traffic for Different Truck Types

| **Year** | **Truck Type** | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **All** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **11** | **12** | **13** | **14** | **15** |
| 2000 | 6291 | 147 | 2333 | 225 | 17 | 580 | 2335 | 13 | 309 | 26 | 6 | 248 | 52 |
| 2001 | 5905 | 132 | 2189 | 214 | 20 | 524 | 2228 | 10 | 266 | 23 | 3 | 253 | 44 |

Annual Average Daily Traffic For Different Truck Types ( Station 008009_CONEJO)

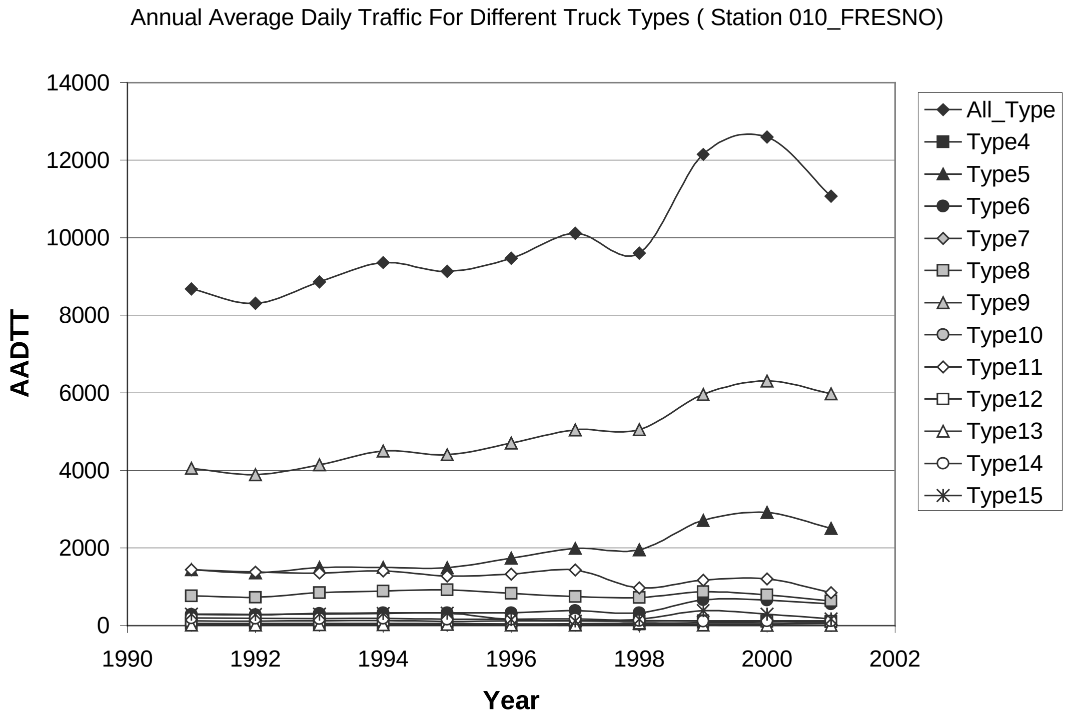


## STATION 10 FRESNO

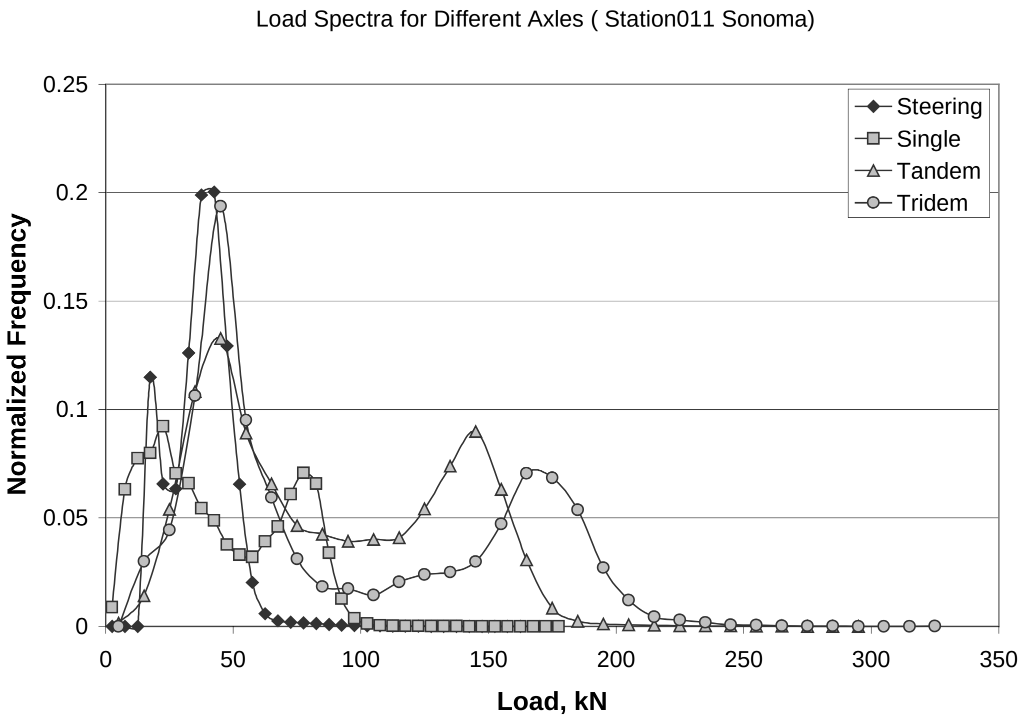



### Average Annual Daily Traffic for Different Truck Types

| Year | Truck Type | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **All** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **11** | **12** | **13** | **14** | **15** |
| 1991 | 8679 | 53 | 1440 | 287 | 8 | 764 | 4055 | 17 | 1440 | 118 | 8 | 191 | 296 |
| 1992 | 8308 | 49 | 1358 | 273 | 16 | 726 | 3891 | 18 | 1379 | 114 | 16 | 181 | 286 |
| 1993 | 8860 | 50 | 1498 | 316 | 17 | 844 | 4147 | 23 | 1353 | 120 | 19 | 179 | 294 |
| 1994 | 9358 | 56 | 1495 | 327 | 12 | 888 | 4501 | 30 | 1411 | 127 | 20 | 181 | 311 |
| 1995 | 9131 | 53 | 1491 | 326 | 8 | 923 | 4406 | 32 | 1277 | 108 | 23 | 163 | 321 |
| 1996 | 9474 | 43 | 1737 | 331 | 8 | 831 | 4706 | 41 | 1328 | 116 | 14 | 165 | 153 |
| 1997 | 10113 | 43 | 1988 | 383 | 13 | 748 | 5047 | 47 | 1427 | 117 | 12 | 170 | 119 |
| 1998 | 9604 | 36 | 1956 | 328 | 10 | 721 | 5051 | 61 | 973 | 112 | 64 | 129 | 163 |
| 1999 | 12150 | 74 | 2713 | 661 | 21 | 870 | 5963 | 62 | 1168 | 120 | 8 | 110 | 380 |
| 2000 | 12594 | 104 | 2914 | 654 | 20 | 791 | 6307 | 60 | 1199 | 123 | 5 | 120 | 297 |
| 2001 | 11071 | 93 | 2504 | 557 | 4 | 638 | 5975 | 53 | 852 | 102 | 5 | 119 | 169 |


Annual Average Daily Traffic For Different Truck Types ( Station 010_FRESNO)
AADTT
Year
0
2000
4000
6000
8000
10000
12000
14000
1990
1992
1994
1996
1998
2000
2002
All_Type
Type4
Type5
Type6
Type7
Type8
Type9
Type10
Type11
Type12
Type13
Type14
Type15

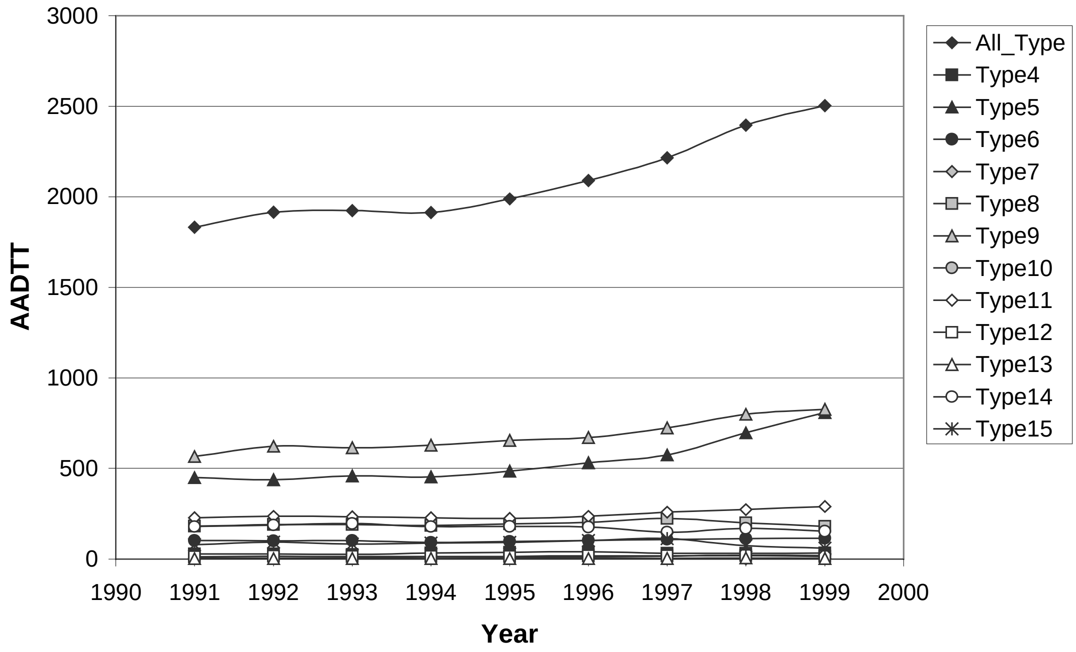
## STATION 11 SONOMA



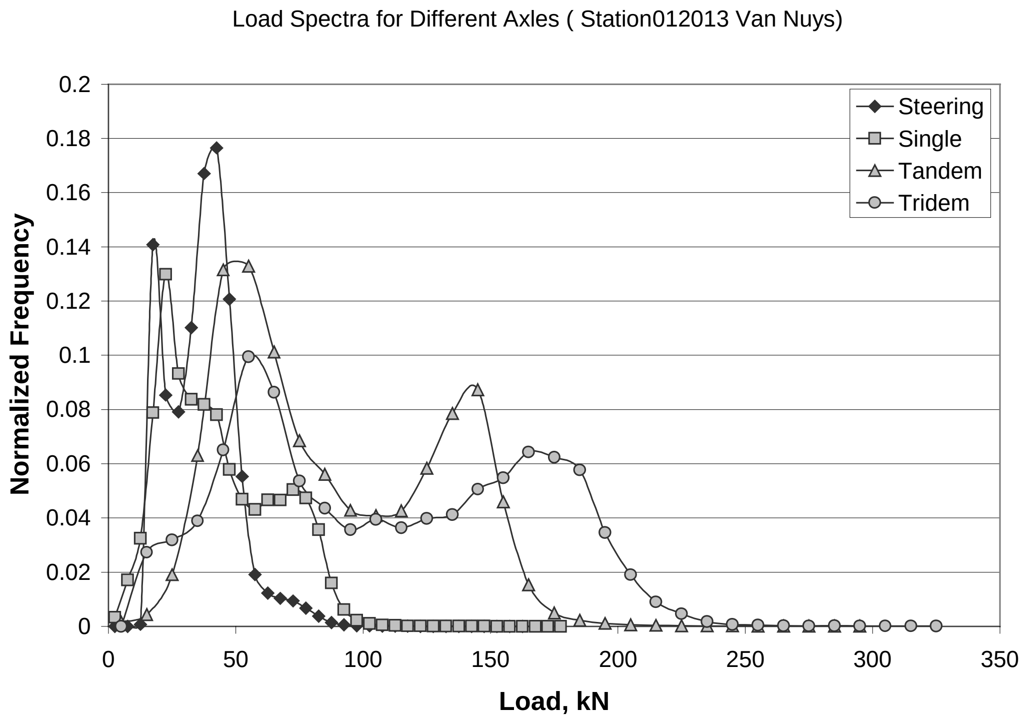

### Average Annual Daily Traffic for Different Truck Types

| Year | Truck Type | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **All** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **11** | **12** | **13** | **14** | **15** |
| 1991 | 1831 | 28 | 449 | 102 | 2 | 181 | 566 | 5 | 228 | 12 | 2 | 179 | 78 |
| 1992 | 1914 | 27 | 438 | 100 | 2 | 190 | 622 | 4 | 235 | 15 | 2 | 187 | 93 |
| 1993 | 1924 | 25 | 459 | 101 | 1 | 190 | 614 | 7 | 233 | 13 | 3 | 196 | 83 |
| 1994 | 1913 | 33 | 454 | 92 | 1 | 185 | 628 | 11 | 227 | 13 | 3 | 179 | 87 |
| 1995 | 1988 | 37 | 485 | 96 | 2 | 193 | 655 | 10 | 223 | 14 | 2 | 180 | 92 |
| 1996 | 2090 | 39 | 531 | 101 | 2 | 203 | 670 | 11 | 236 | 17 | 2 | 177 | 101 |
| 1997 | 2215 | 32 | 574 | 108 | 1 | 223 | 724 | 15 | 258 | 17 | 3 | 148 | 112 |
| 1998 | 2396 | 31 | 697 | 112 | 1 | 199 | 799 | 21 | 272 | 18 | 5 | 169 | 73 |
| 1999 | 2504 | 33 | 809 | 114 | 1 | 180 | 826 | 20 | 290 | 14 | 3 | 154 | 59 |

Annual Average Daily Traffic For Different Truck Types ( Station 011_SONOMA)

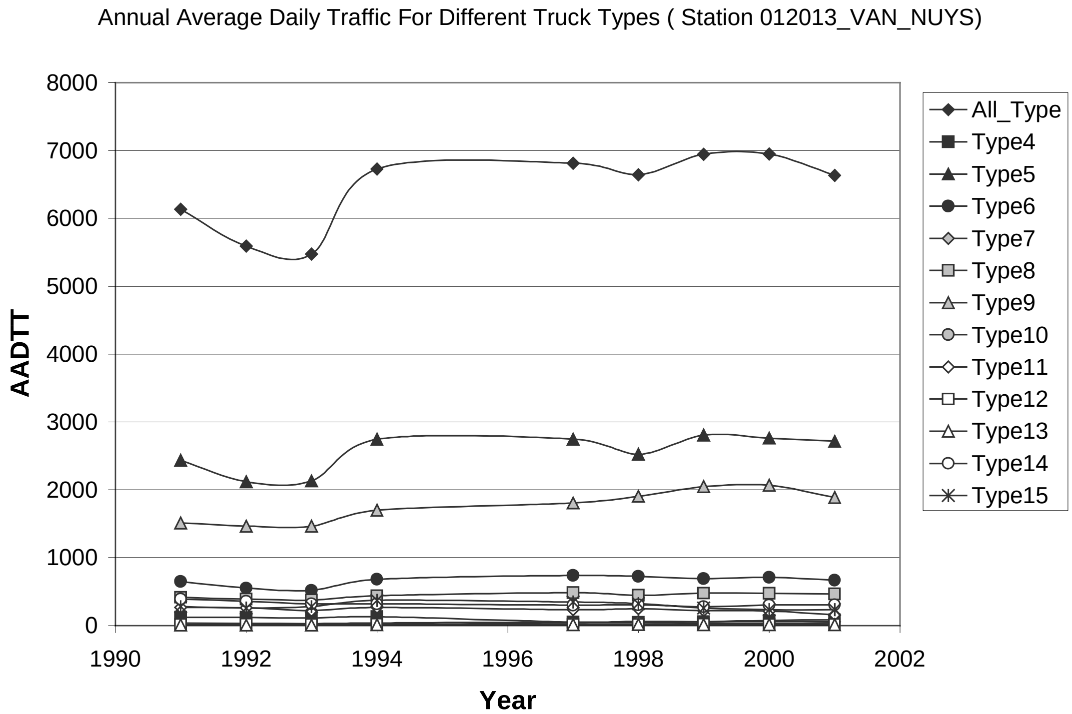


## STATIONS 12&13 VAN NUYS



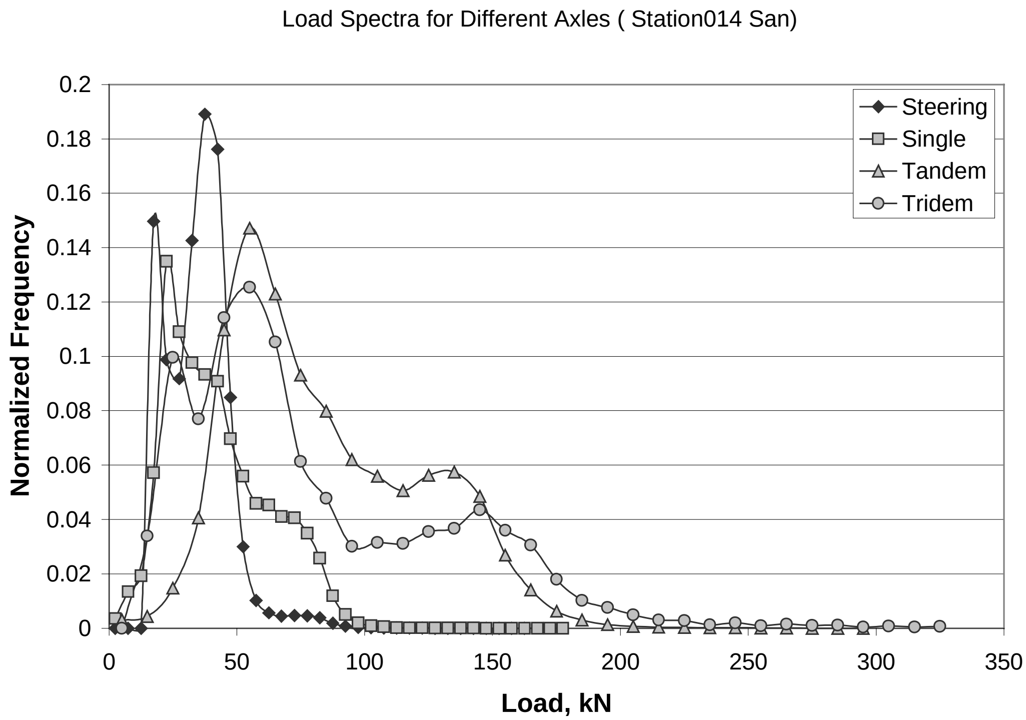

### Average Annual Daily Traffic for Different Truck Types

| Year | Truck Type | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **All** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **11** | **12** | **13** | **14** | **15** |
| 1991 | 6134 | 120 | 2432 | 647 | 39 | 416 | 1512 | 8 | 267 | 15 | 10 | 389 | 280 |
| 1992 | 5591 | 120 | 2120 | 553 | 31 | 390 | 1466 | 9 | 261 | 16 | 7 | 357 | 260 |
| 1993 | 5473 | 111 | 2132 | 516 | 26 | 376 | 1461 | 10 | 222 | 14 | 7 | 321 | 279 |
| 1994 | 6727 | 130 | 2745 | 681 | 37 | 440 | 1699 | 11 | 267 | 16 | 12 | 319 | 371 |
| 1997 | 6813 | 48 | 2747 | 739 | 50 | 484 | 1804 | 39 | 234 | 11 | 13 | 299 | 346 |
| 1998 | 6643 | 47 | 2522 | 723 | 59 | 444 | 1903 | 42 | 246 | 13 | 14 | 304 | 324 |
| 1999 | 6944 | 54 | 2806 | 691 | 54 | 477 | 2047 | 29 | 221 | 16 | 12 | 277 | 260 |
| 2000 | 6948 | 76 | 2761 | 710 | 60 | 473 | 2067 | 30 | 213 | 13 | 13 | 302 | 232 |
| 2001 | 6635 | 84 | 2714 | 670 | 55 | 465 | 1888 | 36 | 161 | 11 | 12 | 305 | 233 |



Annual Average Daily Traffic For Different Truck Types ( Station 012013_VAN_NUYS)
AADTT
8000
7000
6000
5000
4000
3000
2000
1000
0
1990
1992
1994
1996
1998
2000
2002
Year
All_Type
Type4
Type5
Type6
Type7
Type8
Type9
Type10
Type11
Type12
Type13
Type14
Type15

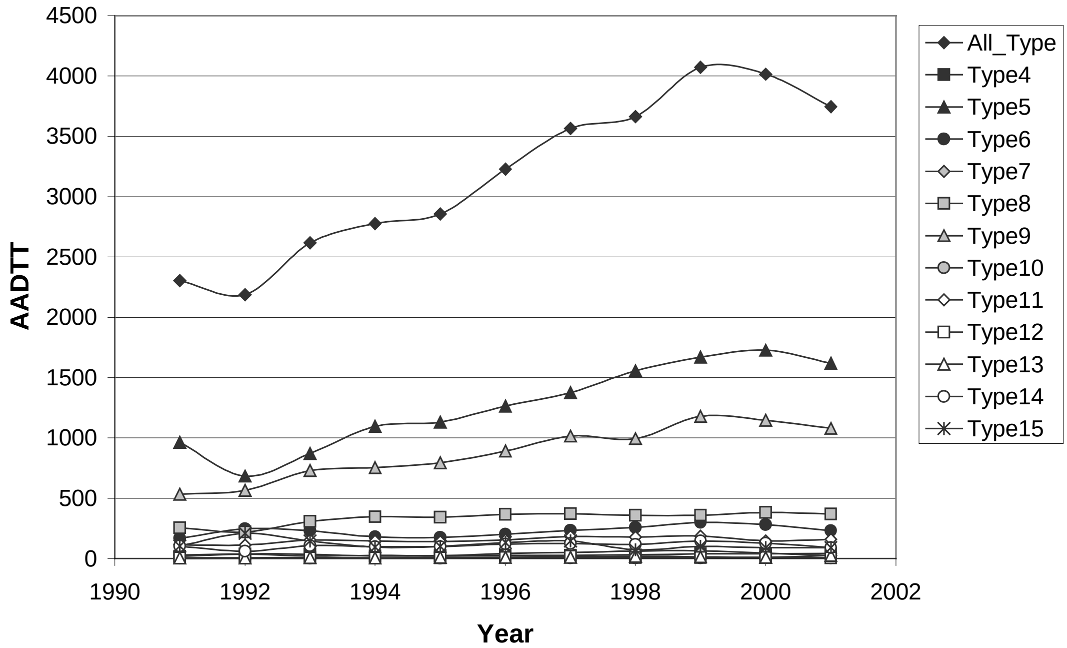
## STATION 14 SAN MARCOS



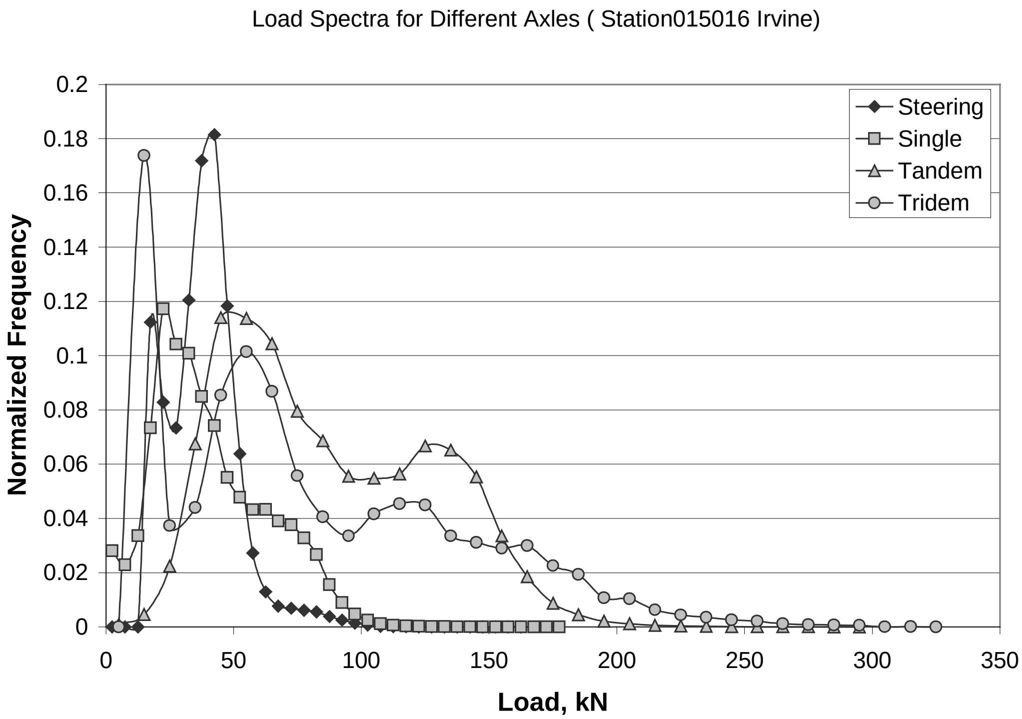

### Average Annual Daily Traffic for Different Truck Types

| Year | Truck Type | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **All** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **11** | **12** | **13** | **14** | **15** |
| 1991 | 2304 | 20 | 963 | 167 | 29 | 255 | 533 | 2 | 114 | 6 | 6 | 103 | 105 |
| 1992 | 2188 | 38 | 684 | 247 | 37 | 221 | 565 | 4 | 113 | 5 | 7 | 60 | 209 |
| 1993 | 2616 | 36 | 871 | 230 | 22 | 307 | 730 | 3 | 153 | 5 | 8 | 107 | 145 |
| 1994 | 2777 | 22 | 1095 | 180 | 26 | 347 | 754 | 3 | 145 | 5 | 5 | 100 | 95 |
| 1995 | 2855 | 24 | 1131 | 175 | 25 | 341 | 794 | 4 | 142 | 6 | 11 | 100 | 101 |
| 1996 | 3228 | 26 | 1264 | 203 | 43 | 366 | 891 | 6 | 155 | 9 | 11 | 121 | 133 |
| 1997 | 3565 | 28 | 1375 | 234 | 50 | 372 | 1015 | 6 | 183 | 19 | 12 | 124 | 146 |
| 1998 | 3662 | 31 | 1557 | 258 | 62 | 358 | 995 | 6 | 178 | 8 | 19 | 117 | 74 |
| 1999 | 4071 | 39 | 1670 | 299 | 64 | 360 | 1179 | 7 | 187 | 8 | 14 | 145 | 101 |
| 2000 | 4015 | 41 | 1727 | 281 | 45 | 383 | 1147 | 8 | 147 | 8 | 10 | 127 | 90 |
| 2001 | 3745 | 42 | 1619 | 231 | 25 | 370 | 1079 | 7 | 158 | 5 | 26 | 91 | 92 |

Annual Average Daily Traffic For Different Truck Types ( Station 014_SAN_MARCOS)



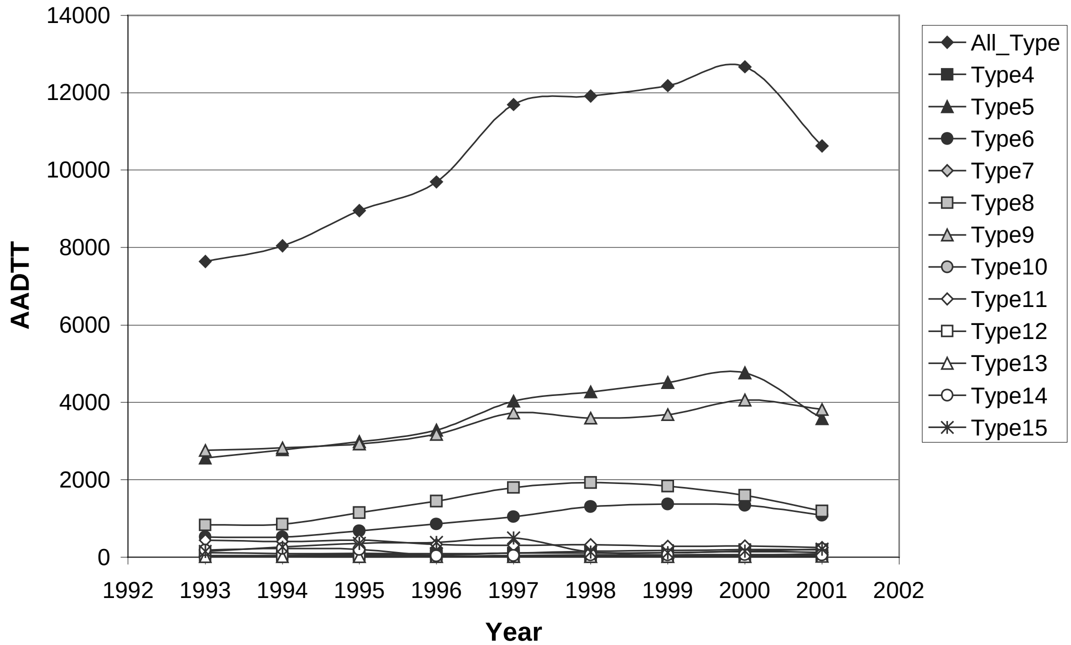
## STATIONS 15&16 IRVINE



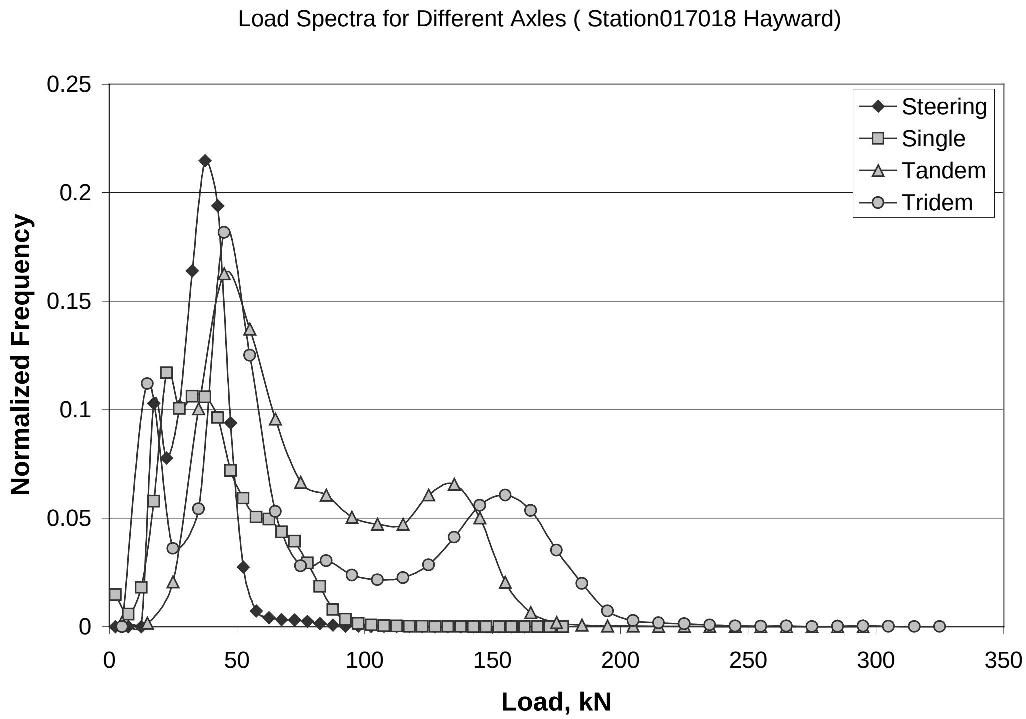

## Average Annual Daily Traffic for Different Truck Types

| Year | Truck Type | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **All** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **11** | **12** | **13** | **14** | **15** |
| 1993 | 7640 | 118 | 2559 | 520 | 23 | 828 | 2758 | 13 | 435 | 42 | 13 | 182 | 150 |
| 1994 | 8045 | 94 | 2770 | 519 | 43 | 848 | 2824 | 15 | 400 | 35 | 13 | 225 | 257 |
| 1995 | 8952 | 98 | 2979 | 675 | 78 | 1144 | 2925 | 18 | 440 | 34 | 11 | 196 | 355 |
| 1996 | 9696 | 89 | 3283 | 857 | 53 | 1443 | 3176 | 19 | 328 | 27 | 13 | 33 | 376 |
| 1997 | 11695 | 100 | 4028 | 1041 | 108 | 1794 | 3723 | 20 | 302 | 27 | 17 | 43 | 491 |
| 1998 | 11914 | 151 | 4270 | 1300 | 102 | 1922 | 3594 | 24 | 319 | 26 | 17 | 58 | 131 |
| 1999 | 12185 | 166 | 4512 | 1369 | 116 | 1830 | 3681 | 24 | 281 | 23 | 14 | 56 | 114 |
| 2000 | 12674 | 191 | 4764 | 1338 | 144 | 1594 | 4059 | 44 | 286 | 25 | 14 | 63 | 152 |
| 2001 | 10627 | 190 | 3579 | 1086 | 120 | 1190 | 3816 | 91 | 249 | 23 | 22 | 58 | 203 |

Annual Average Daily Traffic For Different Truck Types ( Station 015016_IRVINE)



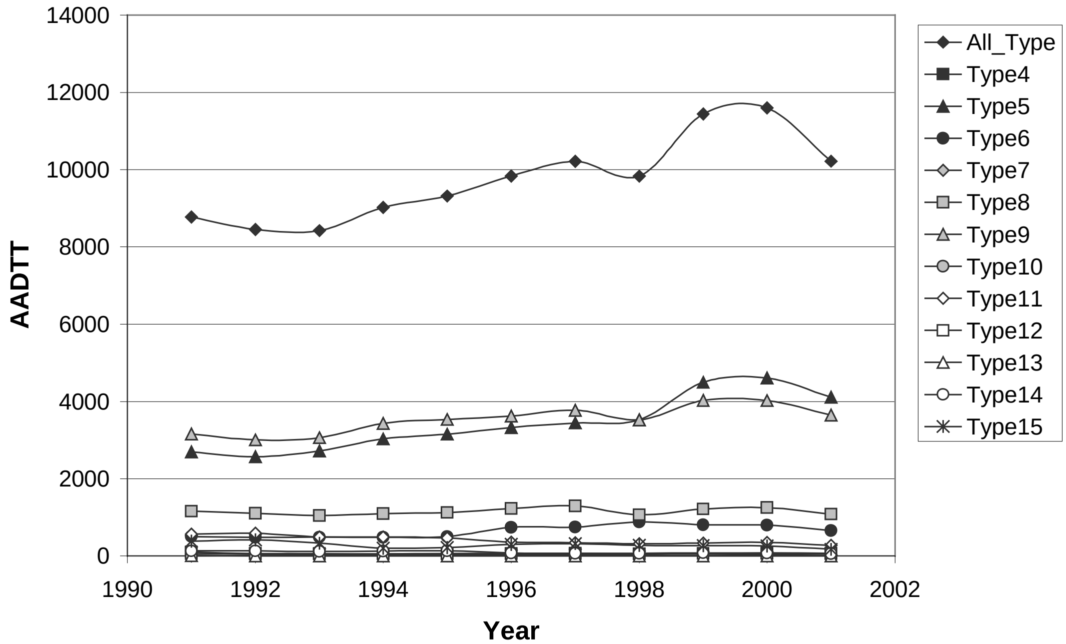
## STATIONS 17&18 HAYWARD



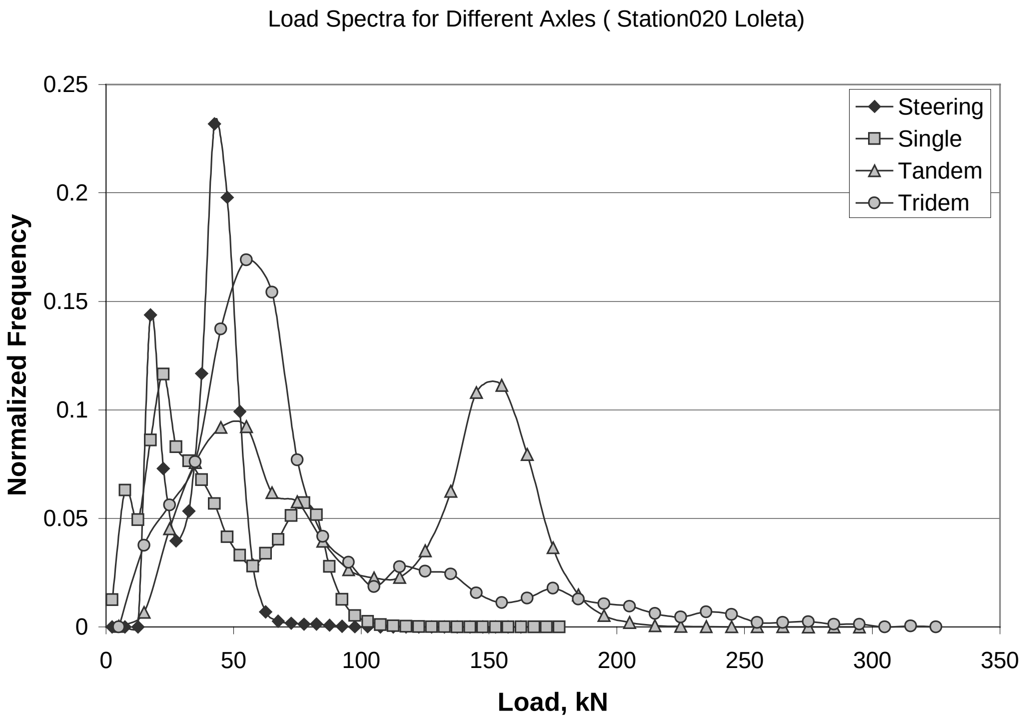

## Average Annual Daily Traffic for Different Truck Types

| Year | Truck Type | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | All | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| 1991 | 8776 | 100 | 2697 | 504 | 7 | 1160 | 3158 | 10 | 566 | 57 | 8 | 130 | 379 |
| 1992 | 8457 | 61 | 2571 | 483 | 9 | 1105 | 3004 | 18 | 590 | 60 | 6 | 132 | 418 |
| 1993 | 8424 | 63 | 2724 | 489 | 11 | 1050 | 3064 | 18 | 495 | 56 | 5 | 119 | 330 |
| 1994 | 9025 | 56 | 3033 | 482 | 11 | 1097 | 3433 | 25 | 494 | 57 | 5 | 129 | 201 |
| 1995 | 9318 | 62 | 3155 | 505 | 11 | 1122 | 3538 | 33 | 467 | 61 | 5 | 138 | 219 |
| 1996 | 9840 | 57 | 3326 | 742 | 18 | 1231 | 3622 | 37 | 363 | 68 | 5 | 75 | 298 |
| 1997 | 10214 | 60 | 3442 | 749 | 21 | 1298 | 3776 | 51 | 347 | 71 | 6 | 69 | 322 |
| 1998 | 9833 | 56 | 3523 | 878 | 22 | 1067 | 3523 | 45 | 313 | 56 | 7 | 70 | 274 |
| 1999 | 11442 | 64 | 4495 | 808 | 17 | 1217 | 4030 | 56 | 334 | 65 | 7 | 79 | 270 |
| 2000 | 11598 | 75 | 4608 | 800 | 21 | 1249 | 4026 | 56 | 352 | 65 | 7 | 78 | 260 |
| 2001 | 10221 | 72 | 4113 | 655 | 13 | 1083 | 3650 | 55 | 275 | 63 | 5 | 61 | 175 |

Annual Average Daily Traffic For Different Truck Types ( Station 017018_HAYWARD)



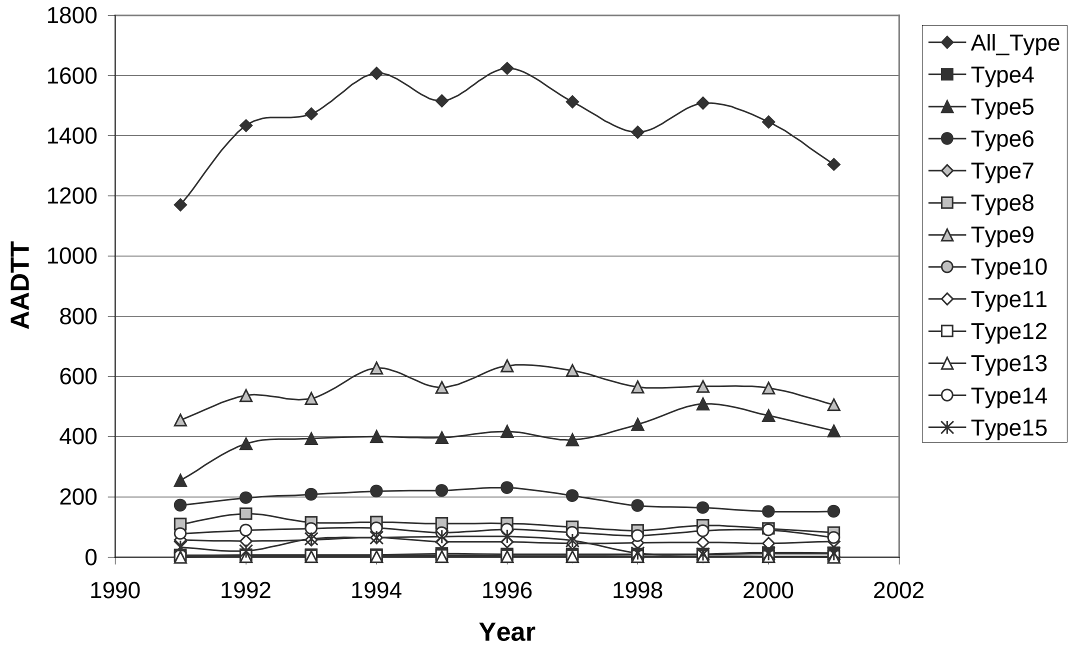
## STATION 20 LOLETA



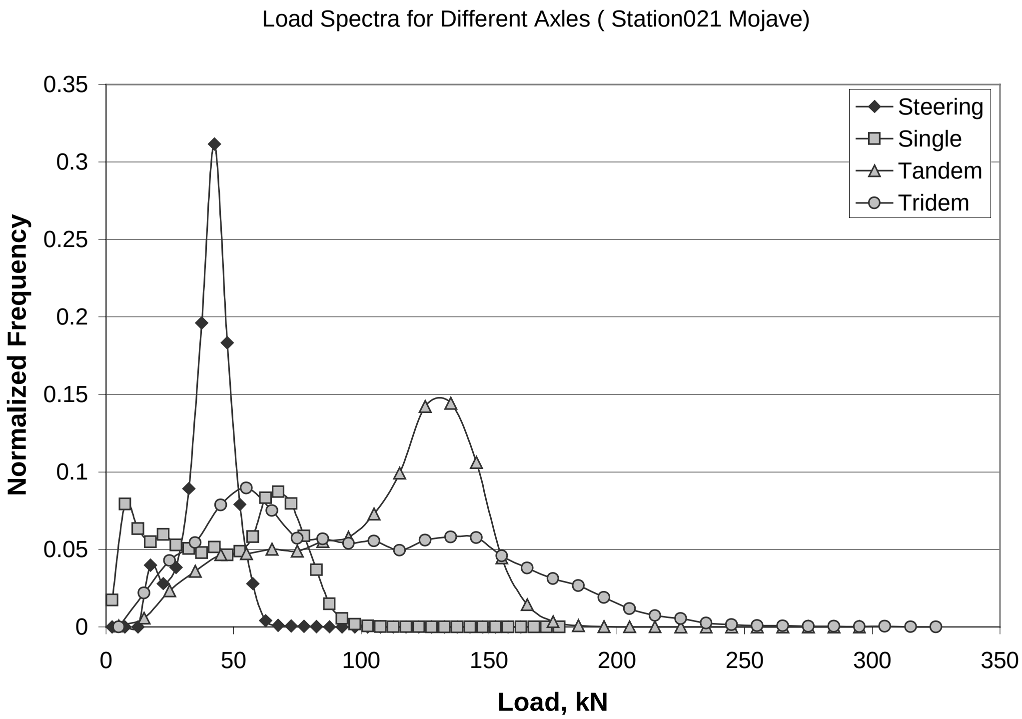

### Average Annual Daily Traffic for Different Truck Types

| Year | Truck Type | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | All | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| 1991 | 1170 | 6 | 255 | 172 | 1 | 109 | 455 | 1 | 57 | 3 | 0 | 78 | 33 |
| 1992 | 1434 | 7 | 377 | 197 | 3 | 144 | 537 | 1 | 53 | 4 | 1 | 89 | 20 |
| 1993 | 1473 | 7 | 394 | 208 | 4 | 115 | 527 | 1 | 57 | 4 | 1 | 95 | 61 |
| 1994 | 1608 | 7 | 400 | 219 | 5 | 116 | 628 | 1 | 65 | 4 | 1 | 97 | 65 |
| 1995 | 1516 | 11 | 397 | 221 | 5 | 111 | 564 | 1 | 51 | 5 | 1 | 81 | 68 |
| 1996 | 1624 | 10 | 417 | 230 | 3 | 112 | 636 | 1 | 51 | 4 | 1 | 92 | 69 |
| 1997 | 1513 | 10 | 390 | 204 | 1 | 100 | 620 | 1 | 45 | 4 | 1 | 82 | 55 |
| 1998 | 1412 | 10 | 441 | 171 | 2 | 88 | 565 | 1 | 47 | 3 | 1 | 71 | 13 |
| 1999 | 1508 | 10 | 509 | 164 | 2 | 105 | 567 | 1 | 49 | 3 | 1 | 87 | 10 |
| 2000 | 1446 | 15 | 470 | 151 | 1 | 95 | 562 | 1 | 46 | 2 | 1 | 90 | 12 |
| 2001 | 1305 | 14 | 419 | 152 | 1 | 81 | 506 | 1 | 52 | 2 | 0 | 65 | 12 |

Annual Average Daily Traffic For Different Truck Types ( Station 020_LOLETA)



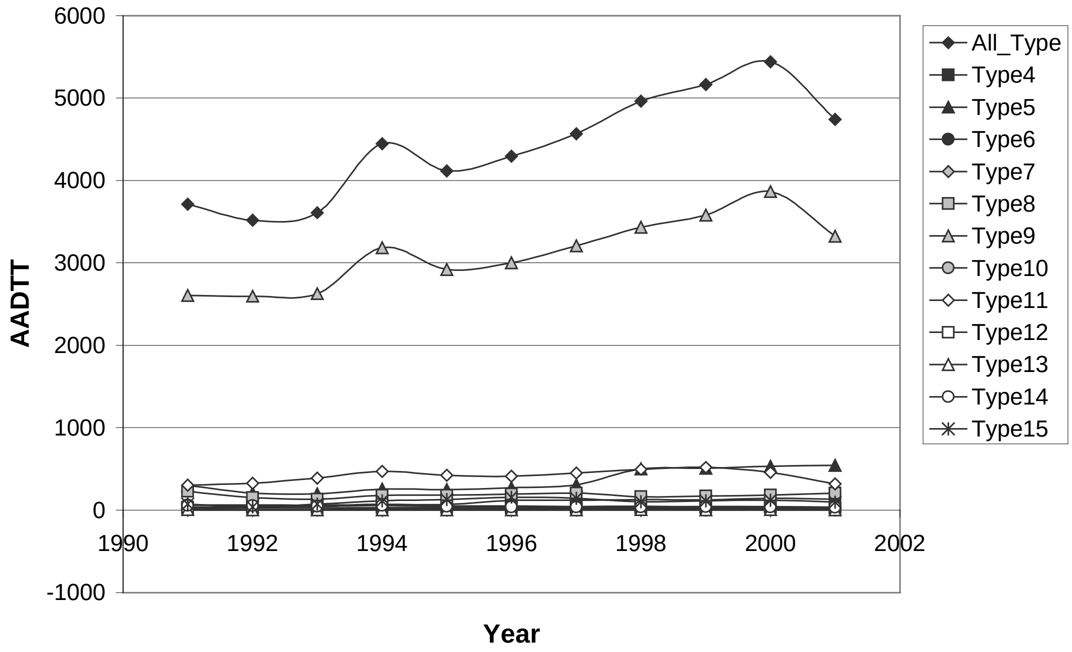
## STATION 21 MOJAVE



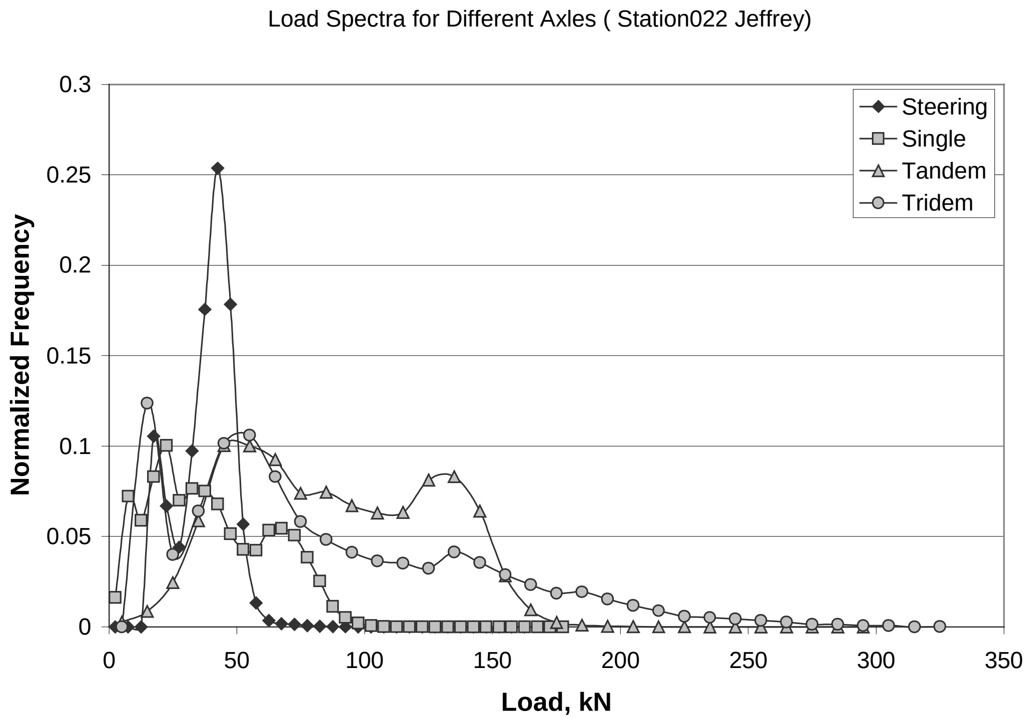

**Average Annual Daily Traffic for Different Truck Types**

| Year | Truck Type | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **All** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **11** | **12** | **13** | **14** | **15** |
| 1991 | 3711 | 27 | 301 | 62 | 0 | 229 | 2605 | 11 | 304 | 36 | 6 | 56 | 74 |
| 1992 | 3517 | 25 | 208 | 64 | 1 | 153 | 2595 | 8 | 327 | 39 | 4 | 54 | 40 |
| 1993 | 3610 | 25 | 198 | 59 | 1 | 133 | 2627 | 8 | 389 | 47 | 3 | 47 | 73 |
| 1994 | 4448 | 29 | 256 | 72 | 1 | 179 | 3184 | 15 | 471 | 66 | 4 | 56 | 115 |
| 1995 | 4117 | 29 | 250 | 69 | 1 | 182 | 2921 | 19 | 422 | 49 | 3 | 44 | 128 |
| 1996 | 4294 | 27 | 272 | 118 | 1 | 194 | 3003 | 19 | 411 | 49 | 4 | 40 | 156 |
| 1997 | 4567 | 28 | 308 | 118 | 1 | 207 | 3207 | 18 | 452 | 45 | 3 | 37 | 142 |
| 1998 | 4963 | 28 | 499 | 129 | 0 | 163 | 3432 | 23 | 496 | 46 | 5 | 38 | 103 |
| 1999 | 5165 | 31 | 509 | 127 | 0 | 171 | 3581 | 24 | 518 | 43 | 4 | 43 | 114 |
| 2000 | 5443 | 31 | 532 | 142 | 1 | 183 | 3865 | 25 | 457 | 43 | 5 | 39 | 121 |
| 2001 | 4742 | 25 | 545 | 131 | 0 | 204 | 3324 | 24 | 318 | 35 | 4 | 34 | 97 |

Annual Average Daily Traffic For Different Truck Types ( Station 021_MOJAVE)



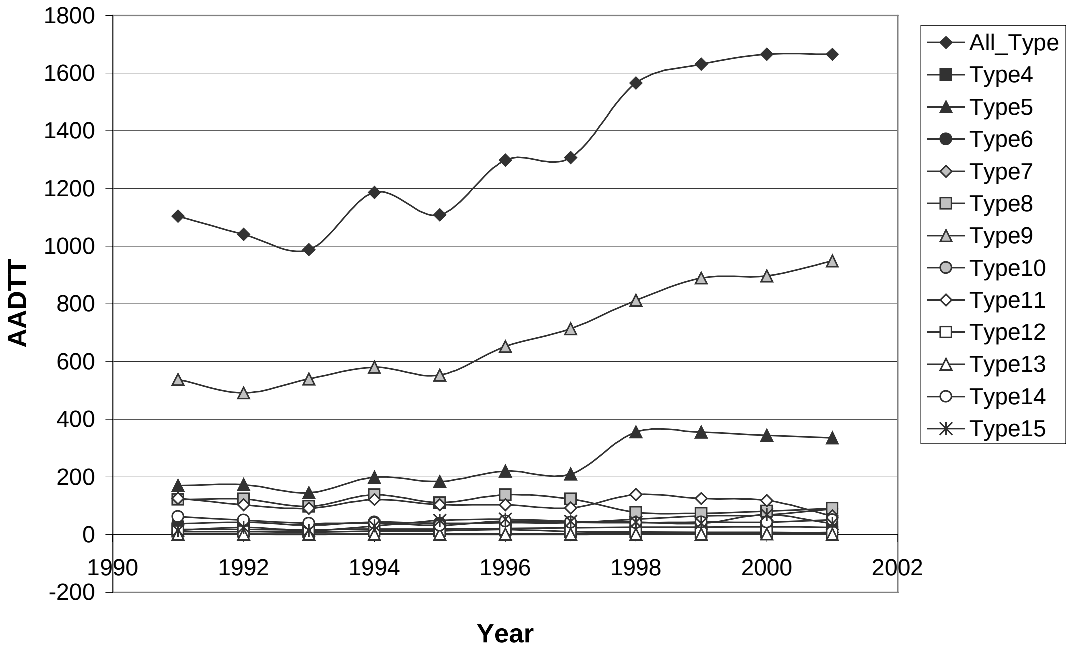
## STATION 22 JEFFREY



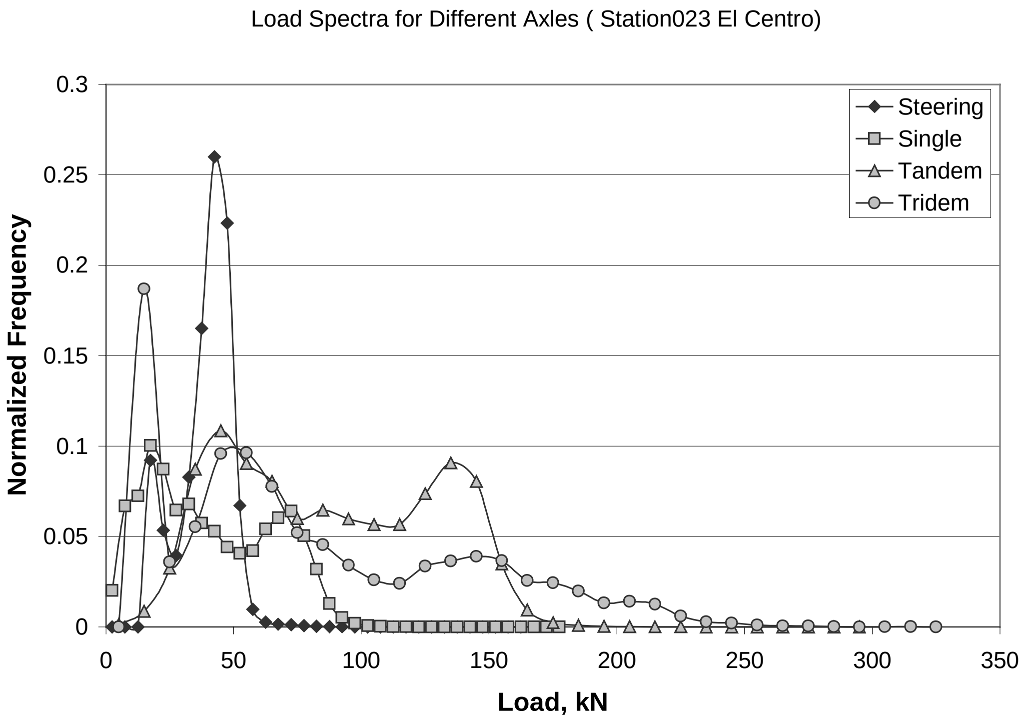

### Average Annual Daily Traffic for Different Truck Types

| Year | Truck Type | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **All** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **11** | **12** | **13** | **14** | **15** |
| 1991 | 1104 | 18 | 170 | 38 | 1 | 122 | 538 | 3 | 126 | 11 | 1 | 63 | 14 |
| 1992 | 1041 | 18 | 173 | 43 | 1 | 123 | 491 | 2 | 103 | 11 | 1 | 50 | 25 |
| 1993 | 988 | 16 | 145 | 33 | 0 | 98 | 540 | 2 | 91 | 9 | 1 | 39 | 14 |
| 1994 | 1187 | 20 | 199 | 44 | 2 | 138 | 580 | 2 | 122 | 12 | 1 | 40 | 30 |
| 1995 | 1109 | 20 | 184 | 39 | 0 | 111 | 553 | 3 | 104 | 13 | 1 | 32 | 49 |
| 1996 | 1298 | 22 | 220 | 41 | 0 | 138 | 652 | 3 | 103 | 18 | 1 | 47 | 53 |
| 1997 | 1307 | 24 | 210 | 41 | 0 | 124 | 714 | 3 | 92 | 10 | 1 | 42 | 46 |
| 1998 | 1566 | 26 | 356 | 54 | 3 | 77 | 812 | 4 | 139 | 9 | 1 | 41 | 44 |
| 1999 | 1631 | 26 | 355 | 64 | 1 | 74 | 890 | 4 | 125 | 8 | 1 | 44 | 39 |
| 2000 | 1666 | 27 | 344 | 68 | 3 | 81 | 897 | 6 | 118 | 8 | 2 | 43 | 69 |
| 2001 | 1665 | 25 | 335 | 89 | 8 | 91 | 949 | 6 | 65 | 7 | 1 | 51 | 38 |

Annual Average Daily Traffic For Different Truck Types ( Station 022_JEFFREY)



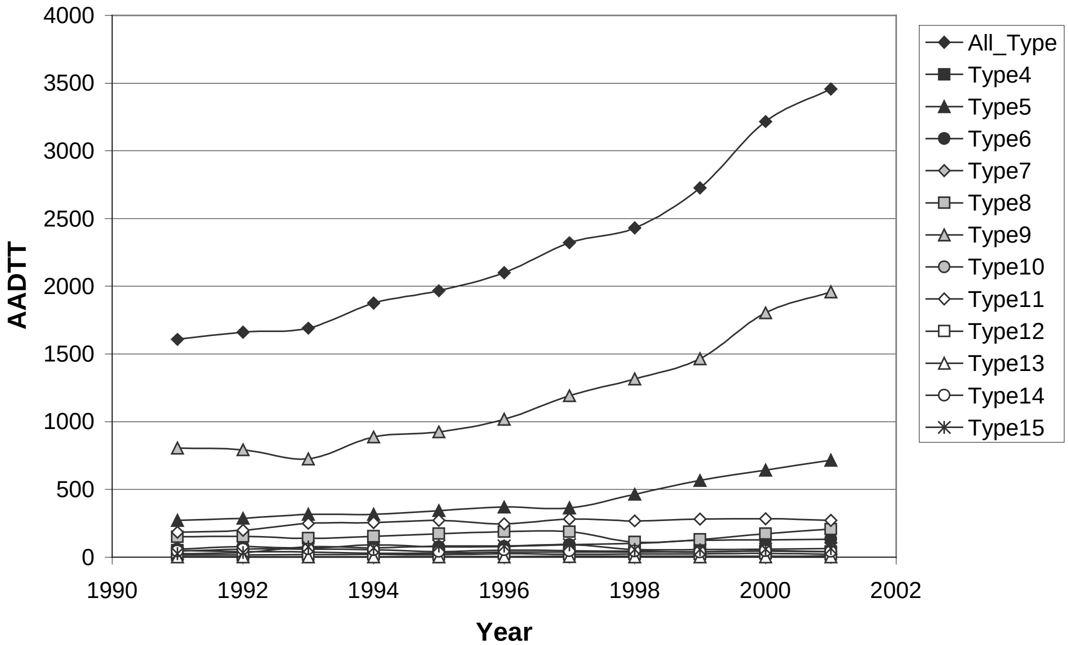
## STATION 23 EL CENTRO



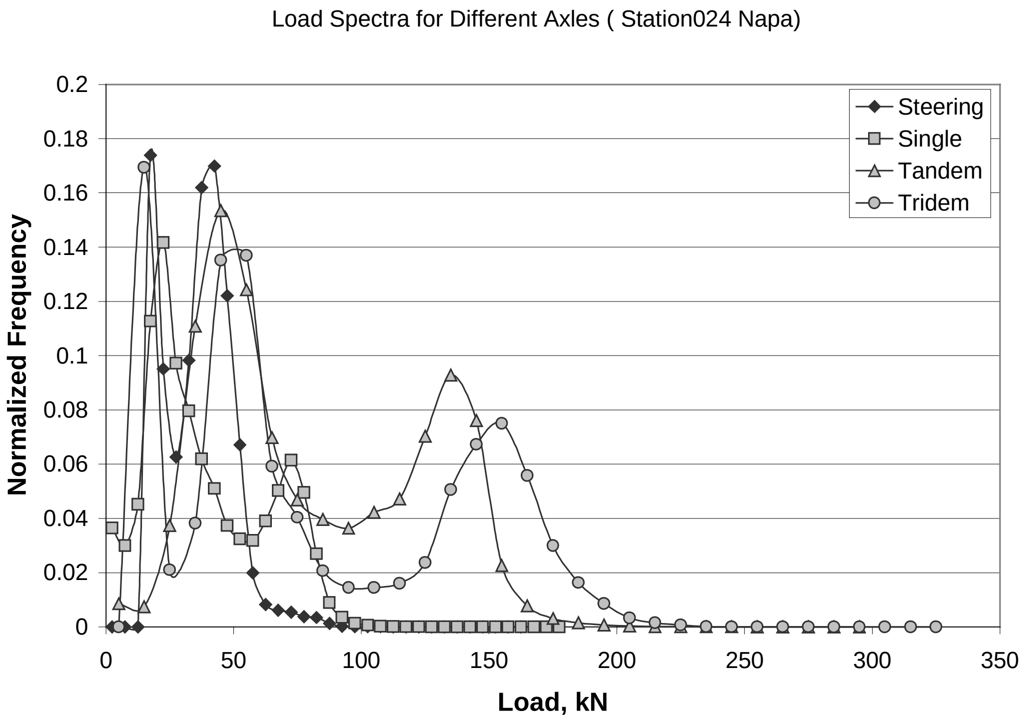

### Average Annual Daily Traffic for Different Truck Types

| **Year** | **Truck Type** | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **All** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **11** | **12** | **13** | **14** | **15** |
| 1991 | 1608 | 49 | 270 | 59 | 4 | 150 | 805 | 3 | 183 | 16 | 1 | 44 | 24 |
| 1992 | 1662 | 41 | 287 | 77 | 3 | 153 | 792 | 2 | 197 | 16 | 1 | 59 | 34 |
| 1993 | 1690 | 38 | 315 | 67 | 2 | 138 | 725 | 3 | 248 | 18 | 2 | 60 | 75 |
| 1994 | 1875 | 28 | 316 | 90 | 2 | 152 | 886 | 3 | 255 | 20 | 1 | 54 | 69 |
| 1995 | 1967 | 31 | 343 | 75 | 2 | 173 | 924 | 4 | 271 | 19 | 2 | 41 | 82 |
| 1996 | 2100 | 37 | 369 | 78 | 1 | 188 | 1017 | 5 | 246 | 24 | 2 | 52 | 82 |
| 1997 | 2321 | 38 | 364 | 92 | 2 | 187 | 1192 | 6 | 280 | 21 | 3 | 47 | 91 |
| 1998 | 2430 | 38 | 463 | 102 | 2 | 111 | 1315 | 7 | 268 | 23 | 2 | 43 | 56 |
| 1999 | 2727 | 39 | 566 | 124 | 1 | 130 | 1465 | 6 | 280 | 23 | 1 | 38 | 55 |
| 2000 | 3217 | 43 | 643 | 127 | 1 | 173 | 1804 | 6 | 284 | 27 | 2 | 46 | 60 |
| 2001 | 3456 | 39 | 715 | 132 | 0 | 206 | 1958 | 9 | 272 | 20 | 2 | 41 | 62 |

Annual Average Daily Traffic For Different Truck Types ( Station 023_EL_CENTRO)



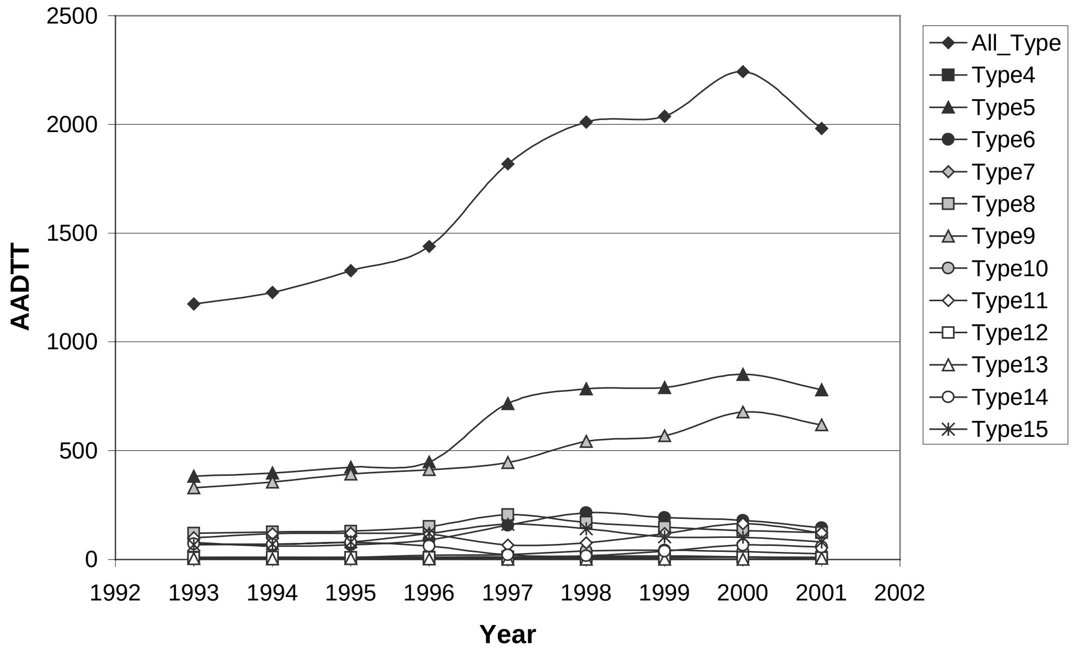
## STATION 24 NAPA



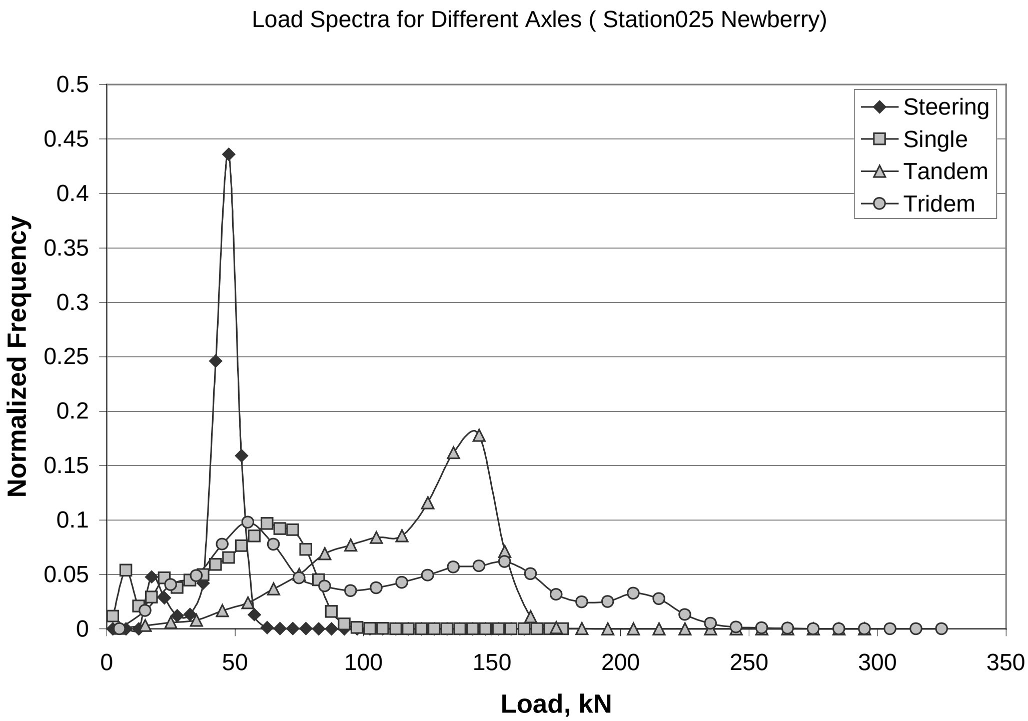

### Average Annual Daily Traffic for Different Truck Types

| Year | Truck Type | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **All** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **11** | **12** | **13** | **14** | **15** |
| 1993 | 1175 | 10 | 382 | 77 | 2 | 121 | 329 | 4 | 100 | 7 | 4 | 72 | 67 |
| 1994 | 1227 | 9 | 397 | 61 | 3 | 126 | 356 | 5 | 118 | 10 | 3 | 69 | 71 |
| 1995 | 1327 | 8 | 424 | 67 | 5 | 130 | 392 | 9 | 120 | 9 | 4 | 78 | 80 |
| 1996 | 1439 | 10 | 448 | 90 | 4 | 152 | 412 | 19 | 115 | 8 | 2 | 61 | 120 |
| 1997 | 1819 | 11 | 717 | 157 | 6 | 205 | 445 | 22 | 66 | 7 | 1 | 21 | 162 |
| 1998 | 2011 | 10 | 784 | 214 | 13 | 170 | 542 | 39 | 76 | 6 | 1 | 16 | 141 |
| 1999 | 2038 | 9 | 790 | 193 | 16 | 148 | 569 | 43 | 119 | 8 | 1 | 38 | 104 |
| 2000 | 2243 | 11 | 851 | 180 | 12 | 133 | 678 | 36 | 164 | 9 | 1 | 66 | 102 |
| 2001 | 1981 | 8 | 780 | 145 | 9 | 124 | 619 | 25 | 122 | 6 | 5 | 57 | 81 |

Annual Average Daily Traffic For Different Truck Types ( Station 024_NAPA)



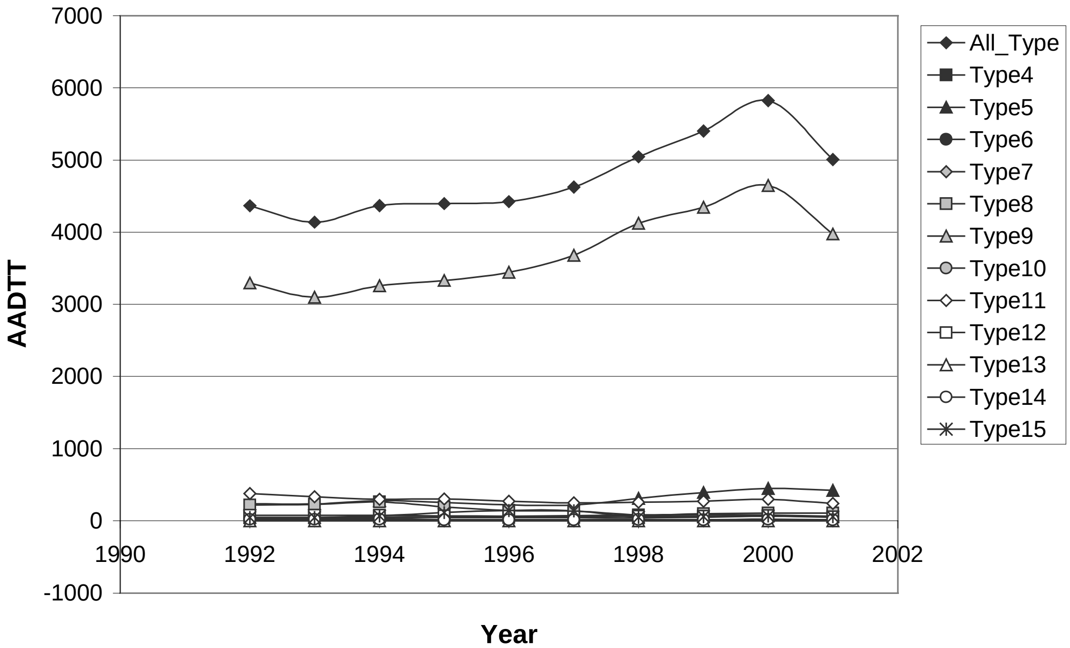
## STATION 25 NEWBERRY



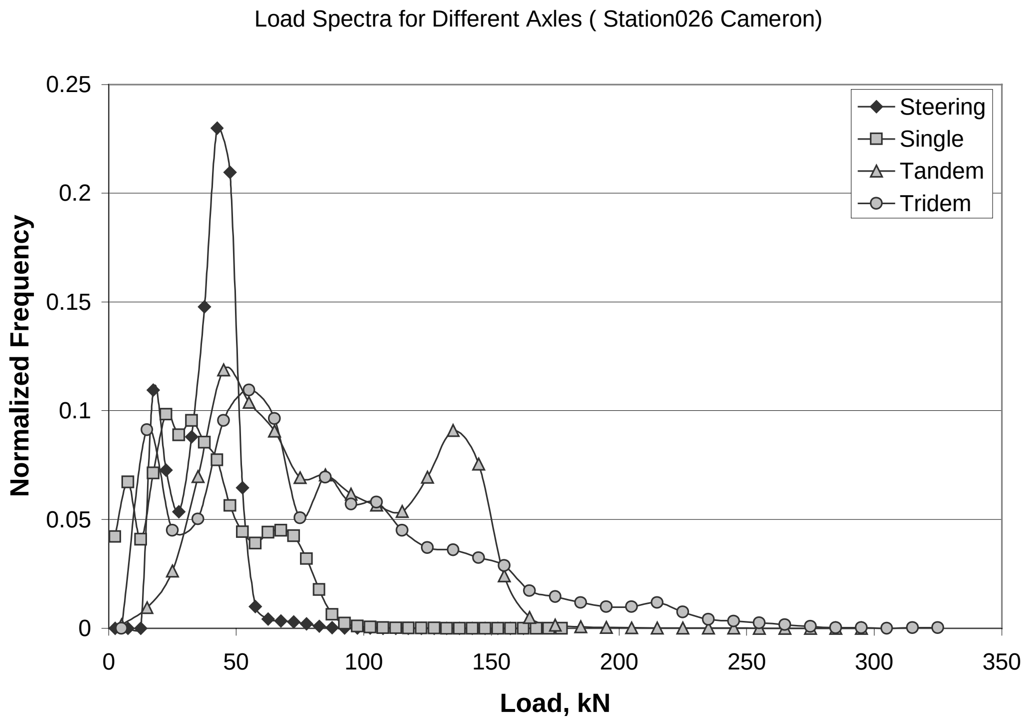

### Average Annual Daily Traffic for Different Truck Types

| Year | Truck Type | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **All** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **11** | **12** | **13** | **14** | **15** |
| 1993 | 1175 | 10 | 382 | 77 | 2 | 121 | 329 | 4 | 100 | 7 | 4 | 72 | 67 |
| 1994 | 1227 | 9 | 397 | 61 | 3 | 126 | 356 | 5 | 118 | 10 | 3 | 69 | 71 |
| 1995 | 1327 | 8 | 424 | 67 | 5 | 130 | 392 | 9 | 120 | 9 | 4 | 78 | 80 |
| 1996 | 1439 | 10 | 448 | 90 | 4 | 152 | 412 | 19 | 115 | 8 | 2 | 61 | 120 |
| 1997 | 1819 | 11 | 717 | 157 | 6 | 205 | 445 | 22 | 66 | 7 | 1 | 21 | 162 |
| 1998 | 2011 | 10 | 784 | 214 | 13 | 170 | 542 | 39 | 76 | 6 | 1 | 16 | 141 |
| 1999 | 2038 | 9 | 790 | 193 | 16 | 148 | 569 | 43 | 119 | 8 | 1 | 38 | 104 |
| 2000 | 2243 | 11 | 851 | 180 | 12 | 133 | 678 | 36 | 164 | 9 | 1 | 66 | 102 |
| 2001 | 1981 | 8 | 780 | 145 | 9 | 124 | 619 | 25 | 122 | 6 | 5 | 57 | 81 |

Annual Average Daily Traffic For Different Truck Types ( Station 025_NEWBERRY)

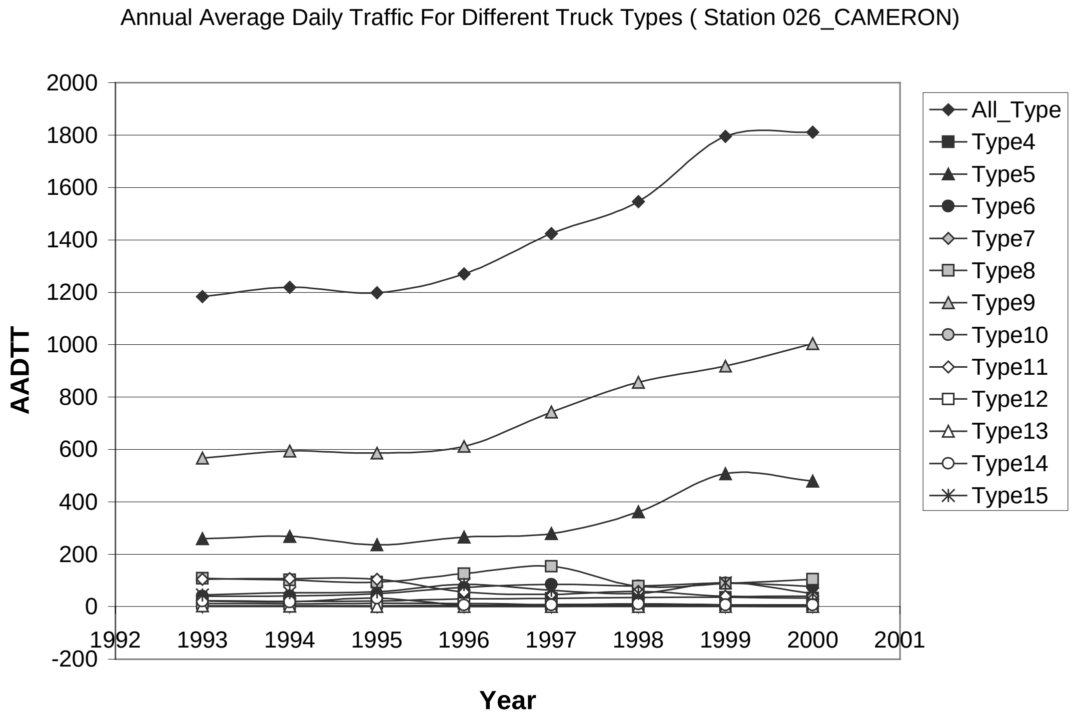


## STATION 26 CAMERON

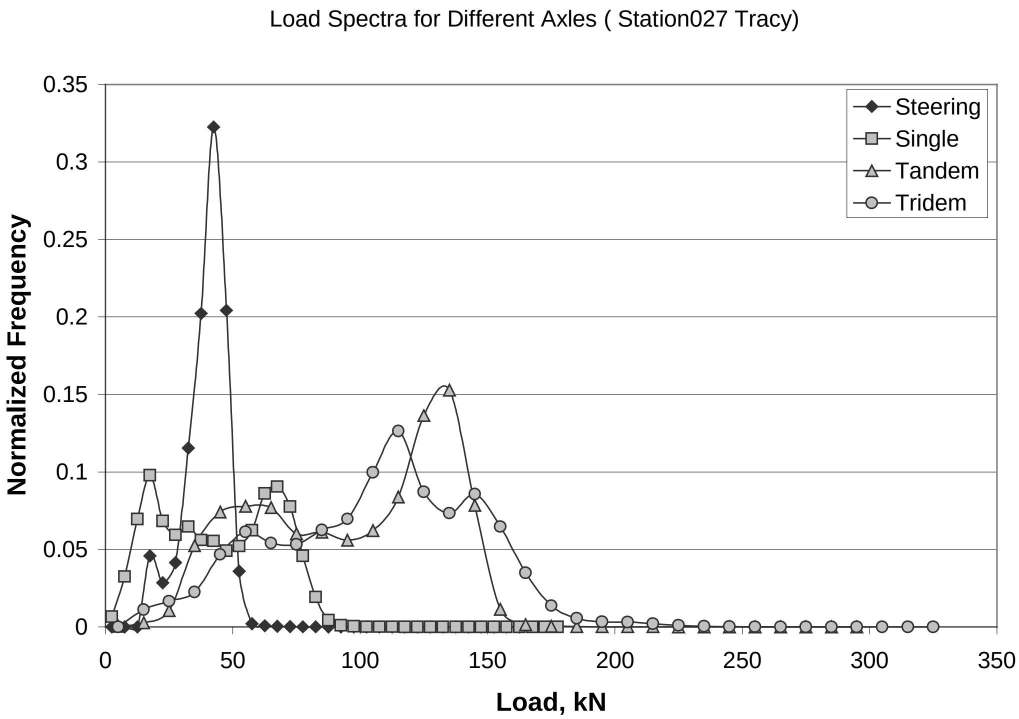



### Average Annual Daily Traffic for Different Truck Types

| Year | Truck Type | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **All** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **11** | **12** | **13** | **14** | **15** |
| 1993 | 1184 | 23 | 259 | 40 | 1 | 108 | 567 | 2 | 105 | 12 | 3 | 21 | 45 |
| 1994 | 1219 | 20 | 268 | 41 | 0 | 102 | 594 | 3 | 107 | 11 | 2 | 18 | 53 |
| 1995 | 1198 | 21 | 236 | 49 | 0 | 94 | 586 | 3 | 105 | 13 | 1 | 33 | 57 |
| 1996 | 1270 | 30 | 265 | 73 | 1 | 126 | 612 | 4 | 56 | 12 | 1 | 6 | 85 |
| 1997 | 1424 | 31 | 279 | 85 | 1 | 154 | 743 | 4 | 47 | 8 | 1 | 7 | 63 |
| 1998 | 1546 | 35 | 362 | 79 | 2 | 78 | 856 | 5 | 58 | 8 | 1 | 11 | 51 |
| 1999 | 1795 | 36 | 508 | 90 | 2 | 88 | 918 | 6 | 40 | 7 | 1 | 7 | 91 |
| 2000 | 1811 | 33 | 479 | 77 | 0 | 105 | 1004 | 7 | 40 | 7 | 1 | 7 | 50 |


Annual Average Daily Traffic For Different Truck Types ( Station 026_CAMERON)
AADTT
Year
2000
1800
1600
1400
1200
1000
800
600
400
200
0
-200
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
All_Type
Type4
Type5
Type6
Type7
Type8
Type9
Type10
Type11
Type12
Type13
Type14
Type15

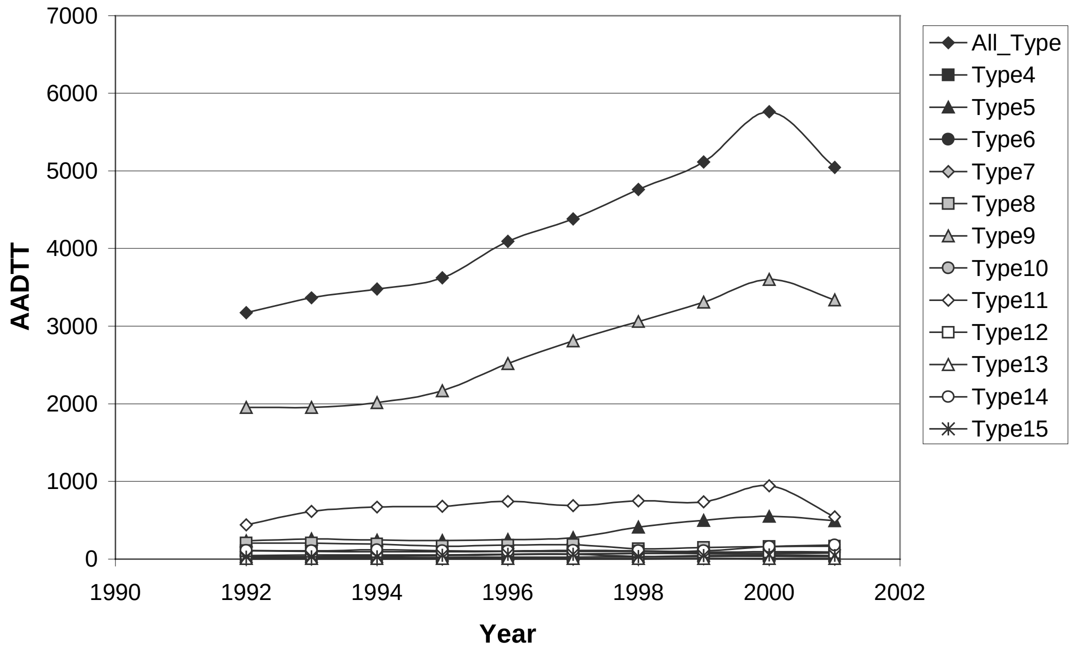
## STATION 27 TRACY



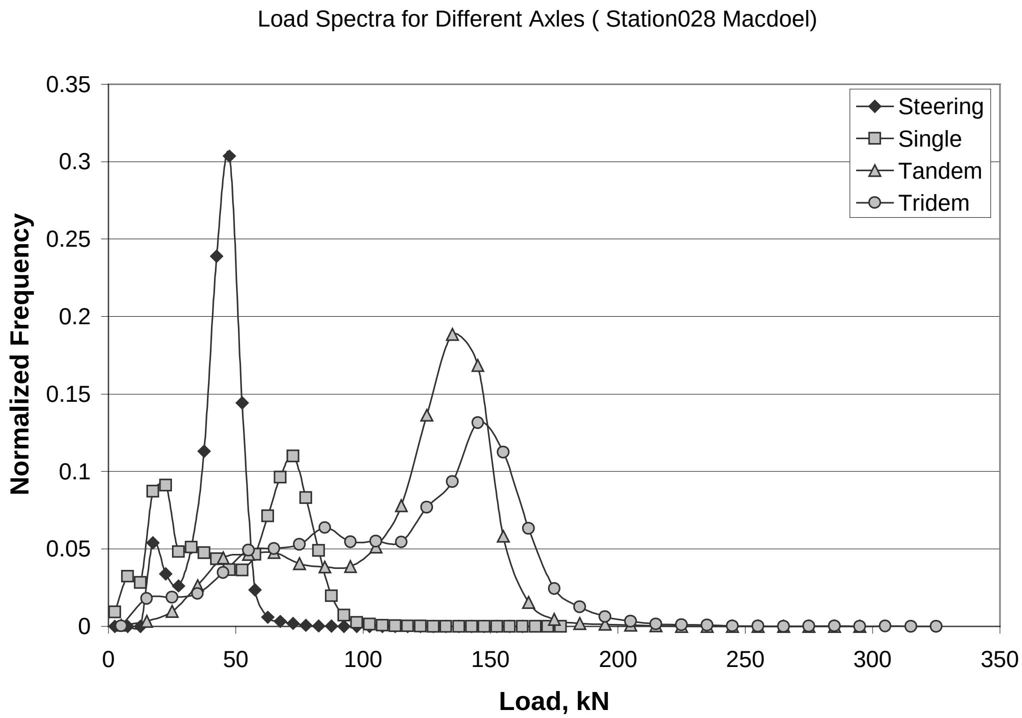

### Average Annual Daily Traffic for Different Truck Types

| Year | Truck Type | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **All** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **11** | **12** | **13** | **14** | **15** |
| 1992 | 3175 | 16 | 235 | 44 | 0 | 204 | 1954 | 31 | 441 | 107 | 5 | 113 | 25 |
| 1993 | 3366 | 19 | 256 | 53 | 1 | 203 | 1954 | 34 | 612 | 97 | 4 | 105 | 28 |
| 1994 | 3477 | 20 | 245 | 50 | 0 | 192 | 2015 | 40 | 669 | 93 | 4 | 120 | 29 |
| 1995 | 3622 | 20 | 239 | 54 | 1 | 166 | 2167 | 44 | 680 | 91 | 4 | 108 | 49 |
| 1996 | 4092 | 22 | 249 | 59 | 1 | 177 | 2519 | 55 | 744 | 99 | 4 | 103 | 62 |
| 1997 | 4383 | 23 | 274 | 67 | 1 | 183 | 2811 | 61 | 688 | 99 | 4 | 111 | 62 |
| 1998 | 4762 | 27 | 409 | 70 | 1 | 133 | 3060 | 72 | 751 | 96 | 5 | 105 | 34 |
| 1999 | 5114 | 32 | 499 | 80 | 2 | 147 | 3310 | 69 | 735 | 90 | 5 | 105 | 42 |
| 2000 | 5760 | 35 | 550 | 95 | 1 | 161 | 3601 | 69 | 943 | 90 | 5 | 159 | 50 |
| 2001 | 5047 | 30 | 493 | 90 | 1 | 162 | 3338 | 79 | 543 | 82 | 5 | 180 | 45 |

Annual Average Daily Traffic For Different Truck Types ( Station 027_TRACY)



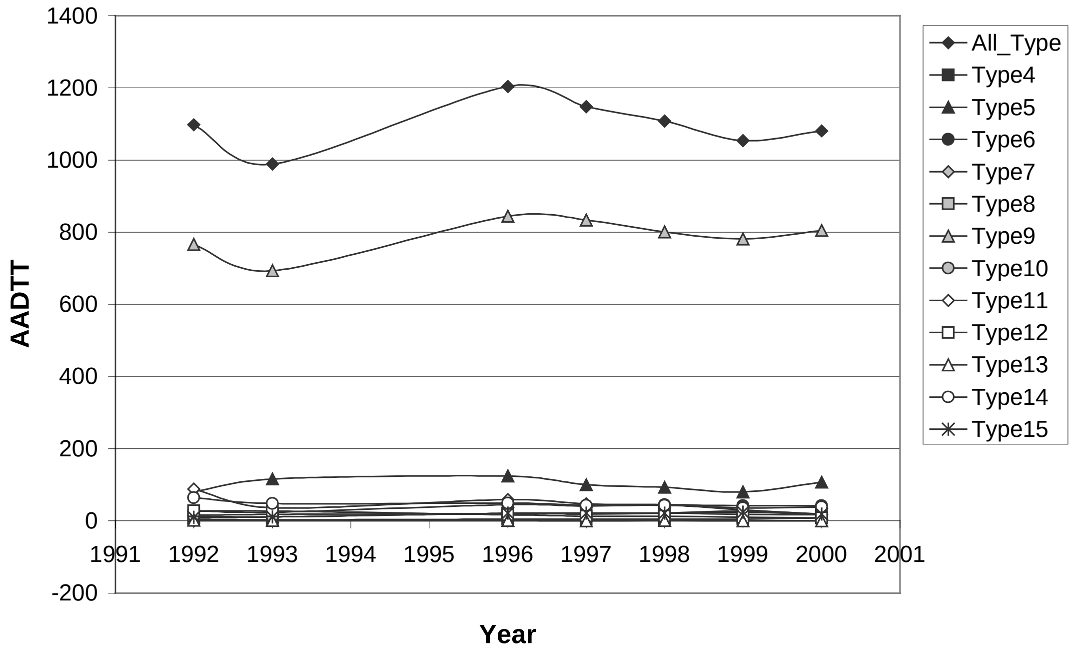
## STATION 28 MACDOEL



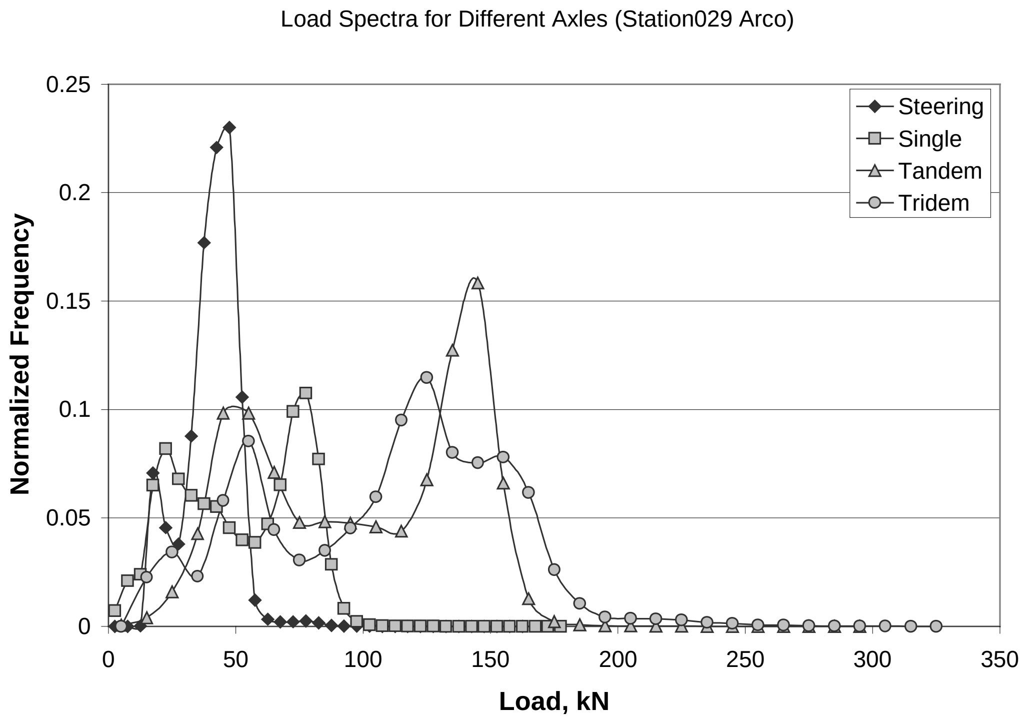

### Average Annual Daily Traffic for Different Truck Types

| **Year** | **Truck Type** | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **All** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **11** | **12** | **13** | **14** | **15** |
| 1992 | 1098 | 4 | 81 | 28 | 0 | 15 | 766 | 13 | 88 | 28 | 2 | 64 | 10 |
| 1993 | 989 | 3 | 116 | 24 | 0 | 18 | 693 | 11 | 36 | 27 | 1 | 48 | 11 |
| 1996 | 1204 | 4 | 124 | 45 | 0 | 20 | 844 | 21 | 59 | 17 | 1 | 49 | 21 |
| 1997 | 1148 | 5 | 100 | 41 | 0 | 19 | 834 | 22 | 47 | 13 | 0 | 43 | 22 |
| 1998 | 1108 | 5 | 93 | 44 | 0 | 21 | 801 | 22 | 45 | 13 | 1 | 43 | 21 |
| 1999 | 1054 | 5 | 80 | 42 | 0 | 27 | 781 | 18 | 30 | 10 | 0 | 36 | 24 |
| 2000 | 1081 | 8 | 107 | 42 | 0 | 19 | 805 | 17 | 18 | 8 | 0 | 38 | 19 |

Annual Average Daily Traffic For Different Truck Types ( Station 028_MACDOEL)

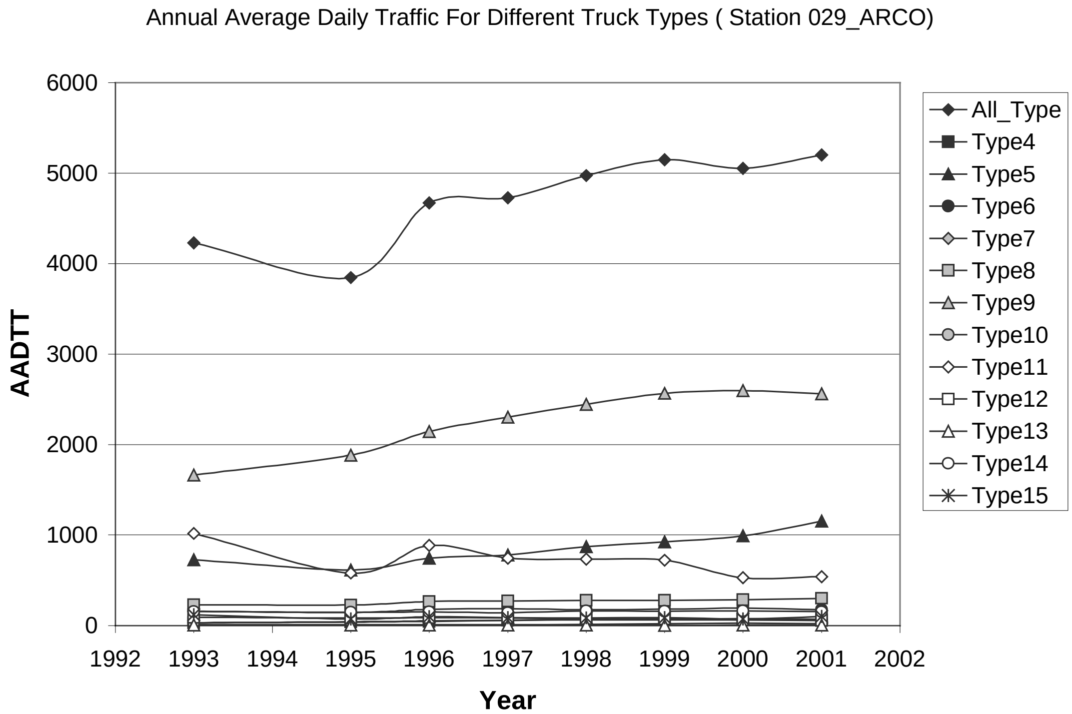


## STATION 29 ARCO

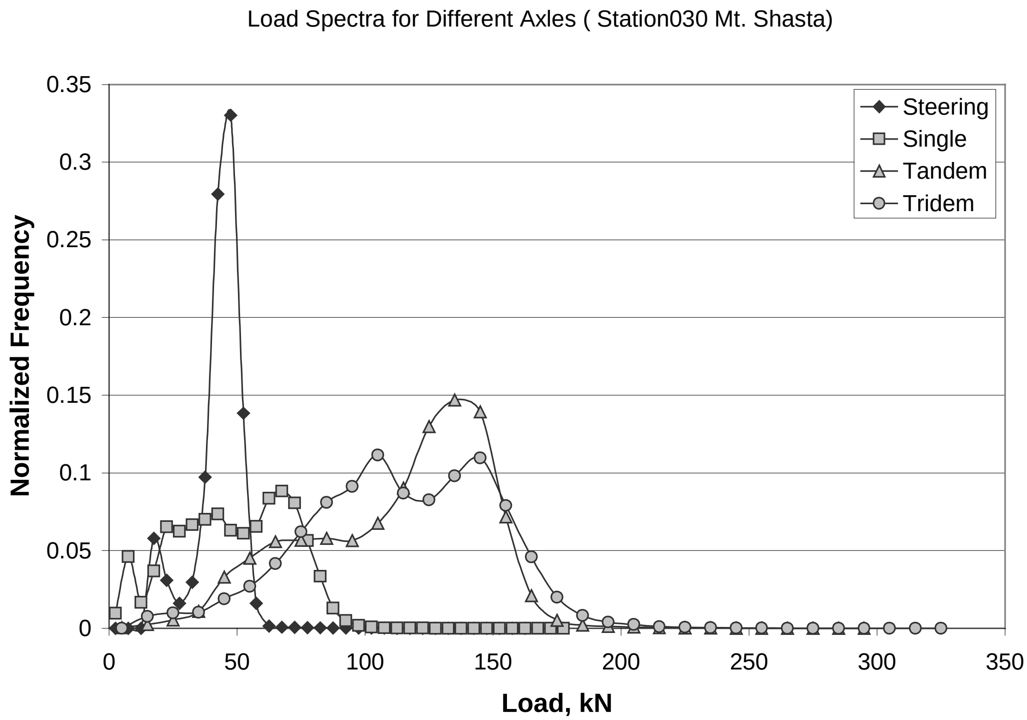



### Average Annual Daily Traffic for Different Truck Types

| Year | Truck Type | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **All** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **11** | **12** | **13** | **14** | **15** |
| 1993 | 4230 | 31 | 725 | 157 | 9 | 229 | 1664 | 28 | 1019 | 92 | 6 | 154 | 118 |
| 1995 | 3845 | 39 | 615 | 143 | 9 | 227 | 1883 | 42 | 581 | 83 | 5 | 145 | 73 |
| 1996 | 4671 | 46 | 743 | 179 | 10 | 267 | 2146 | 50 | 886 | 88 | 5 | 151 | 99 |
| 1997 | 4727 | 59 | 781 | 185 | 9 | 270 | 2302 | 56 | 745 | 84 | 4 | 142 | 88 |
| 1998 | 4973 | 67 | 872 | 175 | 13 | 279 | 2443 | 64 | 732 | 77 | 4 | 161 | 86 |
| 1999 | 5147 | 72 | 924 | 180 | 19 | 280 | 2566 | 63 | 721 | 71 | 3 | 159 | 87 |
| 2000 | 5054 | 77 | 992 | 191 | 27 | 285 | 2597 | 61 | 528 | 60 | 4 | 161 | 72 |
| 2001 | 5199 | 70 | 1154 | 175 | 20 | 301 | 2562 | 60 | 541 | 57 | 5 | 153 | 101 |


Annual Average Daily Traffic For Different Truck Types ( Station 029_ARCO)
AADTT
6000
5000
4000
3000
2000
1000
0
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
Year
All_Type
Type4
Type5
Type6
Type7
Type8
Type9
Type10
Type11
Type12
Type13
Type14
Type15

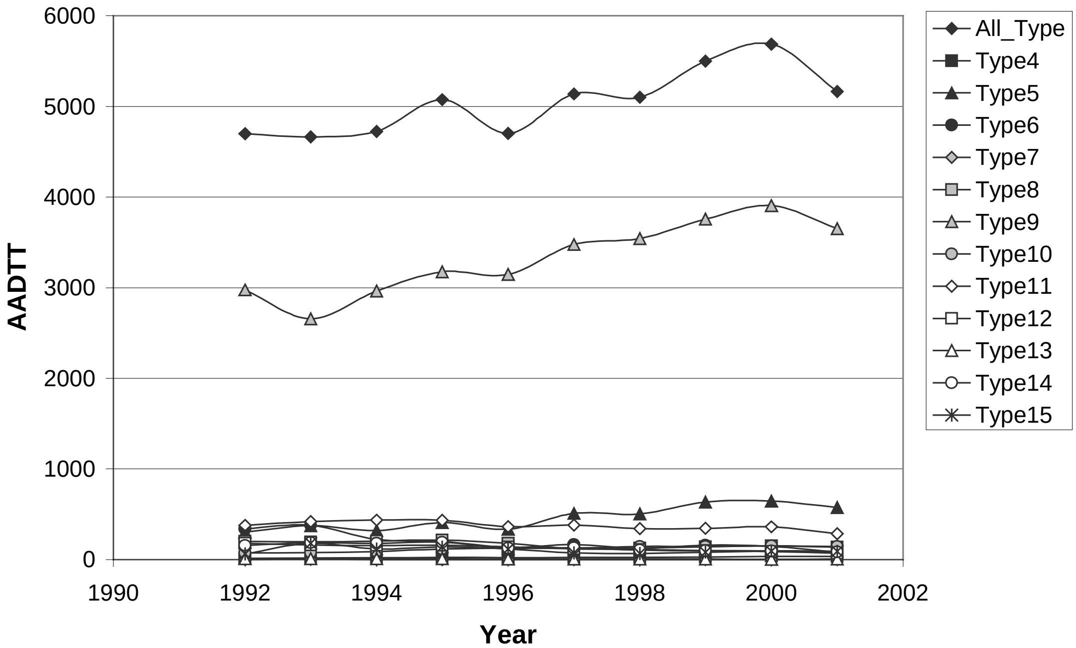
## STATION 30 MT. SHASTA



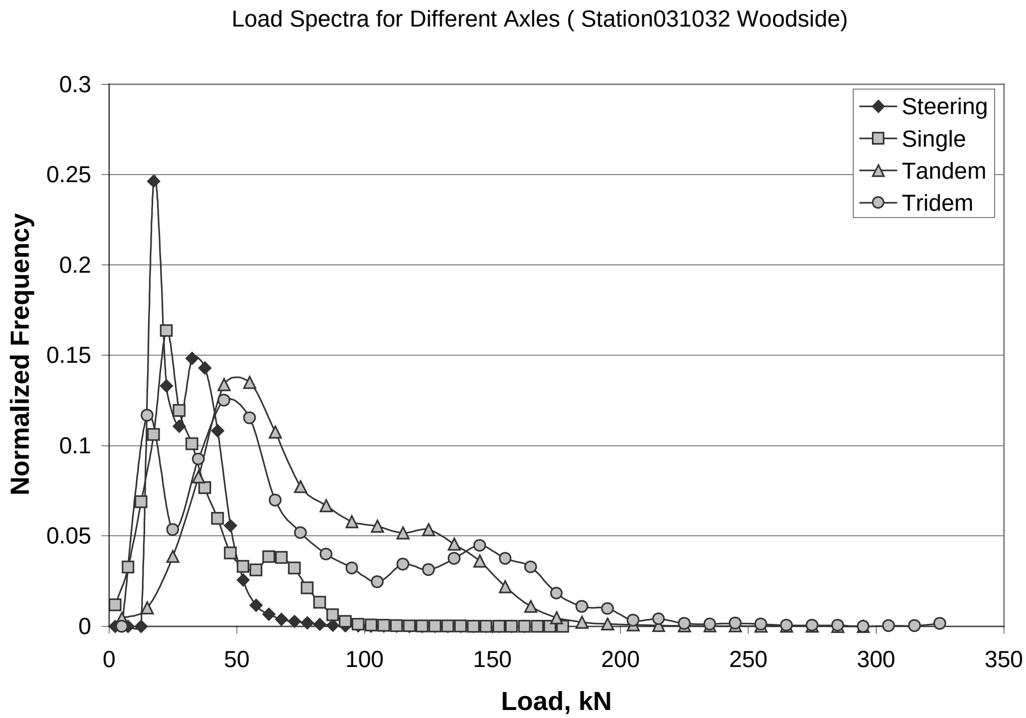

## Average Annual Daily Traffic for Different Truck Types

| Year | Truck Type | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **All** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **11** | **12** | **13** | **14** | **15** |
| 1992 | 4699 | 15 | 302 | 340 | 0 | 203 | 2975 | 74 | 379 | 181 | 10 | 156 | 64 |
| 1993 | 4666 | 17 | 374 | 380 | 3 | 196 | 2657 | 77 | 419 | 161 | 11 | 188 | 182 |
| 1994 | 4725 | 20 | 321 | 223 | 0 | 206 | 2964 | 89 | 437 | 158 | 10 | 179 | 117 |
| 1995 | 5076 | 24 | 407 | 201 | 0 | 216 | 3176 | 118 | 434 | 159 | 10 | 191 | 140 |
| 1996 | 4703 | 21 | 335 | 136 | 1 | 181 | 3145 | 128 | 365 | 140 | 6 | 126 | 118 |
| 1997 | 5139 | 24 | 511 | 166 | 0 | 121 | 3478 | 126 | 381 | 119 | 7 | 130 | 75 |
| 1998 | 5101 | 23 | 504 | 124 | 0 | 127 | 3543 | 145 | 343 | 112 | 6 | 104 | 68 |
| 1999 | 5501 | 29 | 637 | 160 | 1 | 141 | 3756 | 147 | 345 | 98 | 6 | 101 | 82 |
| 2000 | 5689 | 38 | 645 | 147 | 0 | 153 | 3908 | 150 | 361 | 90 | 5 | 97 | 94 |
| 2001 | 5166 | 35 | 575 | 81 | 1 | 137 | 3651 | 146 | 285 | 73 | 6 | 85 | 91 |

Annual Average Daily Traffic For Different Truck Types ( Station 030_MT._SHASTA)



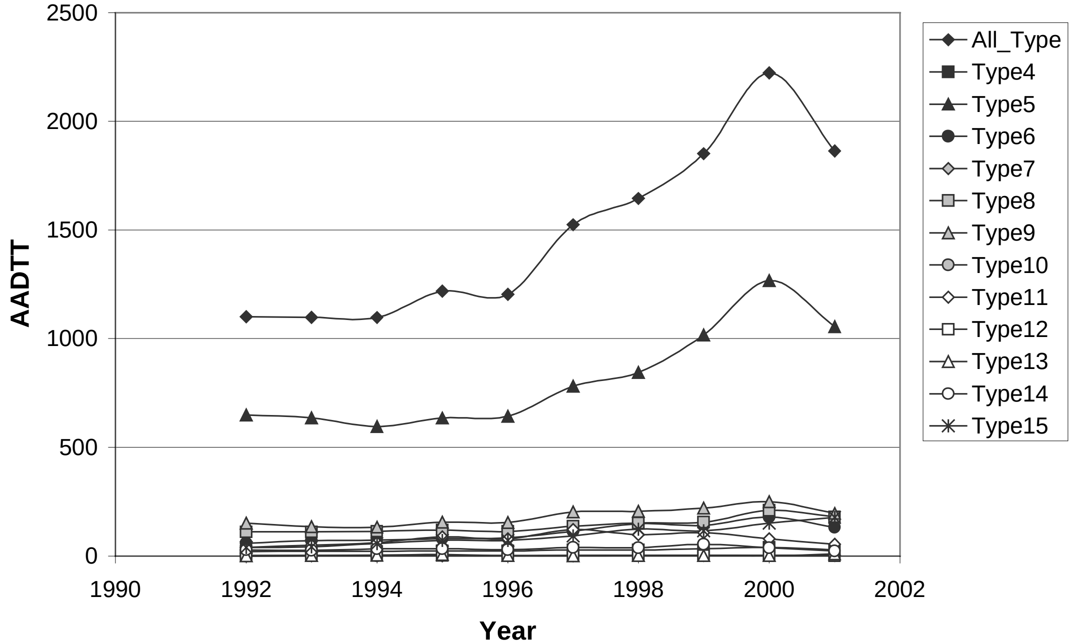
## STATIONS 31&32 WOODSIDE



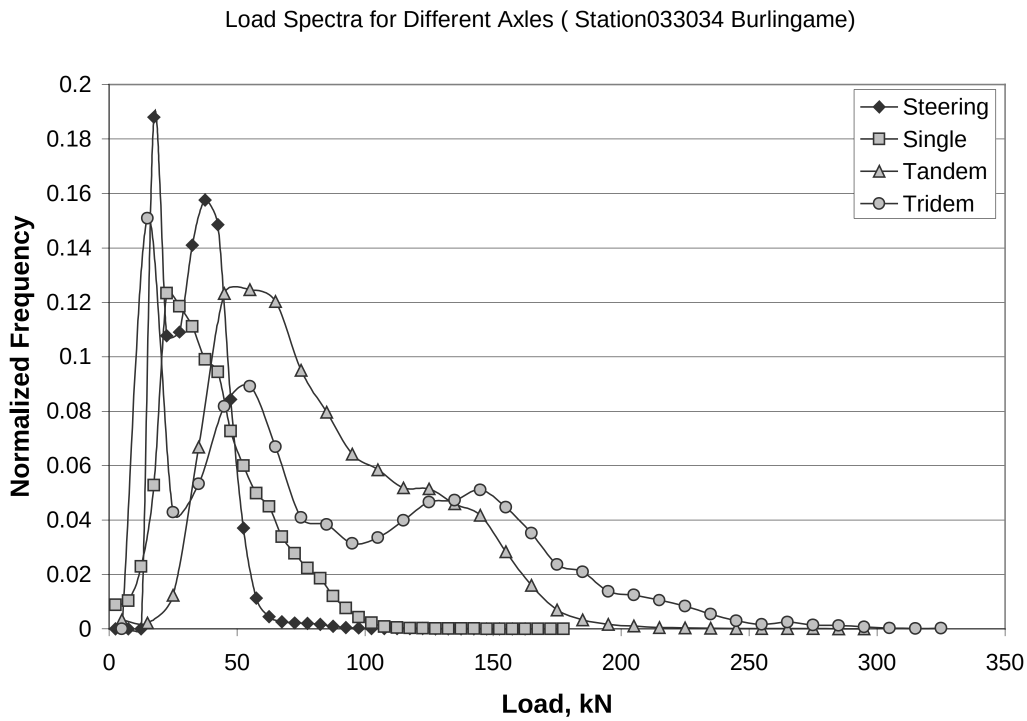

**Average Annual Daily Traffic for Different Truck Types**

| Year | Truck Type | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **All** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **11** | **12** | **13** | **14** | **15** |
| 1992 | 1101 | 20 | 649 | 58 | 0 | 111 | 152 | 0 | 40 | 2 | 1 | 28 | 39 |
| 1993 | 1098 | 22 | 636 | 71 | 1 | 111 | 134 | 1 | 49 | 2 | 2 | 26 | 43 |
| 1994 | 1097 | 21 | 596 | 73 | 1 | 114 | 133 | 1 | 62 | 2 | 4 | 33 | 57 |
| 1995 | 1218 | 24 | 635 | 80 | 1 | 119 | 155 | 2 | 88 | 2 | 6 | 34 | 72 |
| 1996 | 1204 | 23 | 643 | 84 | 1 | 113 | 154 | 1 | 79 | 1 | 2 | 29 | 72 |
| 1997 | 1524 | 28 | 781 | 114 | 1 | 137 | 203 | 2 | 122 | 2 | 1 | 39 | 93 |
| 1998 | 1645 | 27 | 845 | 148 | 2 | 152 | 205 | 3 | 98 | 1 | 2 | 38 | 124 |
| 1999 | 1851 | 34 | 1017 | 141 | 2 | 155 | 220 | 2 | 107 | 2 | 2 | 54 | 115 |
| 2000 | 2223 | 40 | 1267 | 179 | 2 | 210 | 250 | 3 | 79 | 1 | 2 | 38 | 151 |
| 2001 | 1864 | 28 | 1056 | 132 | 3 | 180 | 196 | 4 | 54 | 1 | 9 | 24 | 177 |

Annual Average Daily Traffic For Different Truck Types ( Station 031032_WOODSIDE)

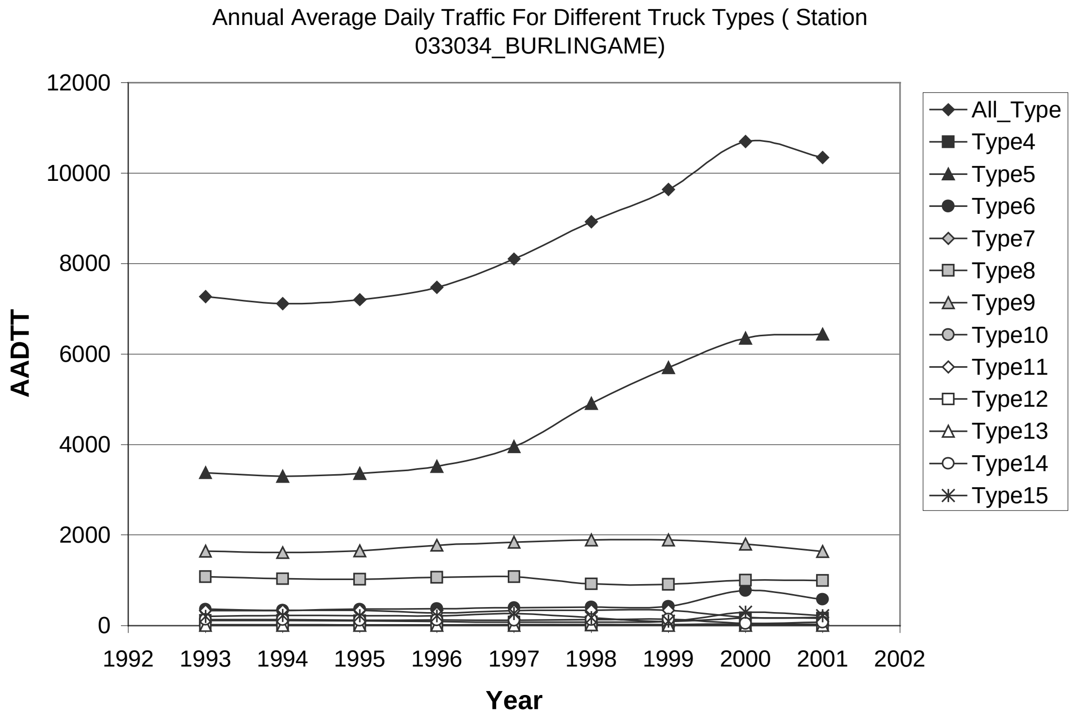


## STATIONS 33&34 BURLINGAME



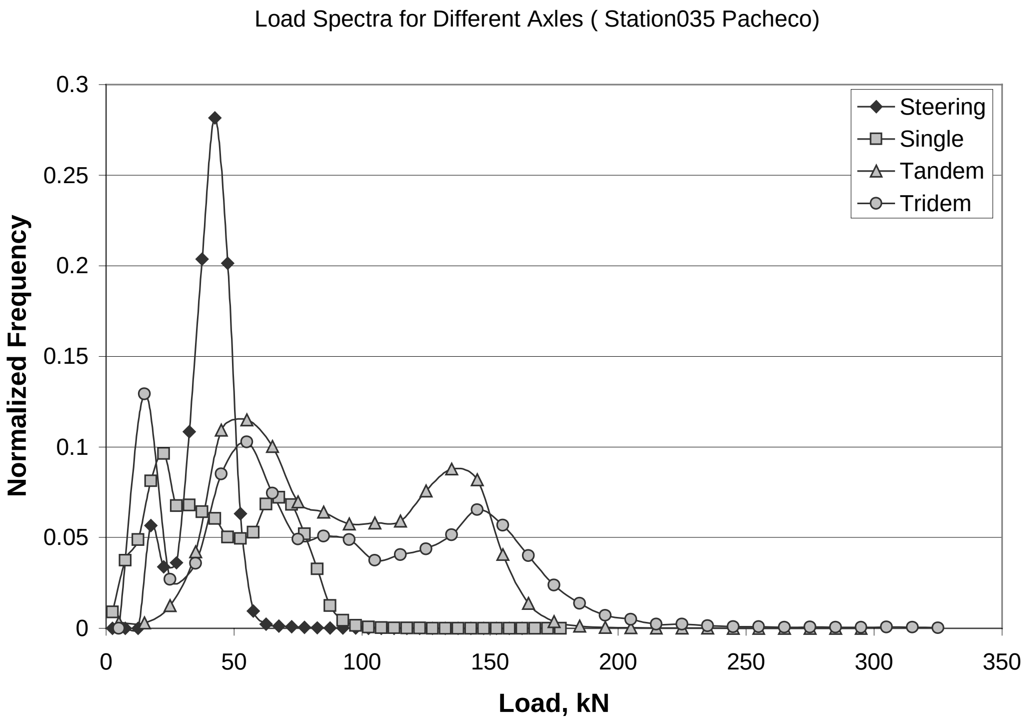

## Average Annual Daily Traffic for Different Truck Types

| Year | Truck Type | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **All** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **11** | **12** | **13** | **14** | **15** |
| 1993 | 7273 | 112 | 3381 | 361 | 12 | 1075 | 1643 | 9 | 325 | 19 | 4 | 133 | 199 |
| 1994 | 7116 | 113 | 3302 | 337 | 11 | 1034 | 1612 | 7 | 330 | 17 | 3 | 129 | 222 |
| 1995 | 7205 | 104 | 3363 | 360 | 13 | 1019 | 1651 | 9 | 334 | 15 | 3 | 117 | 219 |
| 1996 | 7474 | 86 | 3520 | 370 | 15 | 1062 | 1776 | 11 | 280 | 14 | 4 | 121 | 215 |
| 1997 | 8100 | 72 | 3953 | 396 | 17 | 1078 | 1841 | 12 | 332 | 16 | 5 | 116 | 264 |
| 1998 | 8925 | 78 | 4912 | 406 | 23 | 919 | 1894 | 18 | 339 | 15 | 17 | 131 | 173 |
| 1999 | 9638 | 87 | 5698 | 422 | 22 | 911 | 1893 | 16 | 336 | 14 | 4 | 140 | 95 |
| 2000 | 10696 | 167 | 6353 | 778 | 40 | 1004 | 1801 | 14 | 185 | 12 | 3 | 48 | 290 |
| 2001 | 10342 | 162 | 6440 | 582 | 27 | 994 | 1637 | 14 | 180 | 12 | 4 | 72 | 219 |



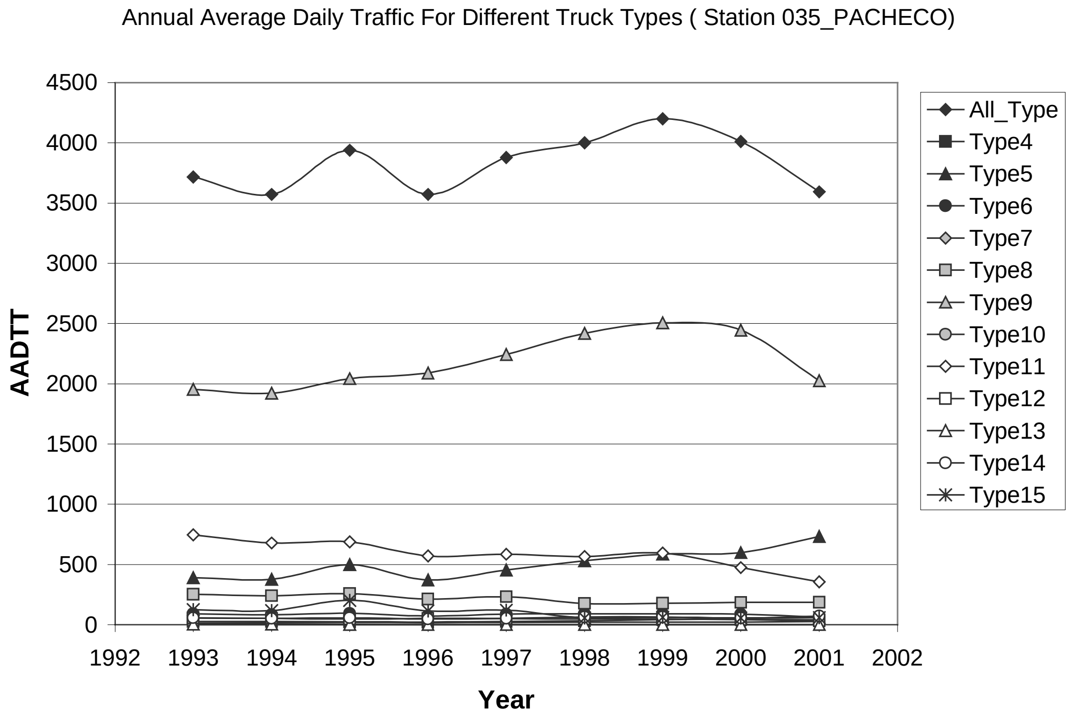
Annual Average Daily Traffic For Different Truck Types ( Station 033034_BURLINGAME)
12000
10000
8000
6000
4000
2000
0
AADTT
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
Year
All_Type
Type4
Type5
Type6
Type7
Type8
Type9
Type10
Type11
Type12
Type13
Type14
Type15

## STATION 35 PACHECO

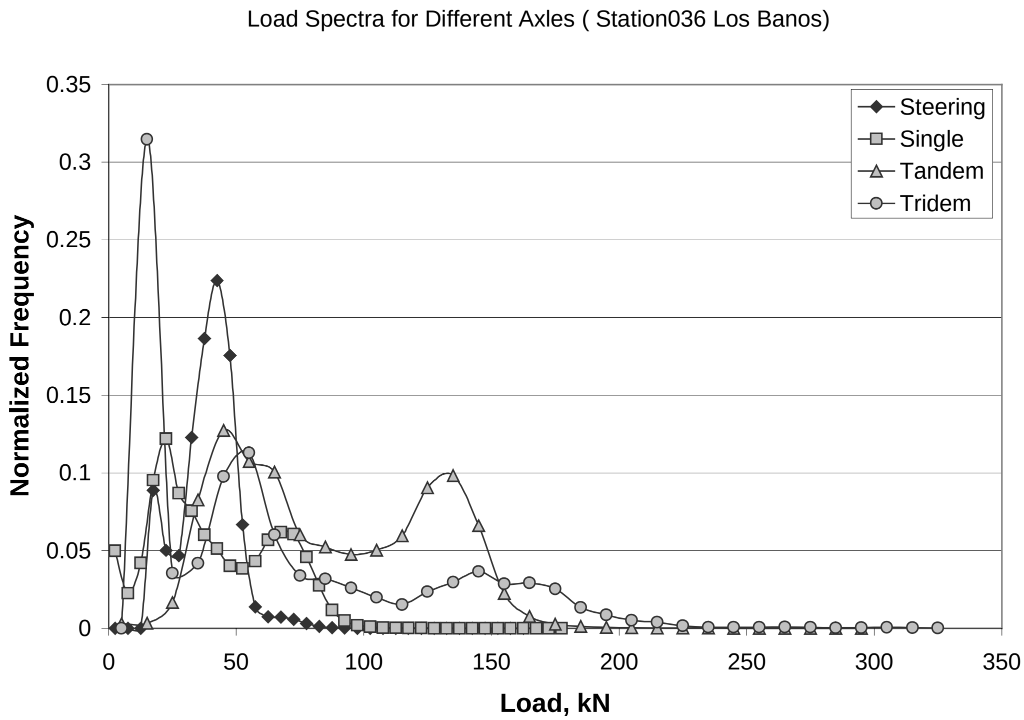



### Average Annual Daily Traffic for Different Truck Types

| Year | Truck Type | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **All** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **11** | **12** | **13** | **14** | **15** |
| 1993 | 3716 | 27 | 391 | 90 | 2 | 252 | 1954 | 13 | 746 | 56 | 5 | 58 | 124 |
| 1994 | 3571 | 26 | 377 | 81 | 1 | 241 | 1921 | 16 | 678 | 53 | 6 | 53 | 118 |
| 1995 | 3937 | 25 | 499 | 95 | 1 | 258 | 2043 | 19 | 686 | 48 | 3 | 57 | 203 |
| 1996 | 3571 | 22 | 371 | 72 | 1 | 213 | 2090 | 17 | 570 | 52 | 2 | 47 | 115 |
| 1997 | 3879 | 28 | 454 | 88 | 1 | 232 | 2244 | 19 | 586 | 51 | 2 | 54 | 121 |
| 1998 | 3999 | 31 | 529 | 90 | 1 | 176 | 2418 | 21 | 565 | 48 | 2 | 63 | 55 |
| 1999 | 4199 | 43 | 586 | 92 | 1 | 178 | 2505 | 22 | 595 | 49 | 2 | 63 | 62 |
| 2000 | 4009 | 45 | 598 | 88 | 1 | 184 | 2444 | 21 | 474 | 42 | 2 | 56 | 55 |
| 2001 | 3592 | 39 | 732 | 62 | 1 | 186 | 2024 | 26 | 356 | 33 | 2 | 72 | 59 |


Annual Average Daily Traffic For Different Truck Types ( Station 035_PACHECO)
AADTT
4500
4000
3500
3000
2500
2000
1500
1000
500
0
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
Year
All_Type
Type4
Type5
Type6
Type7
Type8
Type9
Type10
Type11
Type12
Type13
Type14
Type15

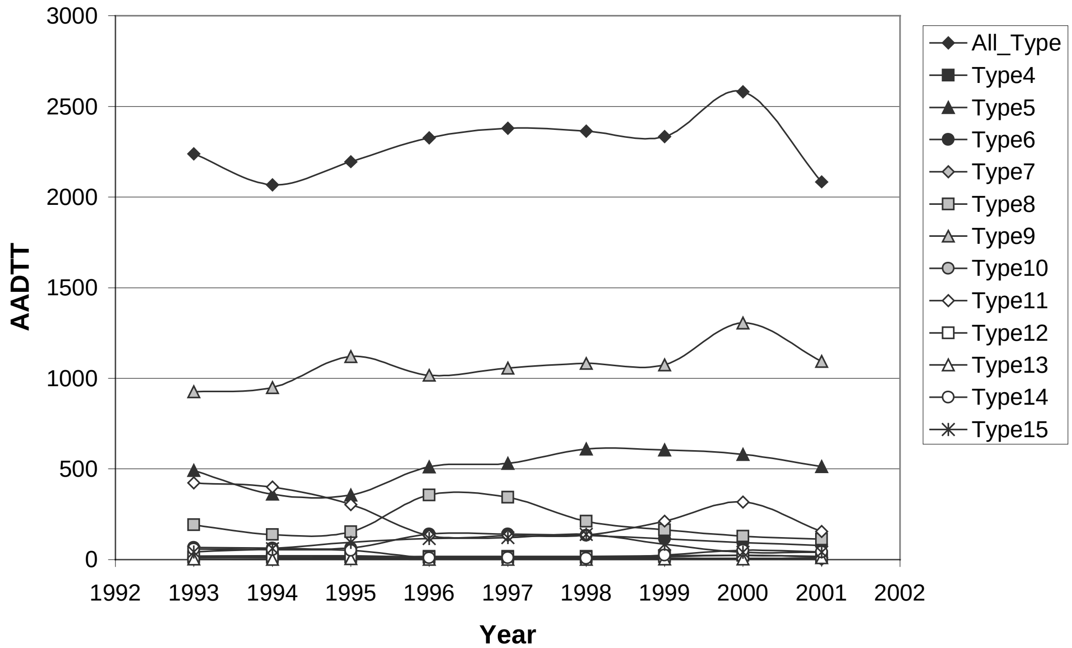
## STATION 36 LOS BANOS



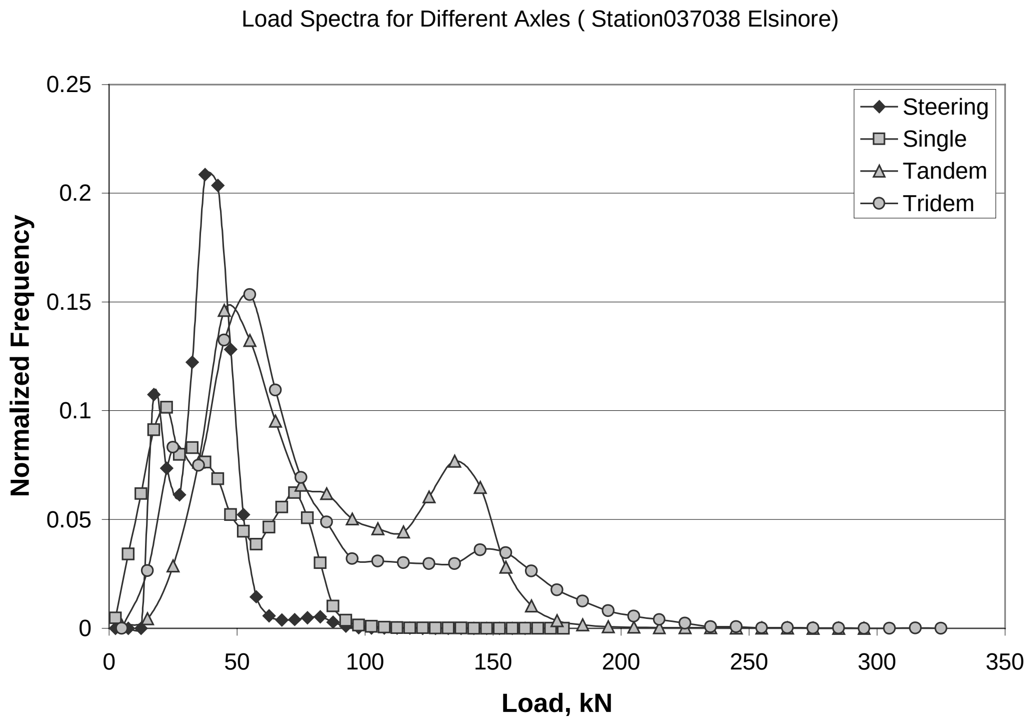

### Average Annual Daily Traffic for Different Truck Types

| Year | Truck Type | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **All** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **11** | **12** | **13** | **14** | **15** |
| 1993 | 2239 | 12 | 492 | 68 | 2 | 192 | 926 | 2 | 423 | 20 | 3 | 58 | 42 |
| 1994 | 2068 | 12 | 361 | 63 | 1 | 138 | 950 | 4 | 400 | 21 | 2 | 55 | 61 |
| 1995 | 2196 | 14 | 356 | 64 | 4 | 154 | 1121 | 8 | 304 | 21 | 4 | 51 | 96 |
| 1996 | 2327 | 17 | 512 | 141 | 1 | 357 | 1017 | 8 | 133 | 13 | 1 | 10 | 117 |
| 1997 | 2380 | 19 | 531 | 141 | 2 | 343 | 1056 | 9 | 132 | 13 | 2 | 11 | 121 |
| 1998 | 2364 | 19 | 610 | 134 | 2 | 211 | 1082 | 8 | 135 | 13 | 2 | 8 | 140 |
| 1999 | 2334 | 22 | 605 | 115 | 2 | 165 | 1075 | 8 | 213 | 16 | 3 | 25 | 85 |
| 2000 | 2581 | 23 | 581 | 94 | 3 | 130 | 1306 | 8 | 318 | 24 | 3 | 51 | 40 |
| 2001 | 2084 | 17 | 513 | 78 | 1 | 112 | 1094 | 7 | 155 | 14 | 10 | 43 | 41 |

Annual Average Daily Traffic For Different Truck Types ( Station 036_LOS_BANOS)



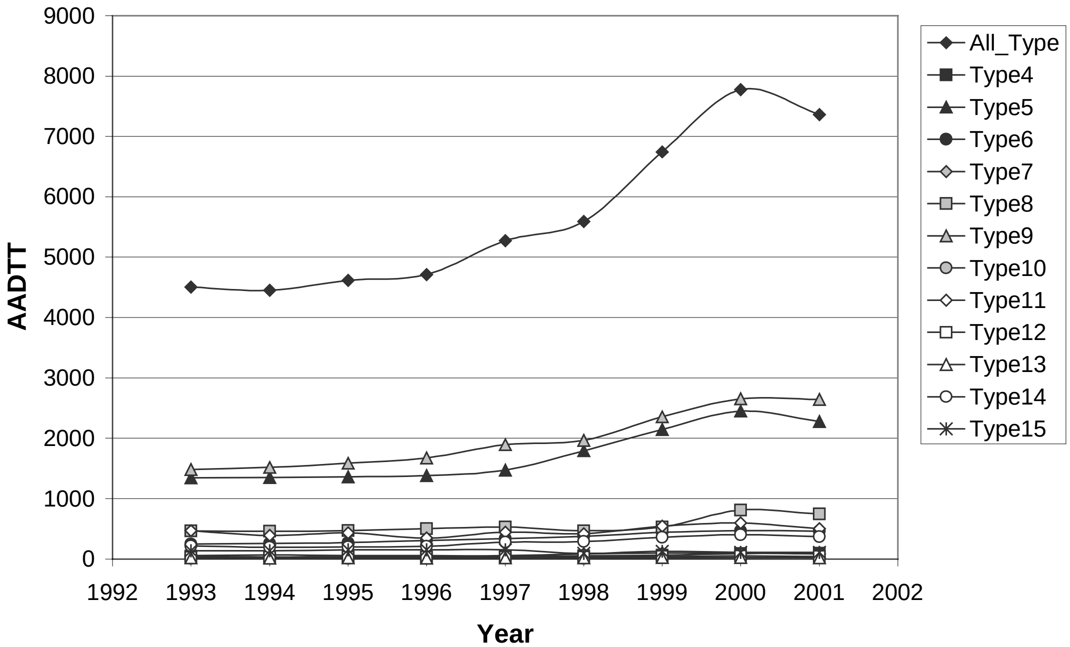
## STATIONS 37&38 ELSINORE



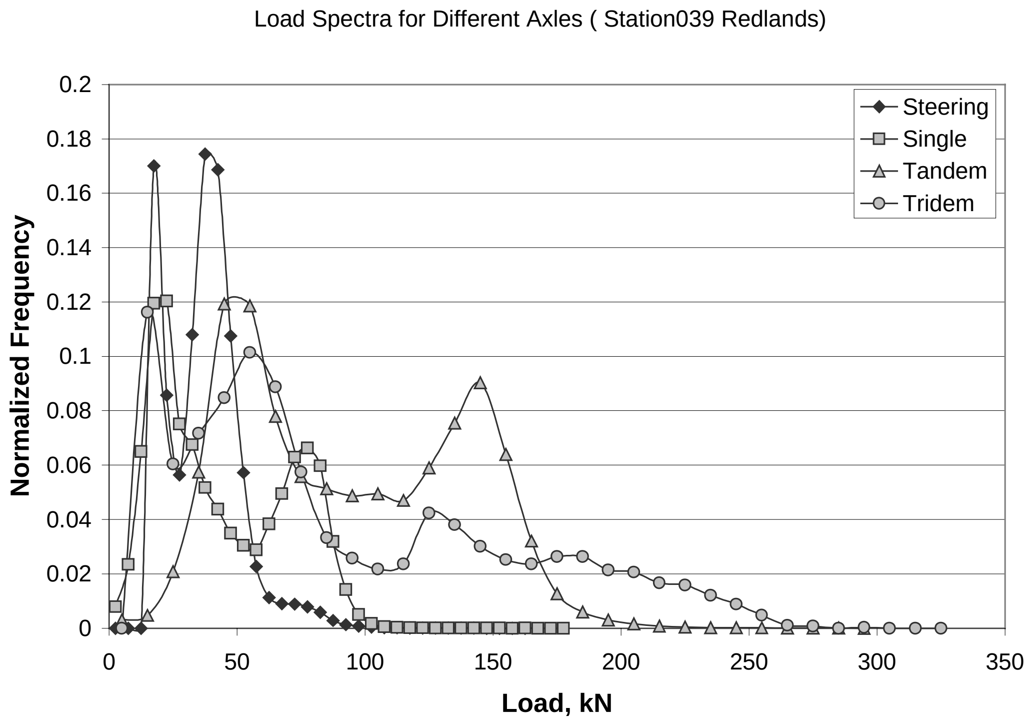

## Average Annual Daily Traffic for Different Truck Types

| Year | Truck Type | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **All** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **11** | **12** | **13** | **14** | **15** |
| 1993 | 4502 | 50 | 1344 | 247 | 54 | 464 | 1481 | 5 | 467 | 26 | 16 | 215 | 133 |
| 1994 | 4450 | 30 | 1350 | 259 | 64 | 457 | 1519 | 10 | 390 | 30 | 13 | 194 | 136 |
| 1995 | 4615 | 35 | 1359 | 270 | 56 | 470 | 1586 | 11 | 433 | 31 | 15 | 198 | 150 |
| 1996 | 4712 | 33 | 1379 | 306 | 54 | 501 | 1674 | 10 | 346 | 31 | 14 | 208 | 155 |
| 1997 | 5271 | 41 | 1471 | 336 | 57 | 531 | 1895 | 12 | 444 | 32 | 18 | 277 | 155 |
| 1998 | 5588 | 51 | 1791 | 374 | 84 | 468 | 1966 | 11 | 417 | 30 | 17 | 287 | 93 |
| 1999 | 6742 | 61 | 2144 | 441 | 103 | 531 | 2355 | 16 | 544 | 39 | 22 | 361 | 127 |
| 2000 | 7774 | 88 | 2450 | 469 | 97 | 812 | 2653 | 20 | 594 | 49 | 27 | 403 | 112 |
| 2001 | 7363 | 90 | 2276 | 460 | 86 | 746 | 2641 | 22 | 499 | 44 | 21 | 369 | 109 |

Annual Average Daily Traffic For Different Truck Types ( Station 037038_ELSINORE)

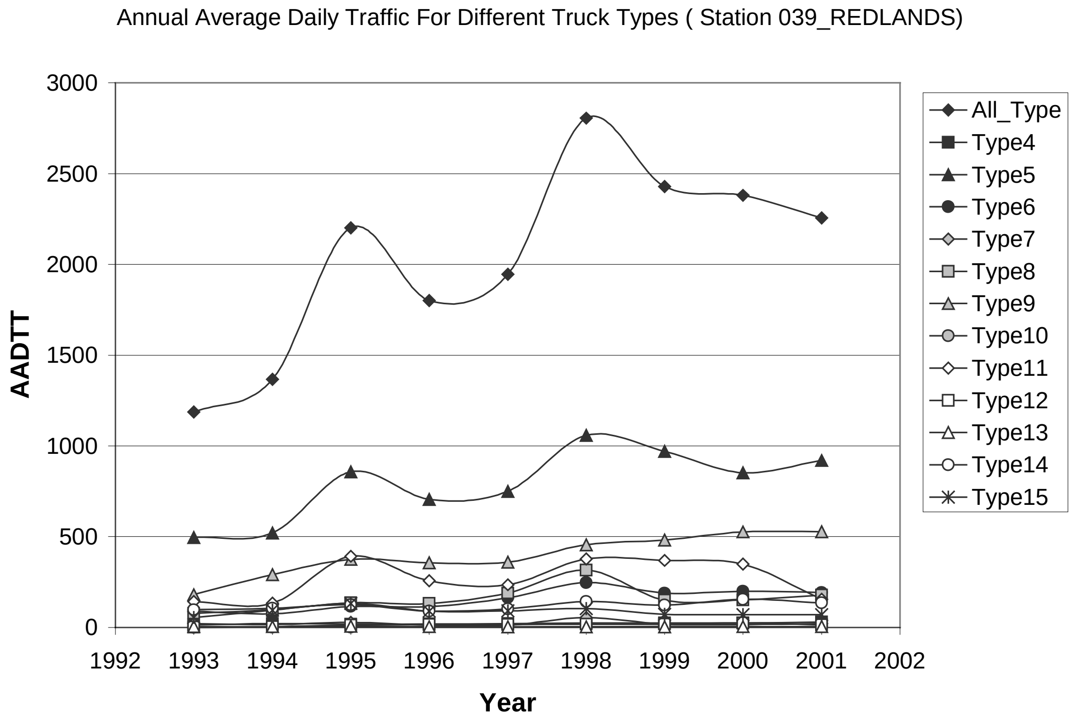


## STATION 39 REDLANDS

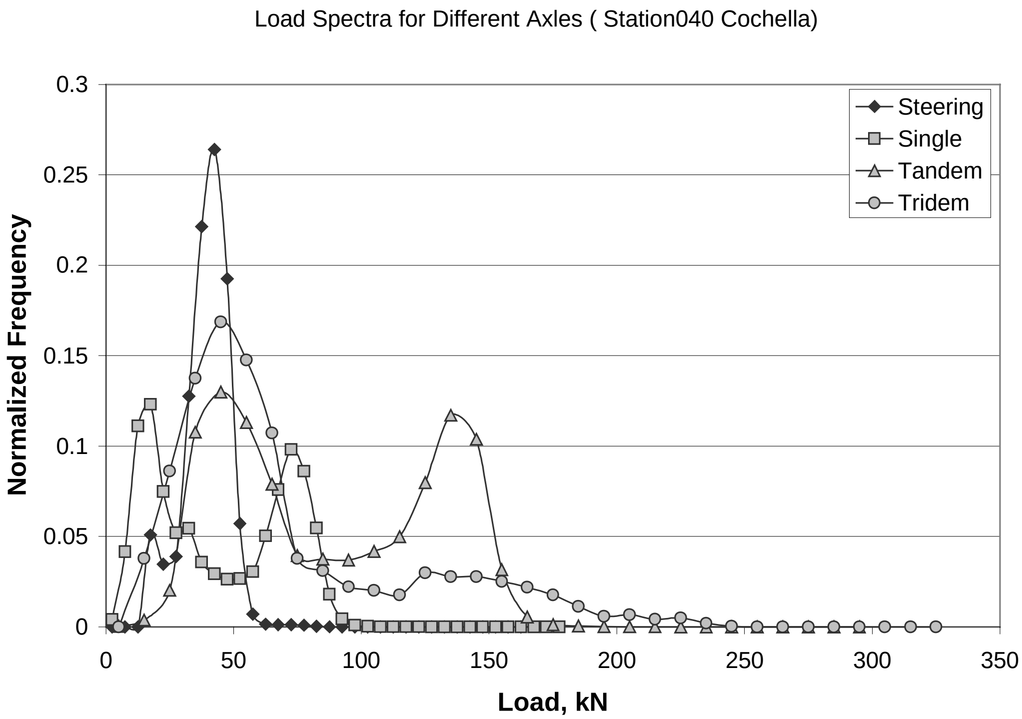



### Average Annual Daily Traffic for Different Truck Types

| Year | Truck Type | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **All** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **11** | **12** | **13** | **14** | **15** |
| 1993 | 1187 | 14 | 496 | 91 | 22 | 79 | 181 | 0 | 143 | 1 | 5 | 98 | 56 |
| 1994 | 1367 | 22 | 521 | 75 | 16 | 98 | 291 | 2 | 134 | 4 | 4 | 106 | 95 |
| 1995 | 2202 | 18 | 858 | 116 | 28 | 136 | 375 | 2 | 392 | 12 | 6 | 125 | 133 |
| 1996 | 1802 | 20 | 706 | 115 | 13 | 132 | 357 | 3 | 257 | 15 | 4 | 91 | 90 |
| 1997 | 1946 | 21 | 750 | 163 | 13 | 190 | 360 | 2 | 236 | 16 | 3 | 102 | 92 |
| 1998 | 2806 | 24 | 1059 | 248 | 55 | 316 | 456 | 4 | 377 | 18 | 3 | 143 | 105 |
| 1999 | 2430 | 25 | 970 | 190 | 19 | 150 | 482 | 5 | 370 | 19 | 3 | 123 | 73 |
| 2000 | 2381 | 25 | 853 | 199 | 16 | 152 | 527 | 5 | 349 | 25 | 4 | 156 | 71 |
| 2001 | 2257 | 31 | 920 | 193 | 22 | 179 | 528 | 3 | 156 | 14 | 5 | 135 | 71 |

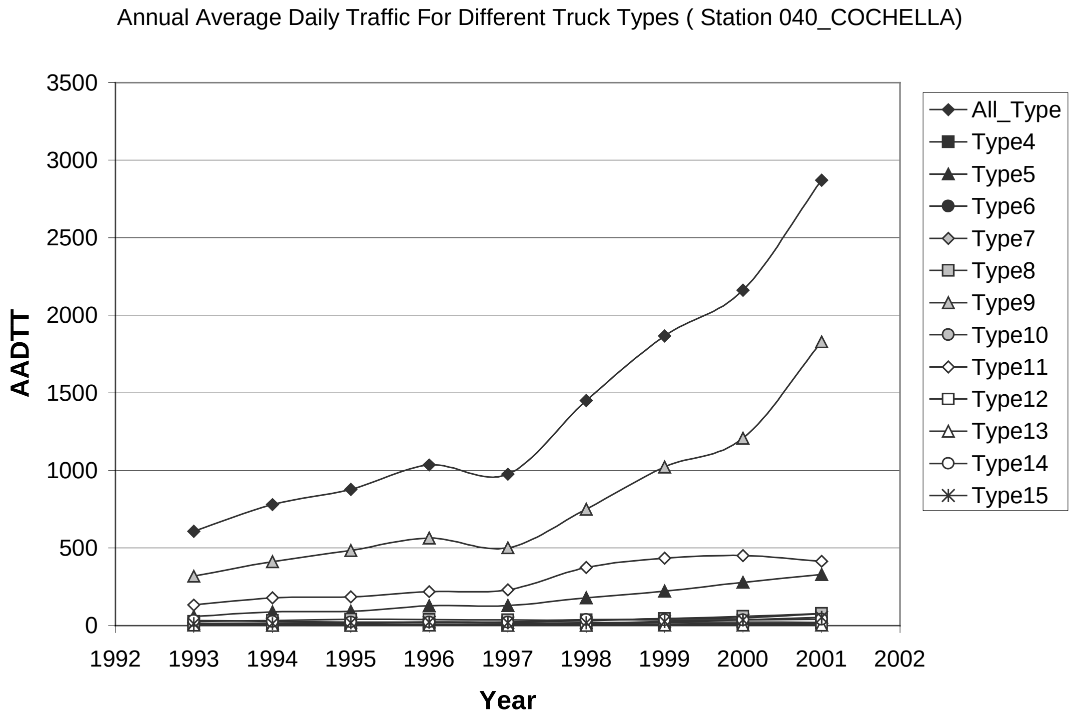

Annual Average Daily Traffic For Different Truck Types ( Station 039_REDLANDS)
3000
2500
2000
1500
1000
500
0
AADTT
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
Year
All_Type
Type4
Type5
Type6
Type7
Type8
Type9
Type10
Type11
Type12
Type13
Type14
Type15

## STATION 40 COCHELLA

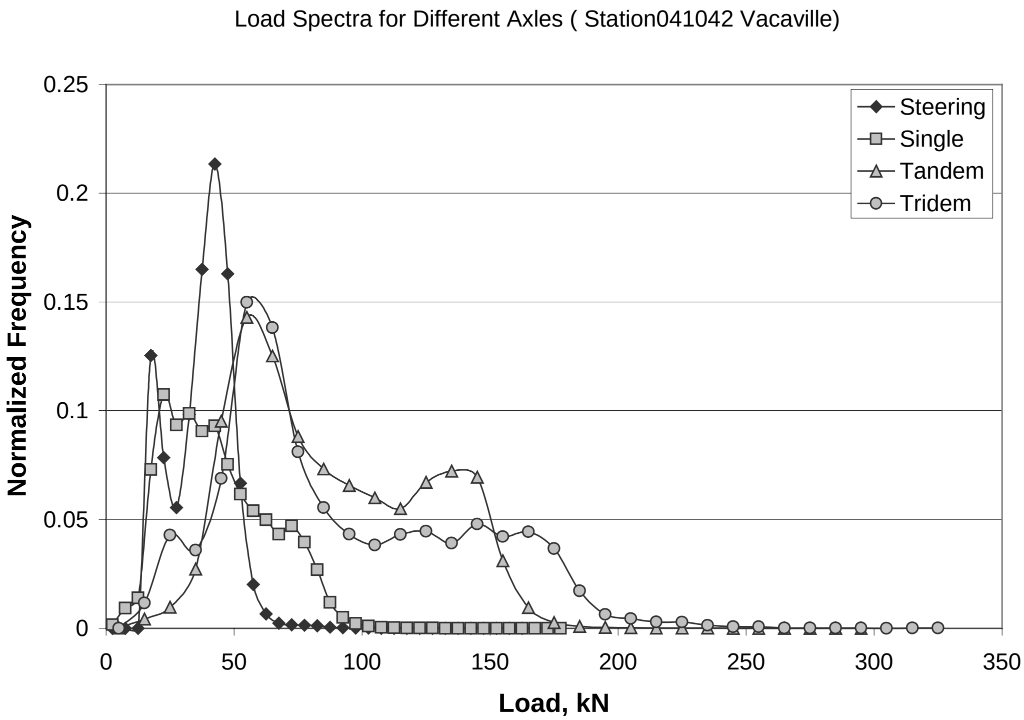



### Average Annual Daily Traffic for Different Truck Types

| Year | Truck Type | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **All** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **11** | **12** | **13** | **14** | **15** |
| 1993 | 608 | 3 | 59 | 13 | 1 | 27 | 318 | 1 | 132 | 8 | 3 | 33 | 11 |
| 1994 | 779 | 2 | 88 | 15 | 2 | 33 | 412 | 1 | 178 | 9 | 1 | 25 | 13 |
| 1995 | 877 | 3 | 91 | 17 | 1 | 41 | 484 | 1 | 184 | 11 | 1 | 23 | 18 |
| 1996 | 1035 | 4 | 127 | 22 | 5 | 39 | 563 | 1 | 219 | 9 | 2 | 23 | 22 |
| 1997 | 976 | 3 | 128 | 23 | 3 | 36 | 501 | 2 | 230 | 9 | 1 | 22 | 18 |
| 1998 | 1450 | 6 | 179 | 30 | 3 | 36 | 750 | 2 | 374 | 14 | 1 | 38 | 18 |
| 1999 | 1867 | 10 | 221 | 45 | 4 | 45 | 1023 | 2 | 434 | 19 | 2 | 35 | 26 |
| 2000 | 2162 | 11 | 278 | 49 | 5 | 59 | 1207 | 3 | 452 | 23 | 3 | 35 | 37 |
| 2001 | 2872 | 13 | 330 | 75 | 13 | 77 | 1829 | 3 | 415 | 19 | 3 | 41 | 54 |


Annual Average Daily Traffic For Different Truck Types ( Station 040_COCHELLA)
AADTT
Year
3500
3000
2500
2000
1500
1000
500
0
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
All_Type
Type4
Type5
Type6
Type7
Type8
Type9
Type10
Type11
Type12
Type13
Type14
Type15

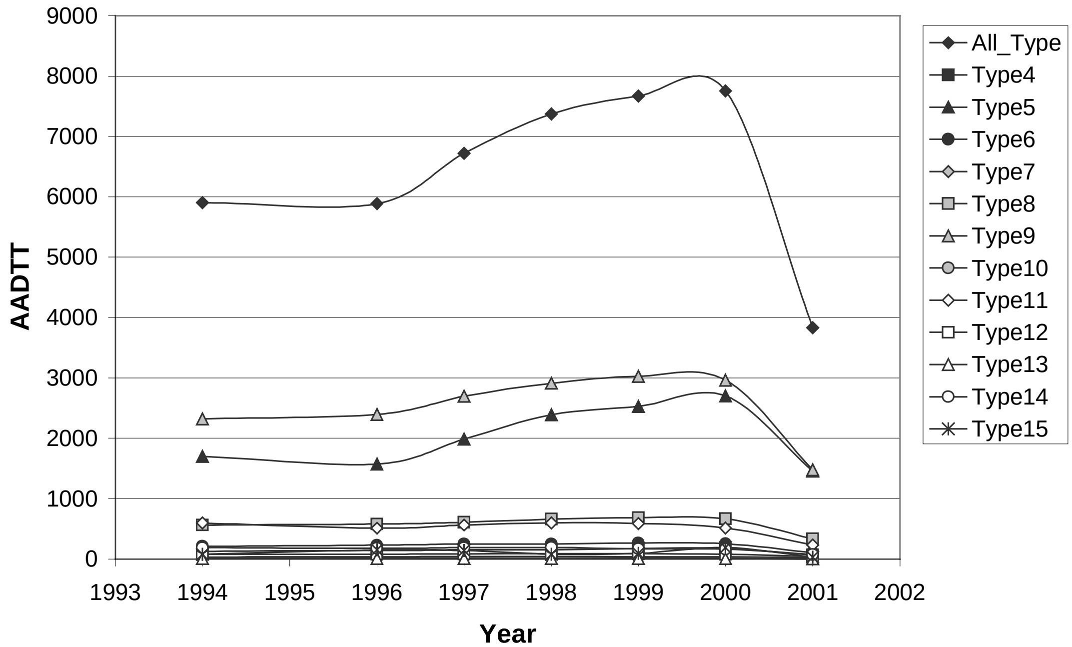
## STATIONS 41&42 VACAVILLE



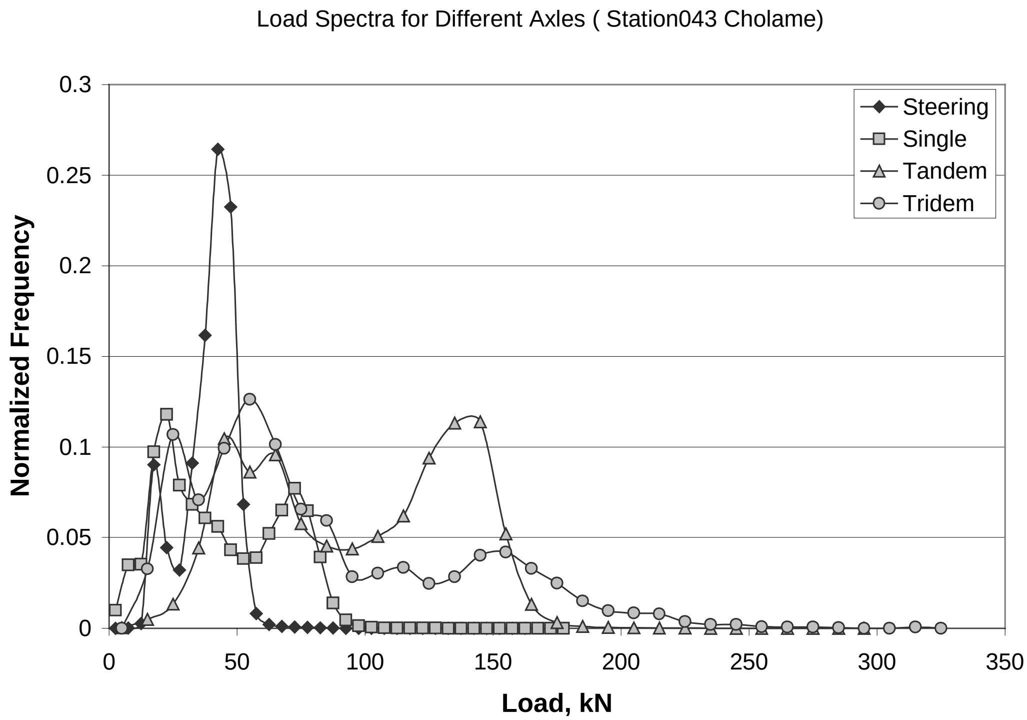

### Average Annual Daily Traffic for Different Truck Types

| Year | Truck Type | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | All | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| 1994 | 5904 | 129 | 1702 | 209 | 6 | 563 | 2323 | 28 | 596 | 75 | 6 | 187 | 80 |
| 1996 | 5887 | 139 | 1573 | 230 | 14 | 578 | 2394 | 37 | 510 | 78 | 9 | 176 | 150 |
| 1997 | 6719 | 151 | 1985 | 248 | 14 | 608 | 2696 | 38 | 564 | 85 | 7 | 185 | 139 |
| 1998 | 7371 | 155 | 2390 | 250 | 10 | 661 | 2909 | 38 | 598 | 88 | 5 | 190 | 77 |
| 1999 | 7669 | 172 | 2528 | 264 | 13 | 685 | 3026 | 35 | 589 | 87 | 6 | 170 | 93 |
| 2000 | 7754 | 178 | 2701 | 251 | 7 | 668 | 2962 | 36 | 513 | 80 | 5 | 164 | 190 |
| 2001 | 3833 | 66 | 1454 | 106 | 0 | 333 | 1477 | 19 | 232 | 41 | 2 | 71 | 31 |

Annual Average Daily Traffic For Different Truck Types ( Station 041042_VACAVILLE)

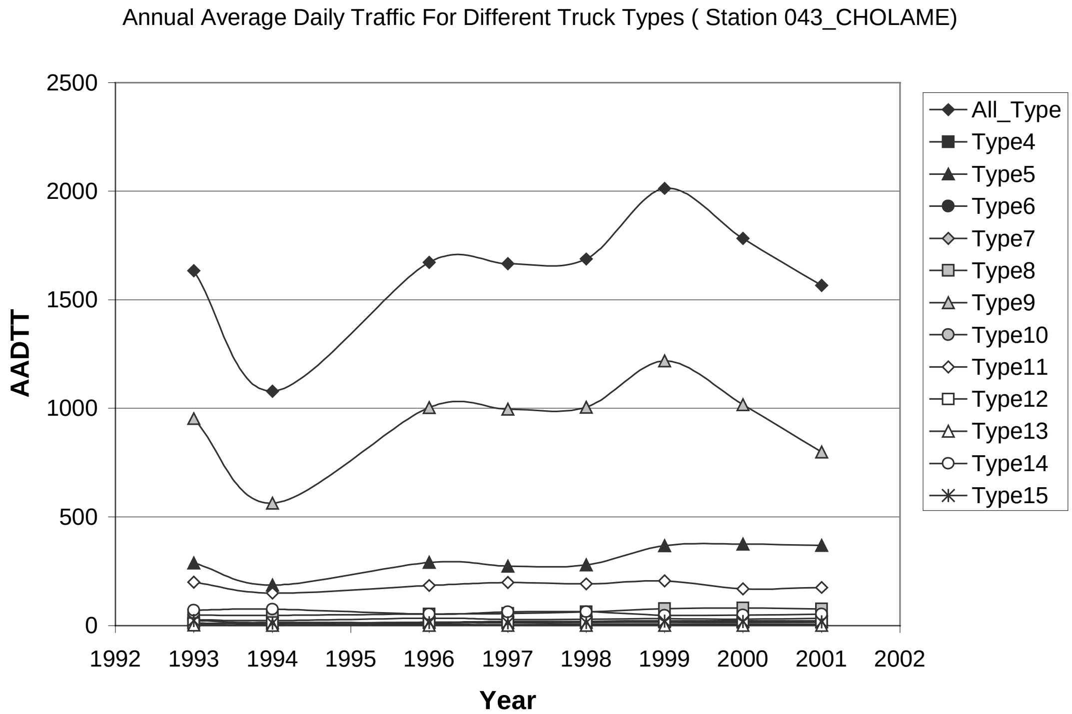


## STATION 43 CHOLAME

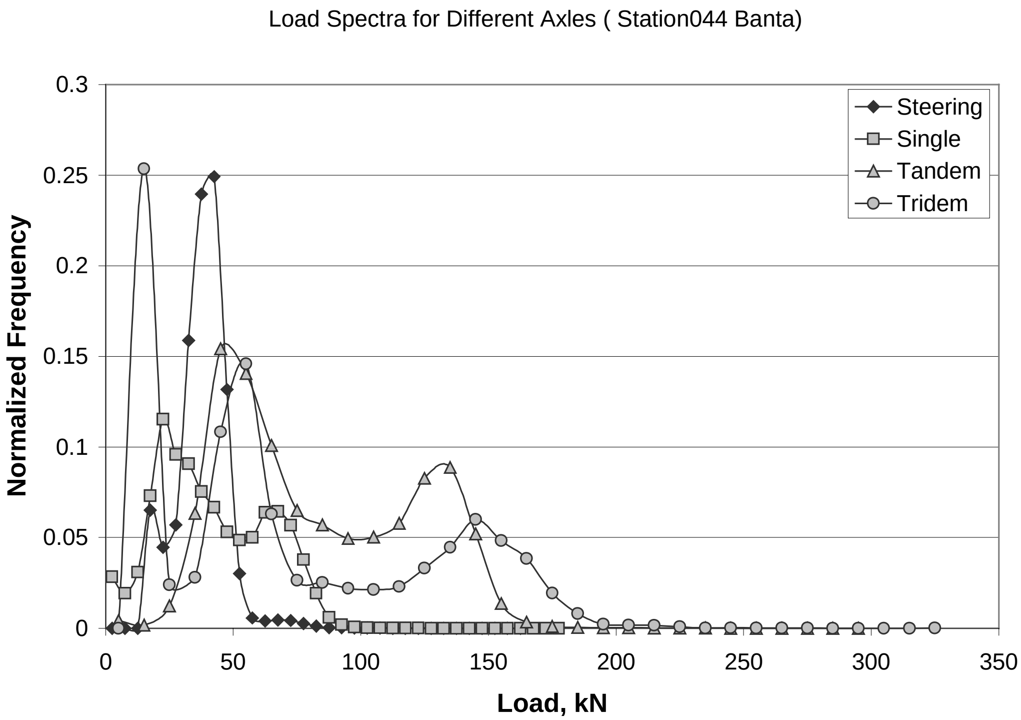



### Average Annual Daily Traffic for Different Truck Types

| Year | Truck Type | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **All** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **11** | **12** | **13** | **14** | **15** |
| 1993 | 1634 | 11 | 288 | 26 | 1 | 48 | 953 | 3 | 200 | 9 | 2 | 71 | 23 |
| 1994 | 1079 | 8 | 186 | 23 | 1 | 47 | 563 | 2 | 149 | 14 | 1 | 75 | 12 |
| 1996 | 1672 | 15 | 291 | 34 | 7 | 53 | 1004 | 4 | 184 | 13 | 1 | 53 | 14 |
| 1997 | 1666 | 18 | 273 | 28 | 1 | 55 | 997 | 4 | 198 | 15 | 1 | 63 | 13 |
| 1998 | 1688 | 19 | 279 | 29 | 1 | 63 | 1006 | 6 | 192 | 15 | 1 | 64 | 14 |
| 1999 | 2013 | 22 | 368 | 32 | 2 | 77 | 1218 | 6 | 205 | 15 | 1 | 47 | 20 |
| 2000 | 1782 | 22 | 375 | 29 | 2 | 81 | 1017 | 6 | 169 | 14 | 1 | 48 | 18 |
| 2001 | 1566 | 21 | 369 | 34 | 2 | 76 | 799 | 5 | 175 | 14 | 1 | 53 | 17 |


Annual Average Daily Traffic For Different Truck Types ( Station 043_CHOLAME)
AADTT
2500
2000
1500
1000
500
0
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
Year
All_Type
Type4
Type5
Type6
Type7
Type8
Type9
Type10
Type11
Type12
Type13
Type14
Type15

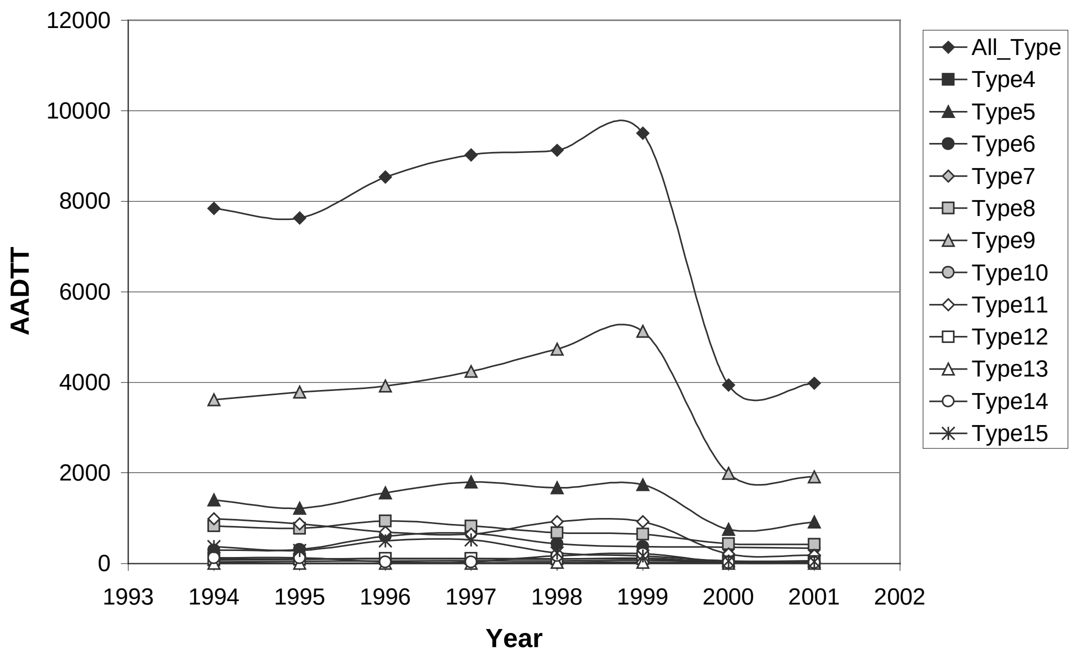
## STATION 44 BANTA



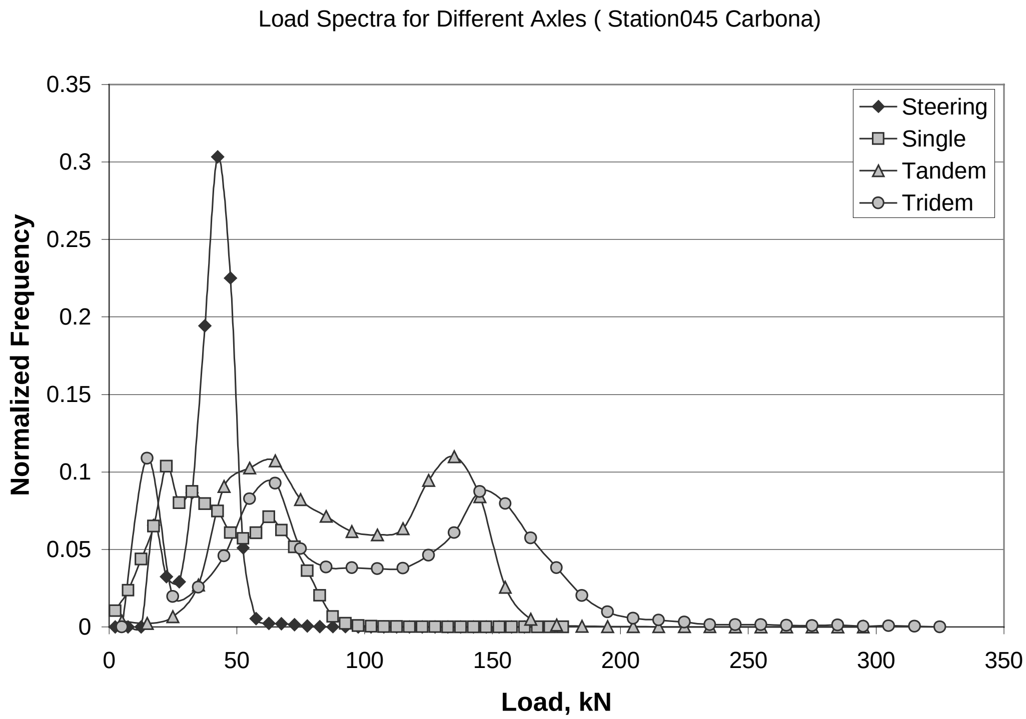

### Average Annual Daily Traffic for Different Truck Types

| **Year** | **Truck Type** | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **All** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **11** | **12** | **13** | **14** | **15** |
| 1994 | 7845 | 74 | 1405 | 296 | 4 | 830 | 3616 | 35 | 989 | 97 | 6 | 123 | 369 |
| 1995 | 7631 | 93 | 1221 | 310 | 5 | 778 | 3786 | 45 | 876 | 97 | 6 | 126 | 287 |
| 1996 | 8535 | 104 | 1562 | 601 | 6 | 938 | 3920 | 56 | 693 | 113 | 6 | 34 | 503 |
| 1997 | 9028 | 100 | 1803 | 668 | 8 | 828 | 4241 | 59 | 650 | 108 | 6 | 35 | 520 |
| 1998 | 9128 | 98 | 1670 | 434 | 10 | 679 | 4731 | 56 | 924 | 105 | 20 | 170 | 229 |
| 1999 | 9506 | 116 | 1738 | 369 | 20 | 644 | 5126 | 65 | 924 | 100 | 24 | 216 | 164 |
| 2000 | 3940 | 41 | 753 | 359 | 7 | 437 | 1987 | 29 | 210 | 37 | 5 | 17 | 58 |
| 2001 | 3979 | 60 | 914 | 338 | 25 | 425 | 1916 | 19 | 185 | 39 | 4 | 16 | 41 |

Annual Average Daily Traffic For Different Truck Types ( Station 044_BANTA)



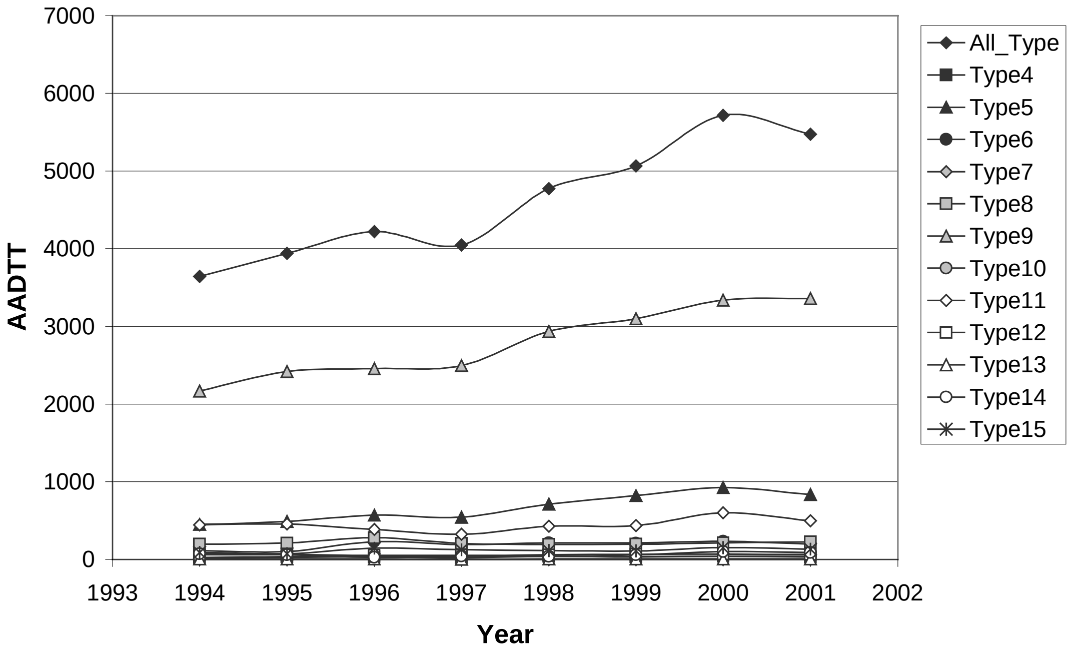
## STATION 45 CARBONA



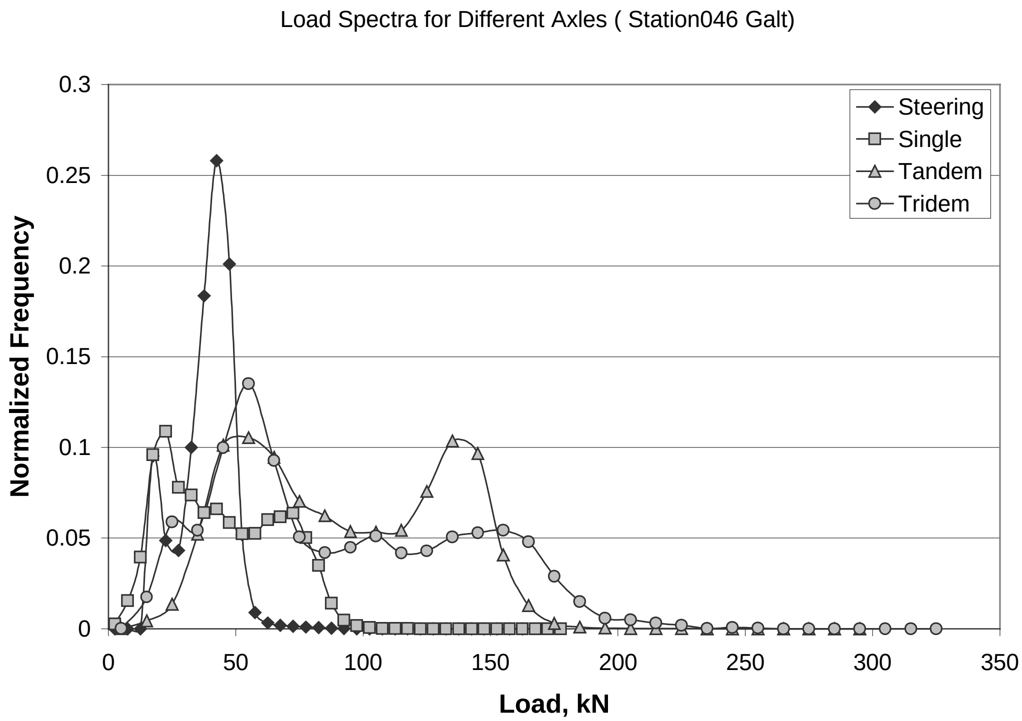

### Average Annual Daily Traffic for Different Truck Types

| Year | Truck Type | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **All** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **11** | **12** | **13** | **14** | **15** |
| 1994 | 3646 | 23 | 451 | 114 | 1 | 197 | 2168 | 23 | 446 | 58 | 4 | 72 | 89 |
| 1995 | 3939 | 36 | 489 | 102 | 1 | 211 | 2420 | 26 | 456 | 60 | 4 | 62 | 73 |
| 1996 | 4220 | 34 | 571 | 228 | 1 | 281 | 2458 | 35 | 386 | 51 | 4 | 29 | 144 |
| 1997 | 4046 | 22 | 544 | 191 | 1 | 207 | 2495 | 42 | 322 | 51 | 3 | 44 | 124 |
| 1998 | 4774 | 37 | 712 | 213 | 0 | 193 | 2936 | 40 | 427 | 58 | 5 | 40 | 114 |
| 1999 | 5066 | 35 | 821 | 210 | 1 | 197 | 3097 | 32 | 434 | 67 | 4 | 58 | 110 |
| 2000 | 5718 | 39 | 926 | 233 | 1 | 213 | 3339 | 37 | 601 | 68 | 4 | 103 | 153 |
| 2001 | 5475 | 31 | 835 | 199 | 1 | 226 | 3360 | 40 | 496 | 63 | 4 | 89 | 131 |

Annual Average Daily Traffic For Different Truck Types ( Station 045_CARBONA)

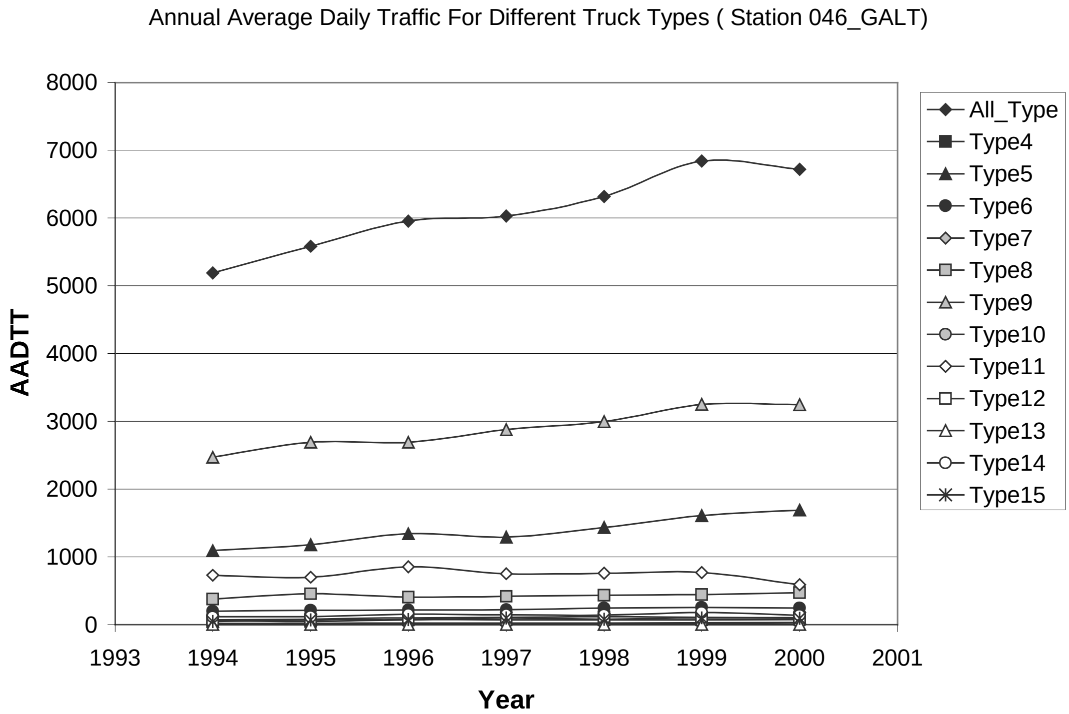


## STATION 46 GALT

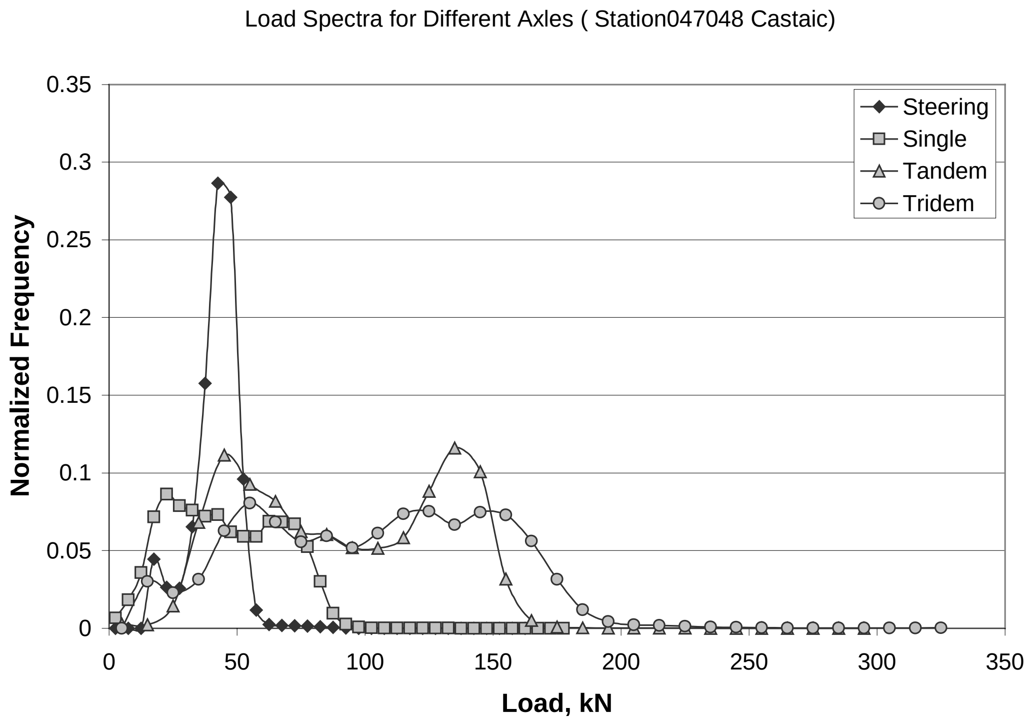



### Average Annual Daily Traffic for Different Truck Types

| Year | Truck Type | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **All** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **11** | **12** | **13** | **14** | **15** |
| 1994 | 5191 | 59 | 1092 | 197 | 11 | 377 | 2471 | 19 | 729 | 69 | 3 | 115 | 50 |
| 1995 | 5583 | 48 | 1179 | 212 | 4 | 457 | 2693 | 19 | 700 | 80 | 3 | 118 | 72 |
| 1996 | 5955 | 72 | 1343 | 217 | 8 | 407 | 2693 | 24 | 856 | 101 | 3 | 154 | 76 |
| 1997 | 6030 | 73 | 1293 | 222 | 9 | 420 | 2879 | 24 | 753 | 108 | 3 | 145 | 99 |
| 1998 | 6319 | 69 | 1432 | 246 | 13 | 432 | 2997 | 26 | 760 | 117 | 4 | 141 | 81 |
| 1999 | 6839 | 74 | 1611 | 255 | 14 | 445 | 3250 | 29 | 770 | 108 | 4 | 179 | 101 |
| 2000 | 6717 | 77 | 1691 | 247 | 13 | 473 | 3248 | 33 | 591 | 105 | 4 | 140 | 97 |


Annual Average Daily Traffic For Different Truck Types ( Station 046_GALT)
AADTT
8000
7000
6000
5000
4000
3000
2000
1000
0
1993
1994
1995
1996
1997
1998
1999
2000
2001
Year
All_Type
Type4
Type5
Type6
Type7
Type8
Type9
Type10
Type11
Type12
Type13
Type14
Type15

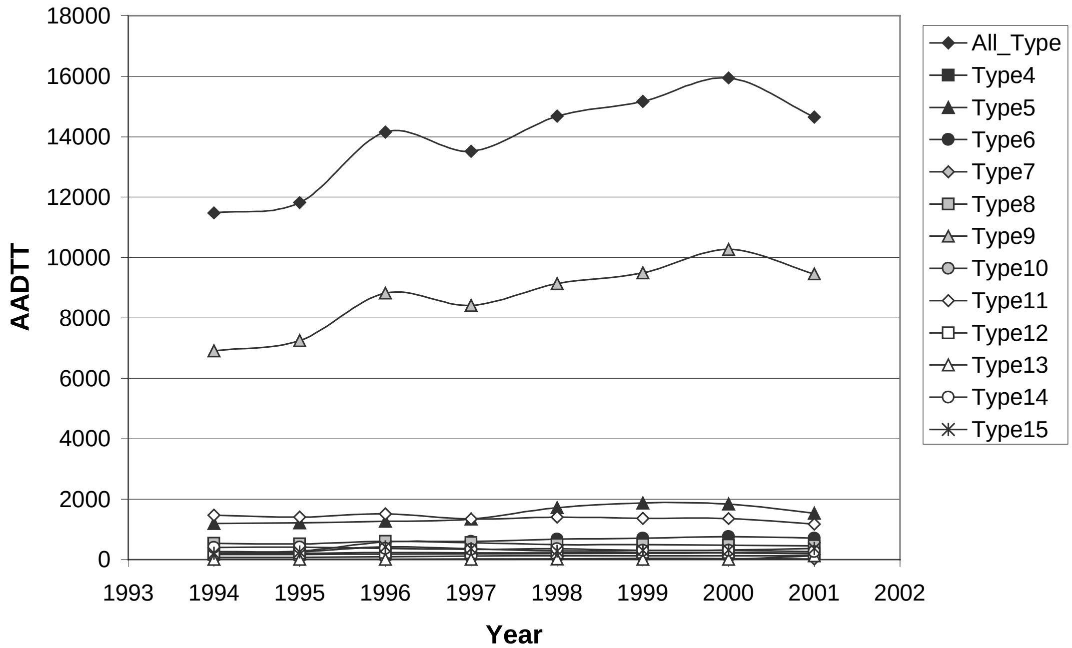
**STATIONS 47&48 CASTAIC**



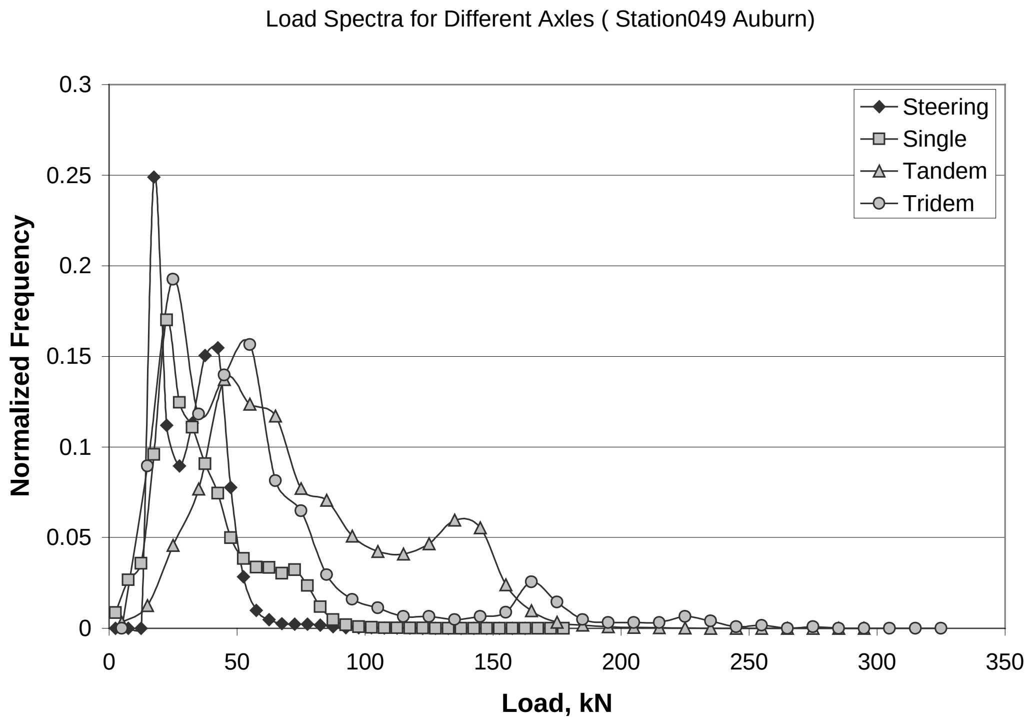

**Average Annual Daily Traffic for Different Truck Types**

| **Year** | **Truck Type** | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **All** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **11** | **12** | **13** | **14** | **15** |
| 1994 | 11480 | 172 | 1196 | 270 | 13 | 536 | 6914 | 71 | 1472 | 213 | 8 | 403 | 213 |
| 1995 | 11818 | 170 | 1215 | 283 | 13 | 514 | 7255 | 81 | 1403 | 208 | 12 | 412 | 253 |
| 1996 | 14153 | 183 | 1268 | 591 | 11 | 607 | 8824 | 101 | 1519 | 236 | 12 | 375 | 425 |
| 1997 | 13521 | 190 | 1338 | 602 | 21 | 563 | 8416 | 115 | 1343 | 223 | 9 | 339 | 362 |
| 1998 | 14677 | 199 | 1718 | 674 | 29 | 497 | 9138 | 132 | 1405 | 222 | 19 | 363 | 281 |
| 1999 | 15171 | 211 | 1876 | 704 | 41 | 496 | 9493 | 129 | 1368 | 227 | 10 | 306 | 309 |
| 2000 | 15948 | 222 | 1838 | 759 | 31 | 480 | 10270 | 126 | 1360 | 228 | 12 | 310 | 314 |
| 2001 | 14652 | 189 | 1538 | 712 | 22 | 451 | 9459 | 127 | 1180 | 208 | 132 | 259 | 375 |

Annual Average Daily Traffic For Different Truck Types ( Station 047048_CASTAIC)



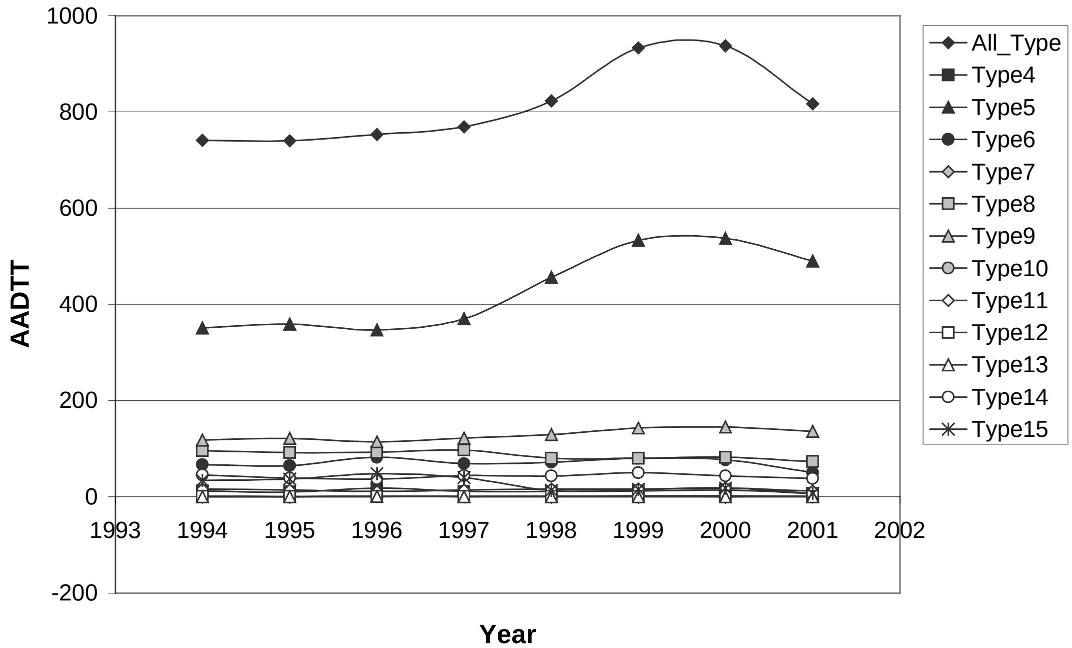
## STATION 49 AUBURN



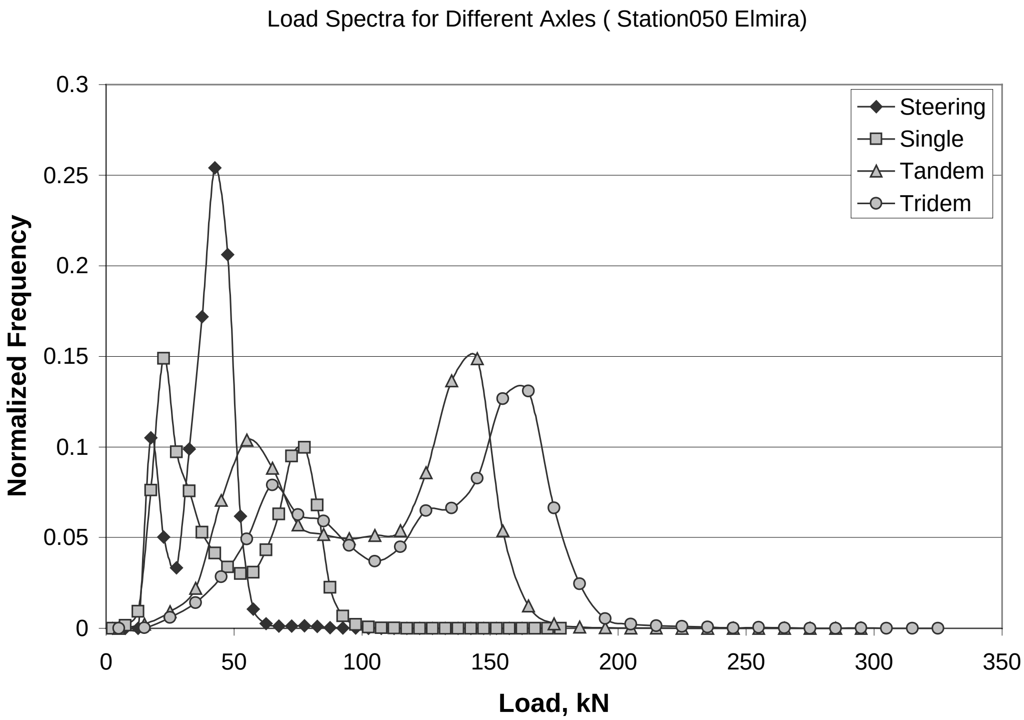

### Average Annual Daily Traffic for Different Truck Types

| Year | Truck Type | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **All** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **11** | **12** | **13** | **14** | **15** |
| 1994 | 741 | 12 | 351 | 67 | 0 | 96 | 118 | 1 | 16 | 1 | 0 | 45 | 34 |
| 1995 | 740 | 10 | 359 | 65 | 0 | 92 | 121 | 0 | 14 | 1 | 0 | 39 | 37 |
| 1996 | 753 | 18 | 347 | 82 | 1 | 93 | 114 | 0 | 11 | 1 | 1 | 37 | 48 |
| 1997 | 769 | 11 | 370 | 69 | 0 | 97 | 122 | 1 | 14 | 1 | 0 | 44 | 40 |
| 1998 | 823 | 11 | 456 | 72 | 1 | 80 | 129 | 1 | 16 | 1 | 0 | 43 | 13 |
| 1999 | 933 | 12 | 533 | 80 | 2 | 80 | 143 | 1 | 16 | 1 | 0 | 50 | 15 |
| 2000 | 937 | 14 | 537 | 77 | 2 | 82 | 145 | 0 | 18 | 1 | 0 | 43 | 18 |
| 2001 | 817 | 7 | 490 | 50 | 1 | 73 | 136 | 1 | 12 | 1 | 0 | 38 | 7 |

Annual Average Daily Traffic For Different Truck Types ( Station 049_AUBURN)



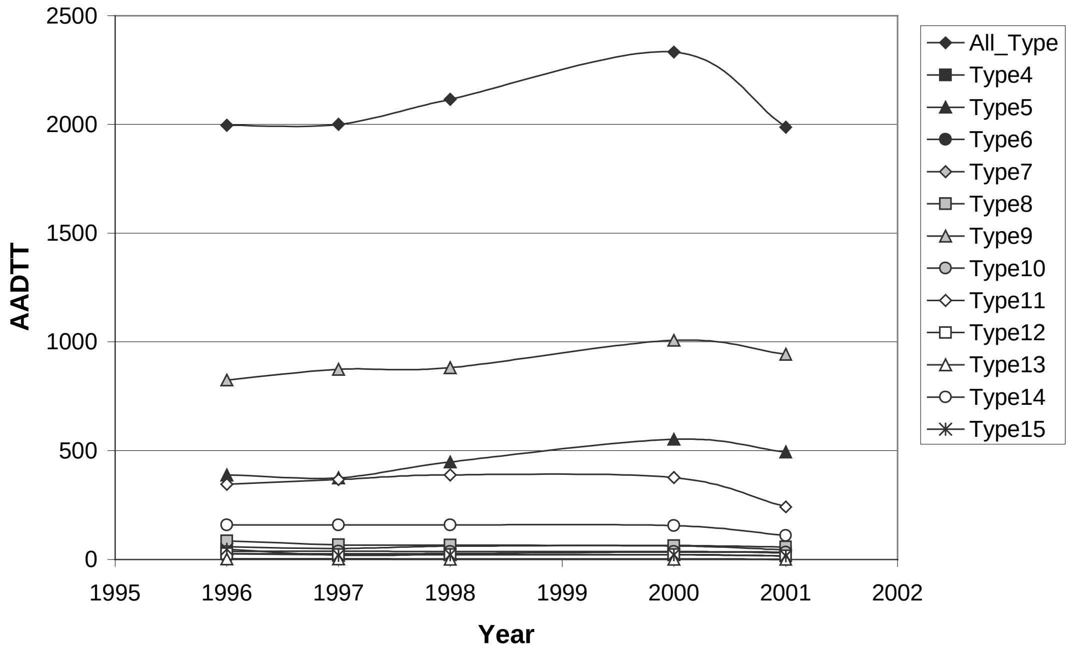
## STATION 50 ELMIRA



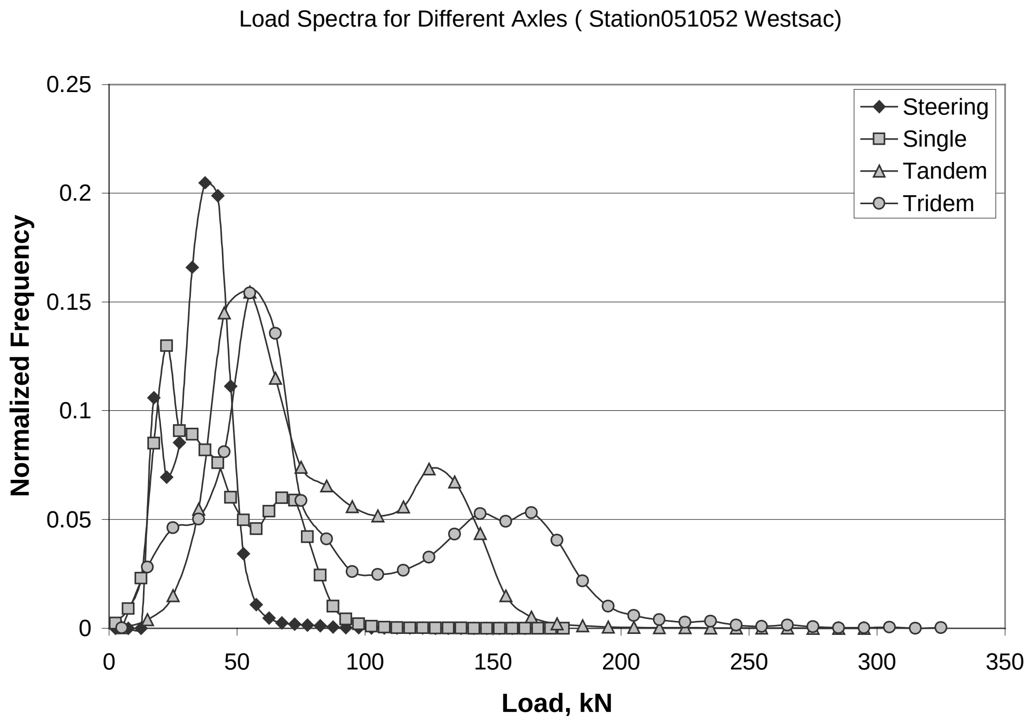

### Average Annual Daily Traffic for Different Truck Types

| Year | Truck Type | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **All** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **11** | **12** | **13** | **14** | **15** |
| 1996 | 1996 | 25 | 389 | 58 | 2 | 85 | 825 | 36 | 345 | 26 | 2 | 159 | 46 |
| 1997 | 2000 | 26 | 375 | 50 | 2 | 67 | 874 | 37 | 367 | 22 | 2 | 158 | 19 |
| 1998 | 2116 | 27 | 448 | 61 | 2 | 65 | 882 | 36 | 389 | 22 | 1 | 159 | 22 |
| 2000 | 2333 | 34 | 552 | 62 | 3 | 64 | 1007 | 36 | 376 | 22 | 1 | 155 | 21 |
| 2001 | 1988 | 31 | 494 | 44 | 0 | 57 | 943 | 34 | 242 | 16 | 1 | 110 | 16 |

Annual Average Daily Traffic For Different Truck Types ( Station 050_ELMIRA)



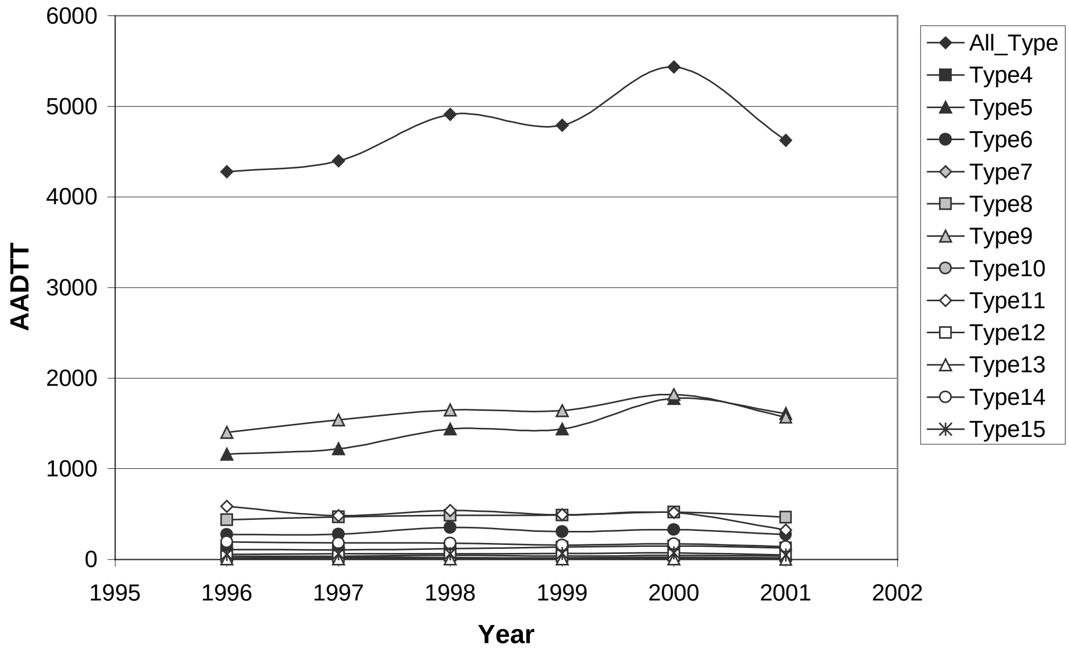
## STATIONS 51&52 WESTSAC



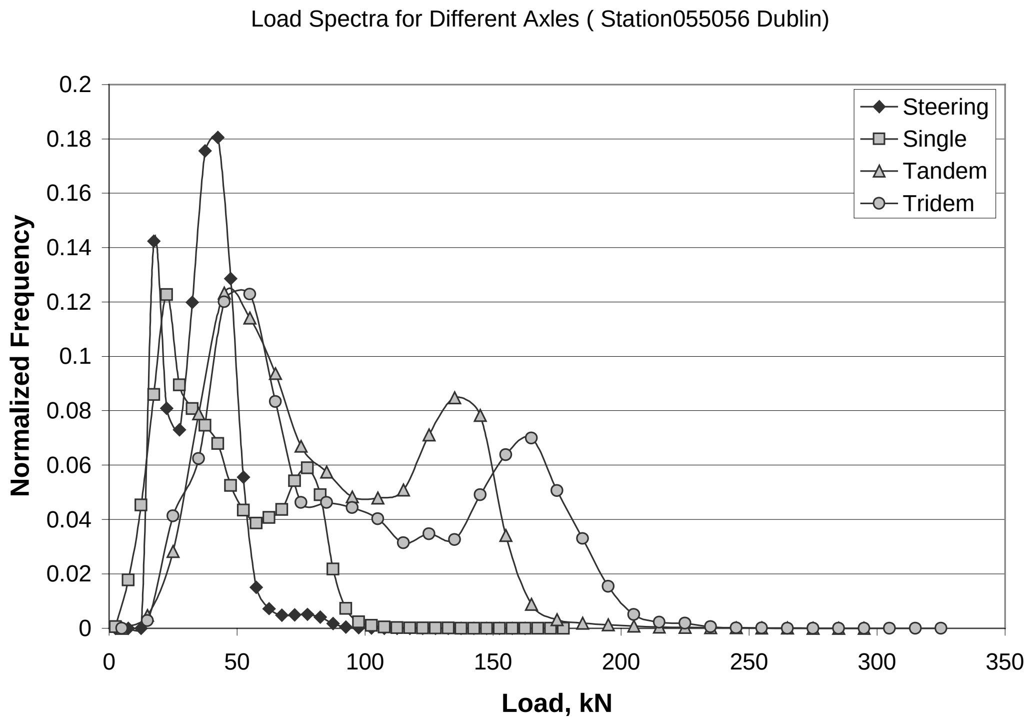

## Average Annual Daily Traffic for Different Truck Types

| Year | Truck Type | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **All** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **11** | **12** | **13** | **14** | **15** |
| 1996 | 4278 | 108 | 1163 | 275 | 10 | 436 | 1402 | 16 | 584 | 33 | 4 | 194 | 54 |
| 1997 | 4398 | 104 | 1222 | 278 | 7 | 468 | 1539 | 21 | 481 | 34 | 4 | 180 | 61 |
| 1998 | 4910 | 117 | 1439 | 354 | 15 | 486 | 1648 | 20 | 540 | 46 | 4 | 179 | 61 |
| 1999 | 4793 | 135 | 1439 | 305 | 10 | 488 | 1641 | 18 | 493 | 37 | 4 | 159 | 65 |
| 2000 | 5433 | 148 | 1776 | 329 | 9 | 520 | 1821 | 21 | 517 | 43 | 4 | 173 | 71 |

Annual Average Daily Traffic For Different Truck Types ( Station 051052_WESTSAC)



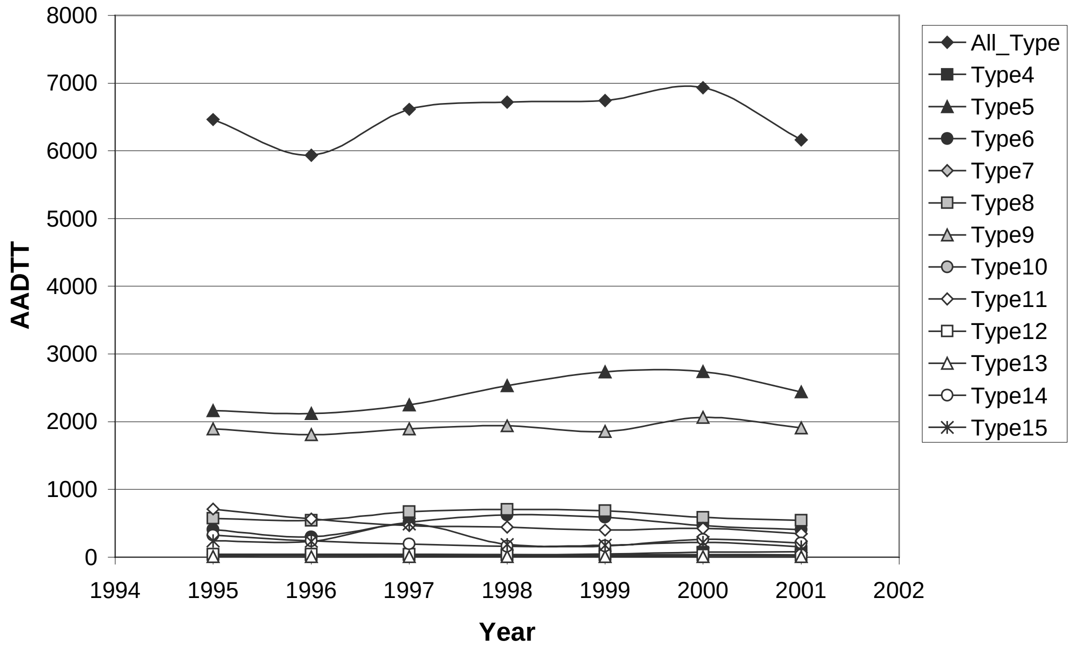
## STATIONS 55&56 DUBLIN



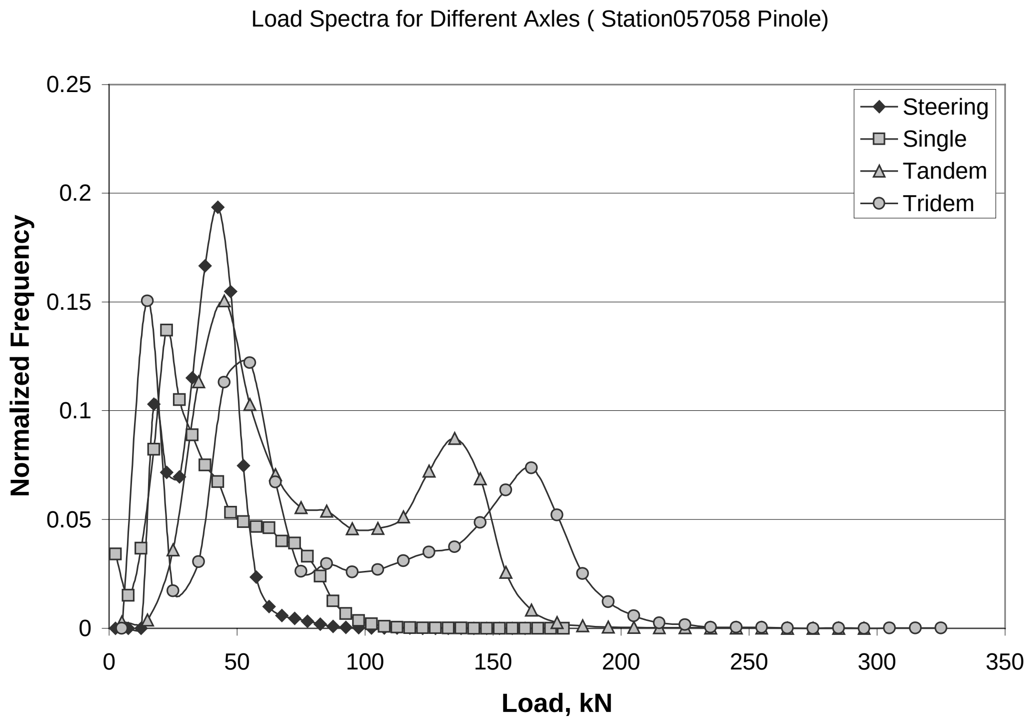

## Average Annual Daily Traffic for Different Truck Types

| Year | Truck Type | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | All | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| 1995 | 6462 | 34 | 2163 | 403 | 40 | 573 | 1896 | 26 | 709 | 44 | 9 | 323 | 240 |
| 1996 | 5937 | 33 | 2120 | 298 | 26 | 540 | 1808 | 29 | 565 | 42 | 6 | 237 | 232 |
| 1997 | 6614 | 36 | 2246 | 514 | 23 | 668 | 1895 | 37 | 464 | 40 | 8 | 195 | 489 |
| 1998 | 6719 | 35 | 2531 | 623 | 23 | 704 | 1940 | 35 | 441 | 31 | 8 | 161 | 187 |
| 1999 | 6743 | 46 | 2736 | 588 | 32 | 683 | 1856 | 32 | 397 | 28 | 9 | 163 | 174 |
| 2000 | 6932 | 72 | 2739 | 465 | 32 | 588 | 2065 | 36 | 424 | 28 | 5 | 261 | 217 |
| 2001 | 6162 | 78 | 2439 | 405 | 29 | 541 | 1907 | 32 | 345 | 26 | 5 | 205 | 151 |

Annual Average Daily Traffic For Different Truck Types ( Station 055056_DUBLIN)



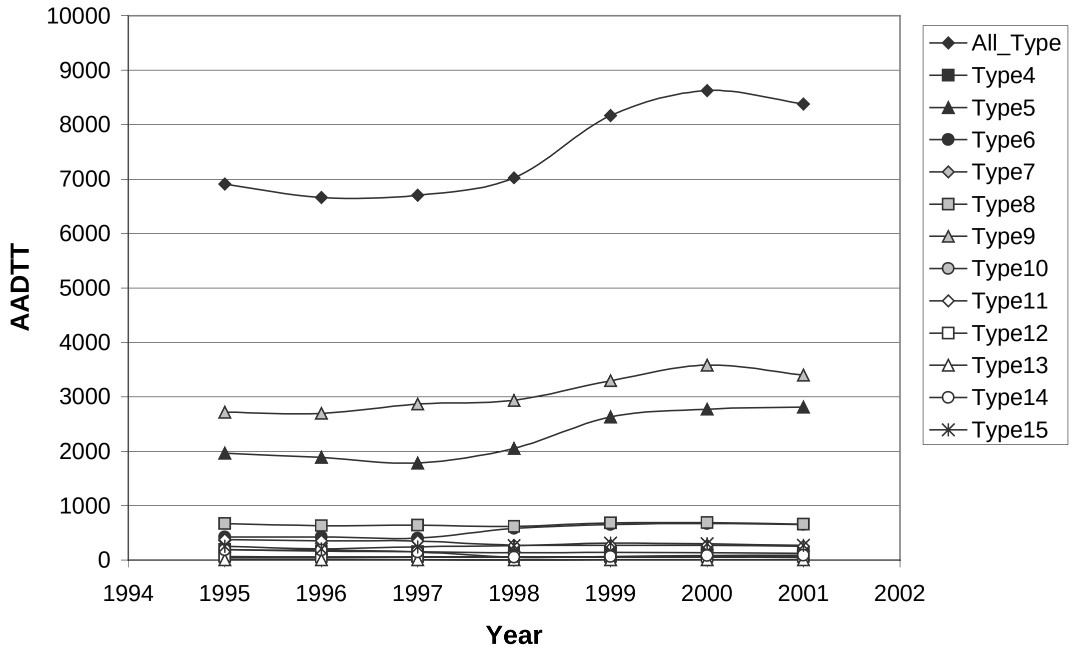
## STATIONS 57&58 PINOLE



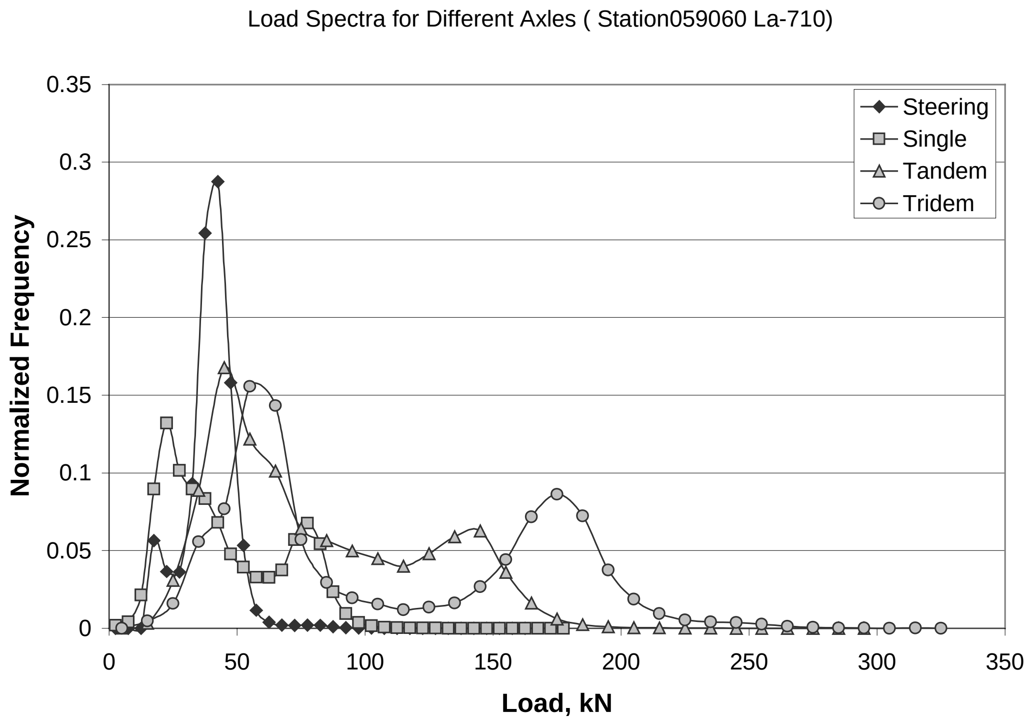

### Average Annual Daily Traffic for Different Truck Types

| Year | Truck Type | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | All | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| 1995 | 6909 | 196 | 1962 | 426 | 5 | 669 | 2718 | 40 | 375 | 67 | 6 | 188 | 256 |
| 1996 | 6663 | 163 | 1887 | 425 | 4 | 633 | 2696 | 45 | 354 | 59 | 7 | 183 | 207 |
| 1997 | 6706 | 153 | 1785 | 402 | 5 | 638 | 2866 | 50 | 350 | 62 | 5 | 148 | 242 |
| 1998 | 7024 | 135 | 2053 | 580 | 1 | 616 | 2937 | 54 | 273 | 58 | 4 | 50 | 264 |
| 1999 | 8170 | 140 | 2629 | 650 | 2 | 683 | 3296 | 54 | 273 | 63 | 4 | 66 | 311 |
| 2000 | 8626 | 137 | 2771 | 672 | 2 | 687 | 3582 | 53 | 271 | 63 | 4 | 85 | 297 |
| 2001 | 8381 | 124 | 2813 | 655 | 2 | 659 | 3397 | 48 | 256 | 65 | 4 | 89 | 269 |

Annual Average Daily Traffic For Different Truck Types ( Station 057058_PINOLE)



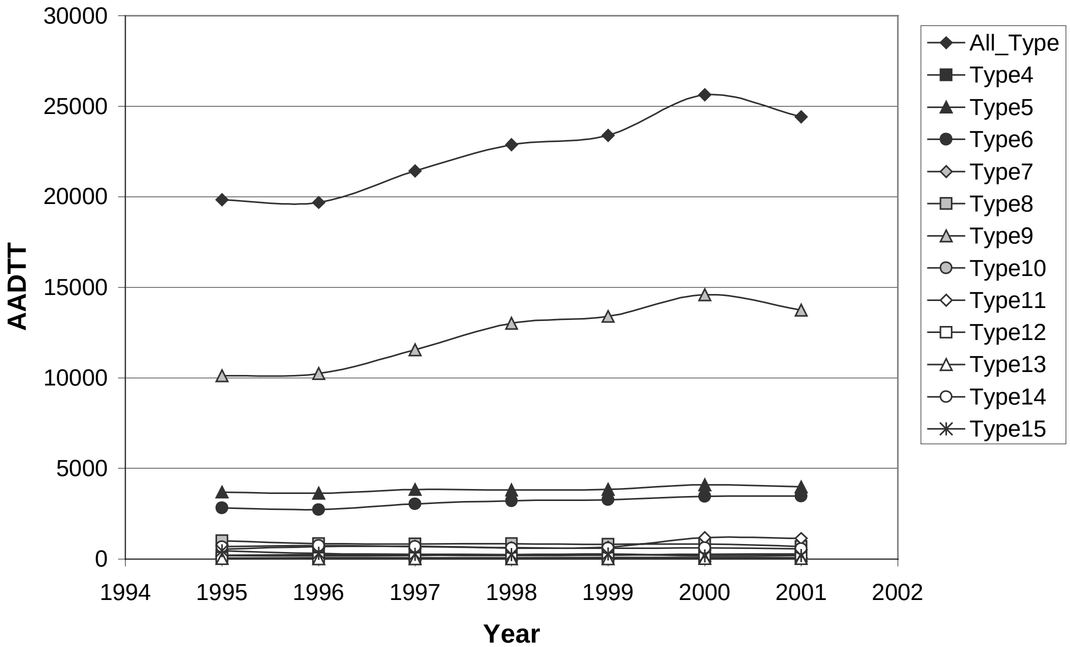
## STATIONS 59&60 LA-710



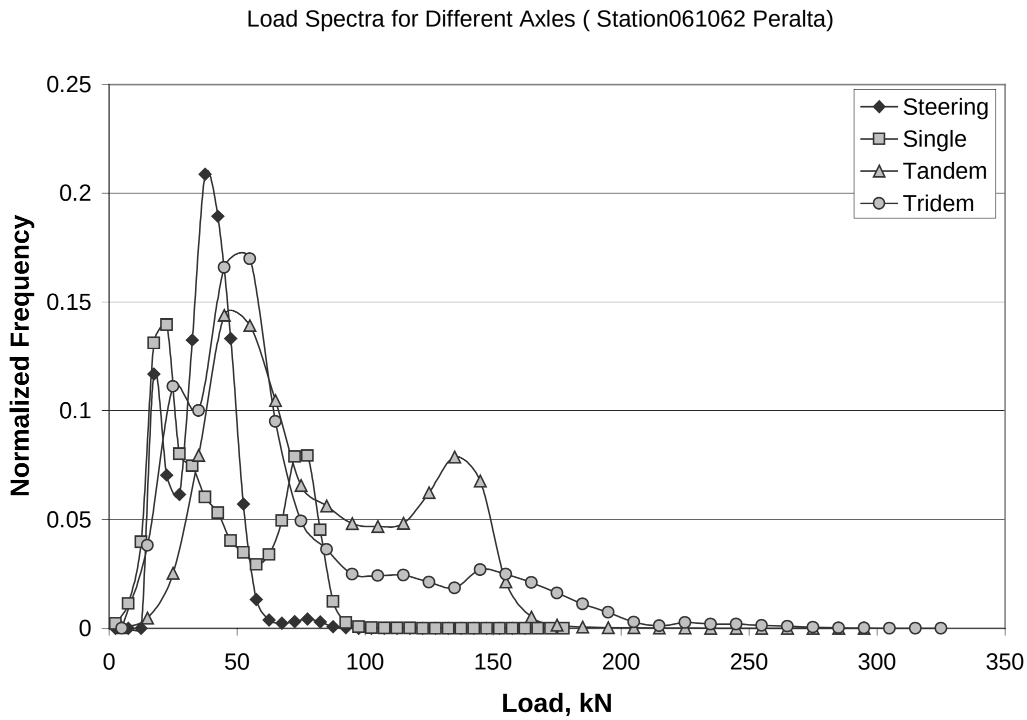

## Average Annual Daily Traffic for Different Truck Types

| Year | Truck Type | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **All** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **11** | **12** | **13** | **14** | **15** |
| 1995 | 19841 | 212 | 3696 | 2819 | 57 | 1008 | 10113 | 201 | 537 | 39 | 23 | 674 | 463 |
| 1996 | 19684 | 237 | 3628 | 2727 | 67 | 847 | 10232 | 167 | 689 | 34 | 15 | 739 | 302 |
| 1997 | 21431 | 215 | 3832 | 3038 | 64 | 826 | 11560 | 191 | 710 | 37 | 16 | 683 | 260 |
| 1998 | 22868 | 190 | 3800 | 3220 | 64 | 841 | 13019 | 230 | 619 | 35 | 16 | 596 | 238 |
| 1999 | 23394 | 223 | 3843 | 3272 | 78 | 808 | 13397 | 211 | 654 | 33 | 15 | 584 | 277 |
| 2000 | 25626 | 267 | 4104 | 3458 | 89 | 827 | 14595 | 258 | 1182 | 42 | 21 | 613 | 171 |
| 2001 | 24419 | 263 | 3975 | 3463 | 63 | 682 | 13744 | 276 | 1130 | 39 | 36 | 562 | 186 |

Annual Average Daily Traffic For Different Truck Types ( Station 059060_LA-710)



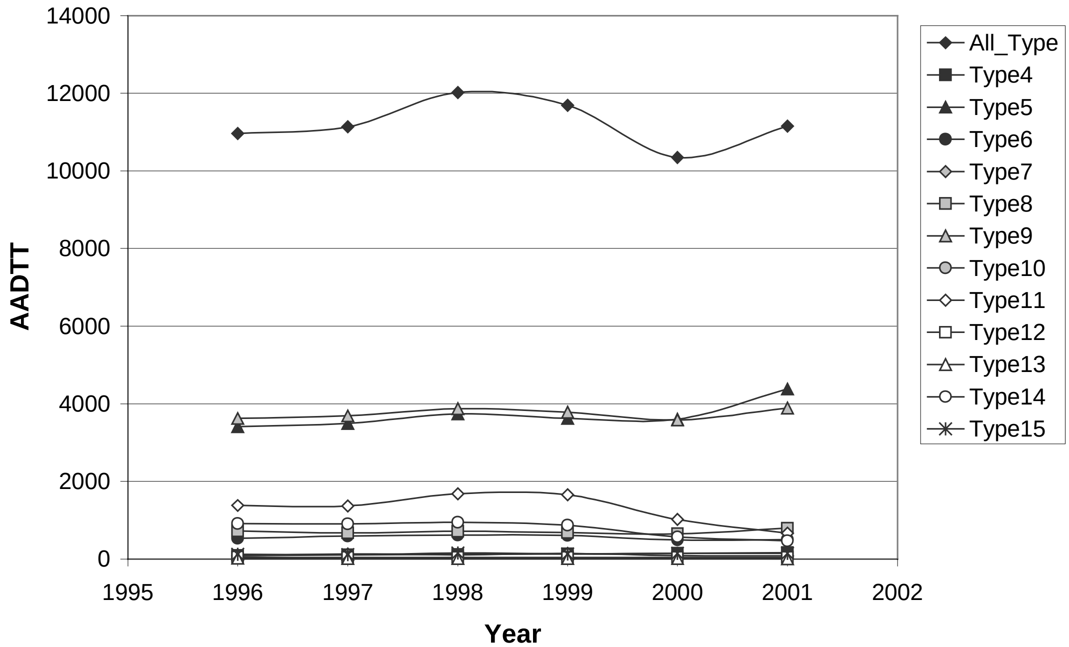
## STATIONS 61&62 PERALTA



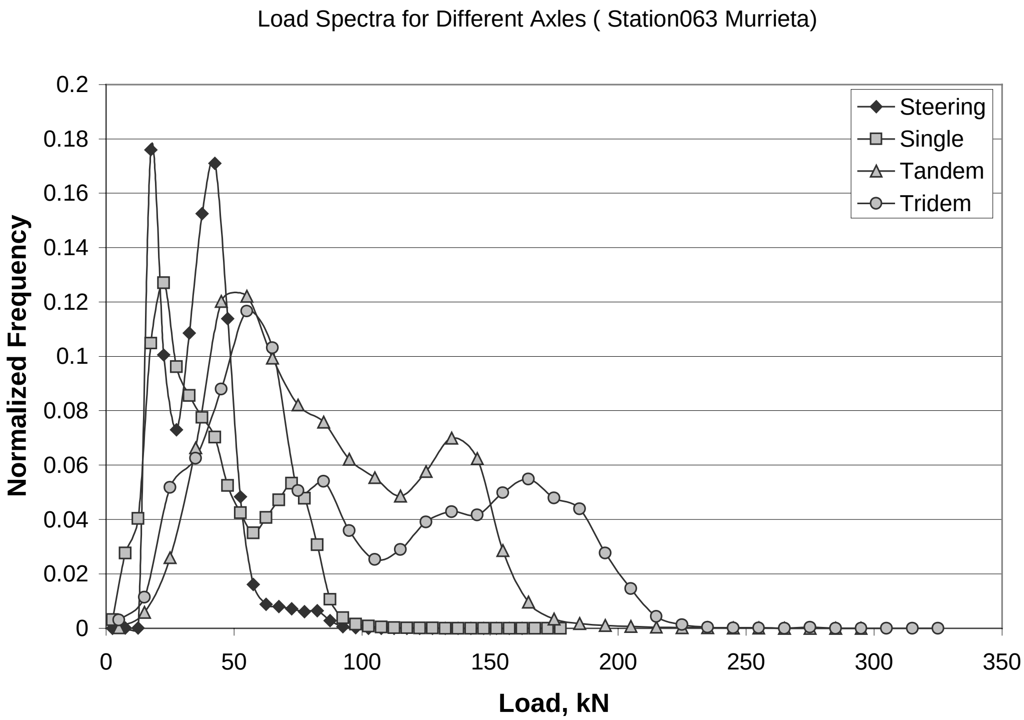

### Average Annual Daily Traffic for Different Truck Types

| Year | Truck Type | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | All | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| 1996 | 10962 | 93 | 3415 | 527 | 87 | 722 | 3620 | 26 | 1379 | 46 | 18 | 910 | 120 |
| 1997 | 11137 | 100 | 3496 | 590 | 129 | 672 | 3689 | 21 | 1367 | 37 | 17 | 905 | 114 |
| 1998 | 12019 | 115 | 3739 | 616 | 108 | 719 | 3873 | 20 | 1679 | 38 | 17 | 944 | 152 |
| 1999 | 11692 | 131 | 3628 | 607 | 141 | 683 | 3778 | 17 | 1652 | 37 | 14 | 871 | 133 |
| 2000 | 10348 | 150 | 3604 | 490 | 86 | 647 | 3579 | 17 | 1017 | 38 | 8 | 570 | 141 |
| 2001 | 11157 | 163 | 4381 | 499 | 81 | 792 | 3893 | 20 | 665 | 42 | 4 | 468 | 149 |

Annual Average Daily Traffic For Different Truck Types ( Station 061062_PERALTA)



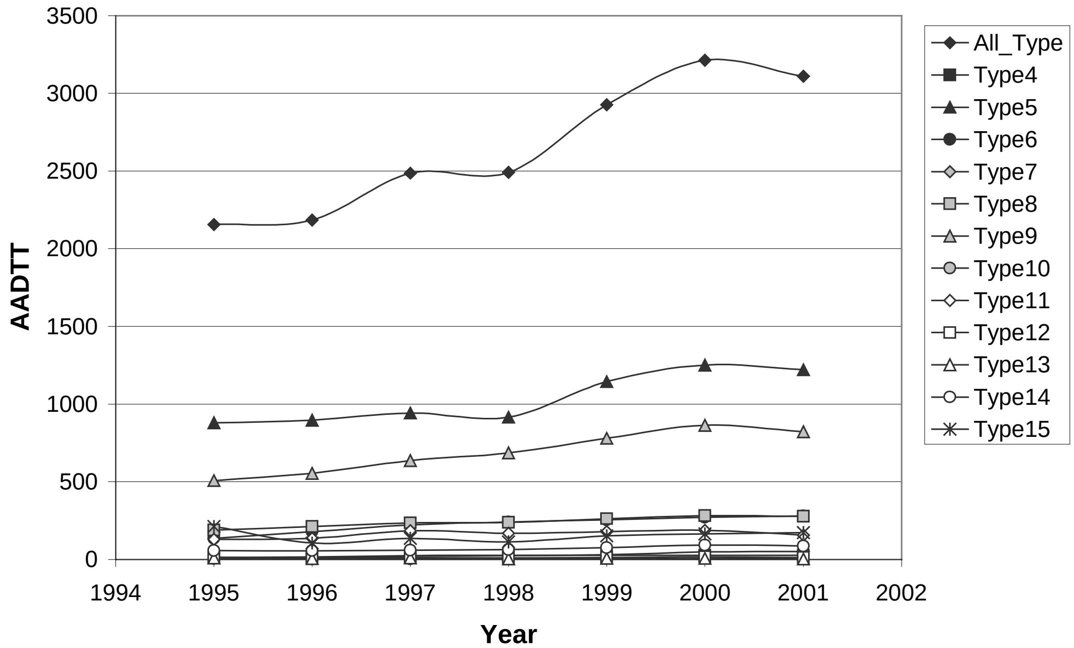
## STATION 63 MURRIETA



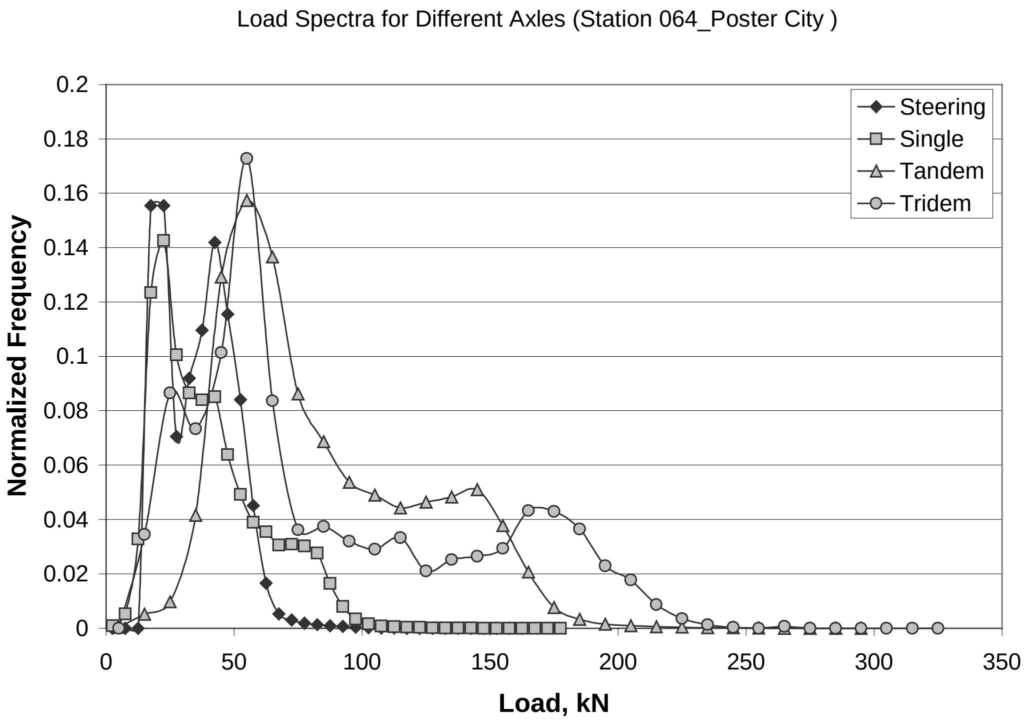

### Average Annual Daily Traffic for Different Truck Types

| Year | Truck Type | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **All** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **11** | **12** | **13** | **14** | **15** |
| 1995 | 2156 | 14 | 879 | 135 | 12 | 189 | 507 | 5 | 128 | 8 | 9 | 57 | 212 |
| 1996 | 2185 | 12 | 897 | 178 | 15 | 211 | 555 | 3 | 136 | 13 | 5 | 56 | 105 |
| 1997 | 2486 | 22 | 942 | 222 | 24 | 235 | 636 | 4 | 184 | 12 | 9 | 59 | 135 |
| 1998 | 2492 | 24 | 916 | 240 | 26 | 238 | 686 | 4 | 168 | 10 | 4 | 63 | 113 |
| 1999 | 2927 | 27 | 1144 | 254 | 31 | 262 | 779 | 5 | 179 | 12 | 6 | 76 | 151 |
| 2000 | 3212 | 27 | 1252 | 271 | 48 | 281 | 863 | 6 | 187 | 15 | 6 | 93 | 164 |
| 2001 | 3110 | 26 | 1221 | 280 | 51 | 277 | 822 | 4 | 156 | 11 | 3 | 87 | 172 |

Annual Average Daily Traffic For Different Truck Types ( Station 063_MURRIETA)

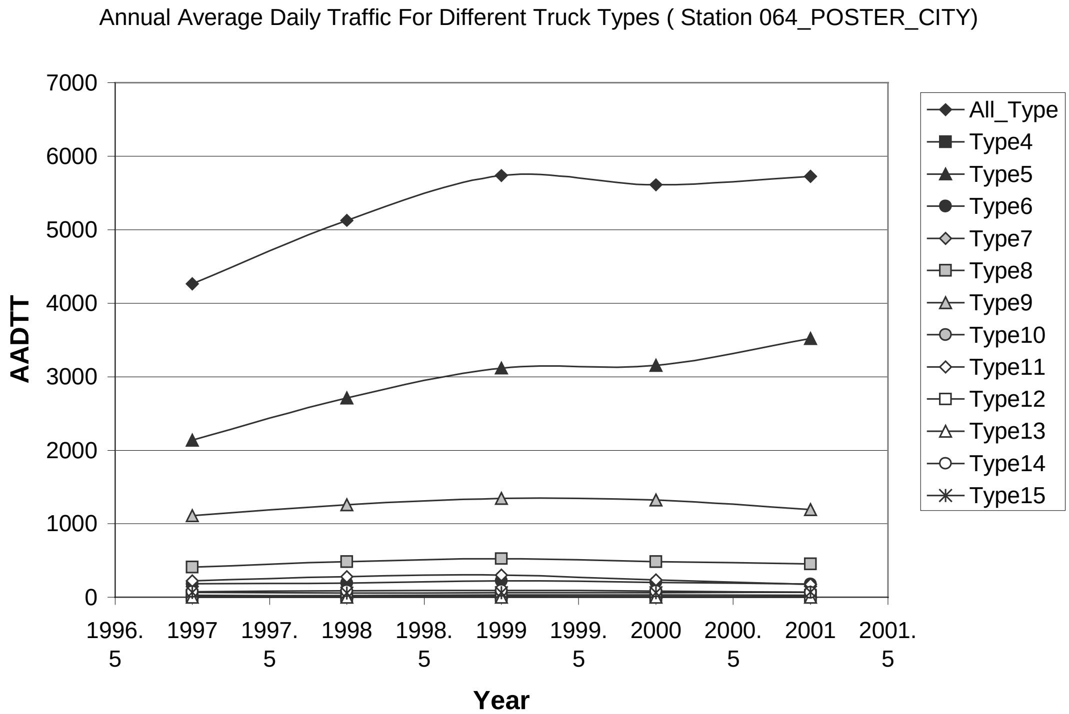


## STATION 64 FOSTER CITY



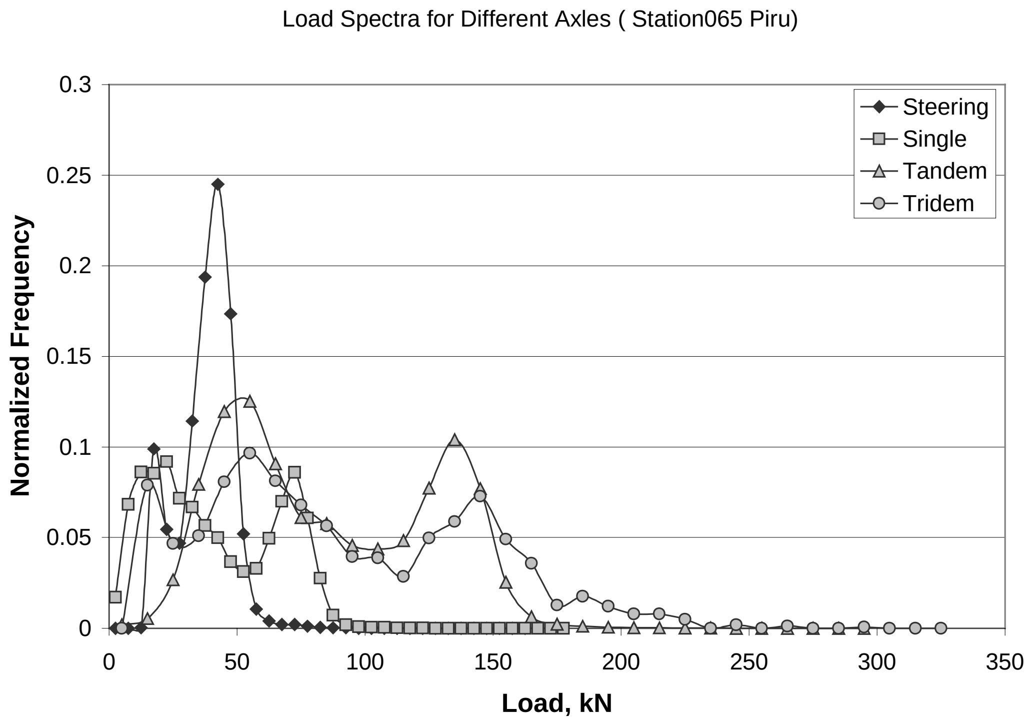

## Average Annual Daily Traffic for Different Truck Types

| Year | Truck Type | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **All** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **11** | **12** | **13** | **14** | **15** |
| 1997 | 4262 | 27 | 2139 | 182 | 1 | 410 | 1110 | 8 | 225 | 13 | 2 | 77 | 68 |
| 1998 | 5127 | 25 | 2713 | 193 | 2 | 485 | 1257 | 9 | 281 | 13 | 2 | 88 | 58 |
| 1999 | 5735 | 32 | 3119 | 224 | 5 | 526 | 1343 | 11 | 302 | 14 | 3 | 94 | 61 |
| 2000 | 5611 | 33 | 3156 | 205 | 2 | 486 | 1322 | 10 | 235 | 12 | 3 | 85 | 61 |
| 2001 | 5725 | 30 | 3521 | 181 | 1 | 453 | 1194 | 9 | 177 | 14 | 2 | 68 | 73 |



Annual Average Daily Traffic For Different Truck Types ( Station 064_POSTER_CITY)
7000
6000
5000
4000
3000
2000
1000
0
AADTT
1996.
5
1997
1997.
5
1998
1998.
5
1999
1999.
5
2000
2000.
5
2001
2001.
5
Year
All_Type
Type4
Type5
Type6
Type7
Type8
Type9
Type10
Type11
Type12
Type13
Type14
Type15

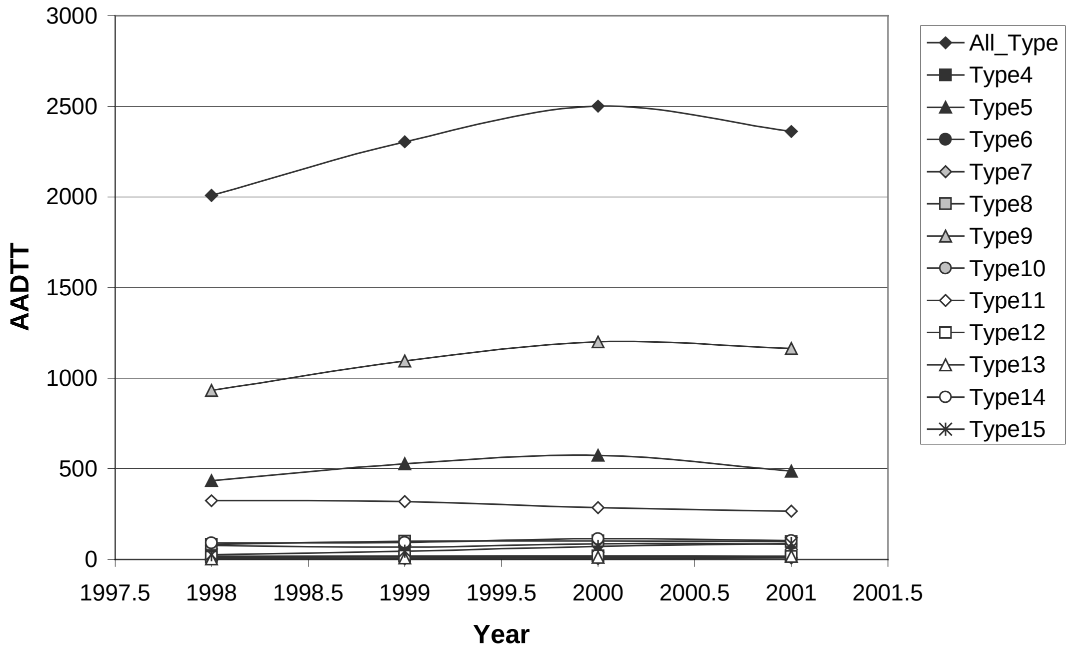
## STATION 65 PIRU



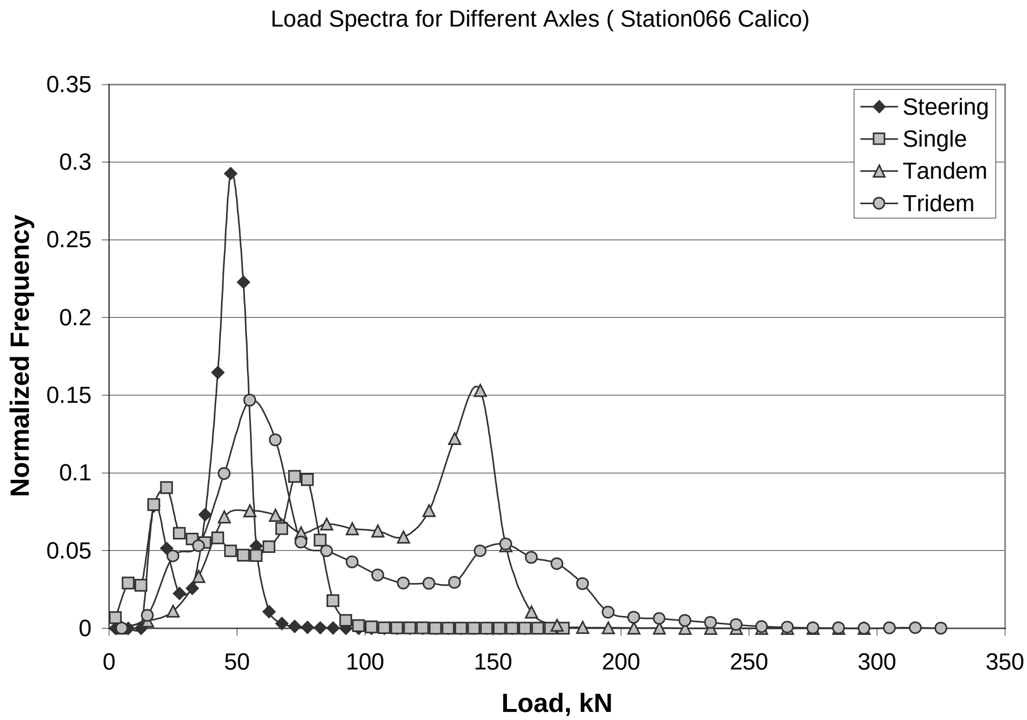

### Average Annual Daily Traffic for Different Truck Types

| Year | Truck Type | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | All | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| 1998 | 2009 | 16 | 435 | 76 | 4 | 83 | 932 | 6 | 324 | 12 | 3 | 92 | 26 |
| 1999 | 2304 | 18 | 528 | 68 | 2 | 100 | 1095 | 9 | 319 | 17 | 8 | 94 | 45 |
| 2000 | 2501 | 20 | 575 | 86 | 4 | 101 | 1200 | 13 | 286 | 20 | 12 | 114 | 72 |
| 2001 | 2361 | 16 | 487 | 85 | 8 | 98 | 1164 | 13 | 266 | 16 | 17 | 104 | 87 |

Annual Average Daily Traffic For Different Truck Types ( Station 065_PIRU)

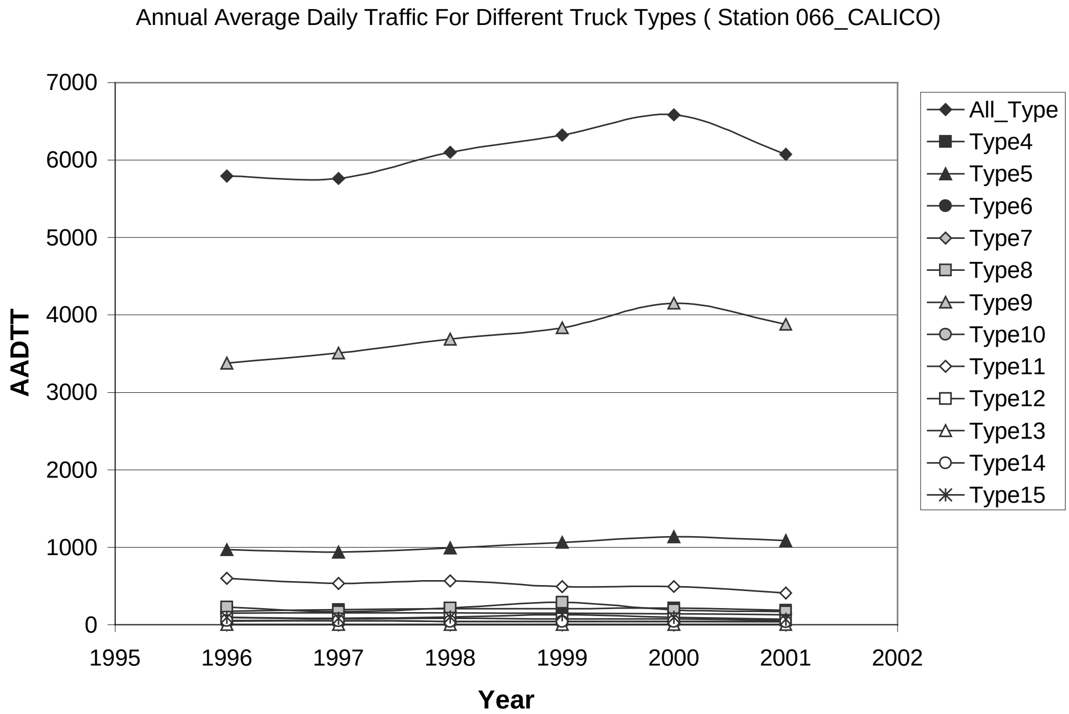


## STATION 66 CALICO

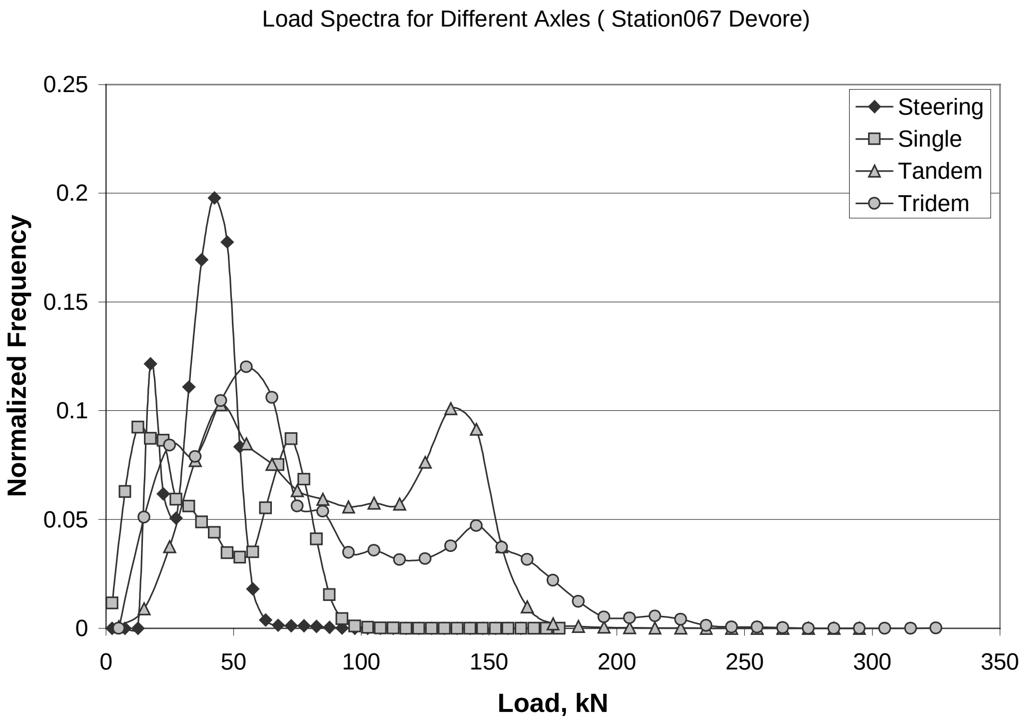



### Average Annual Daily Traffic for Different Truck Types

| Year | Truck Type | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | All | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| 1996 | 5792 | 174 | 968 | 149 | 2 | 230 | 3378 | 47 | 598 | 97 | 4 | 54 | 93 |
| 1997 | 5762 | 195 | 938 | 155 | 1 | 167 | 3508 | 51 | 533 | 74 | 4 | 52 | 83 |
| 1998 | 6100 | 207 | 992 | 152 | 1 | 216 | 3689 | 44 | 567 | 83 | 5 | 44 | 100 |
| 1999 | 6321 | 207 | 1064 | 147 | 1 | 289 | 3832 | 41 | 490 | 75 | 5 | 40 | 129 |
| 2000 | 6584 | 216 | 1134 | 143 | 1 | 190 | 4152 | 41 | 493 | 73 | 5 | 41 | 95 |
| 2001 | 6073 | 188 | 1086 | 128 | 1 | 168 | 3879 | 43 | 410 | 56 | 6 | 38 | 70 |

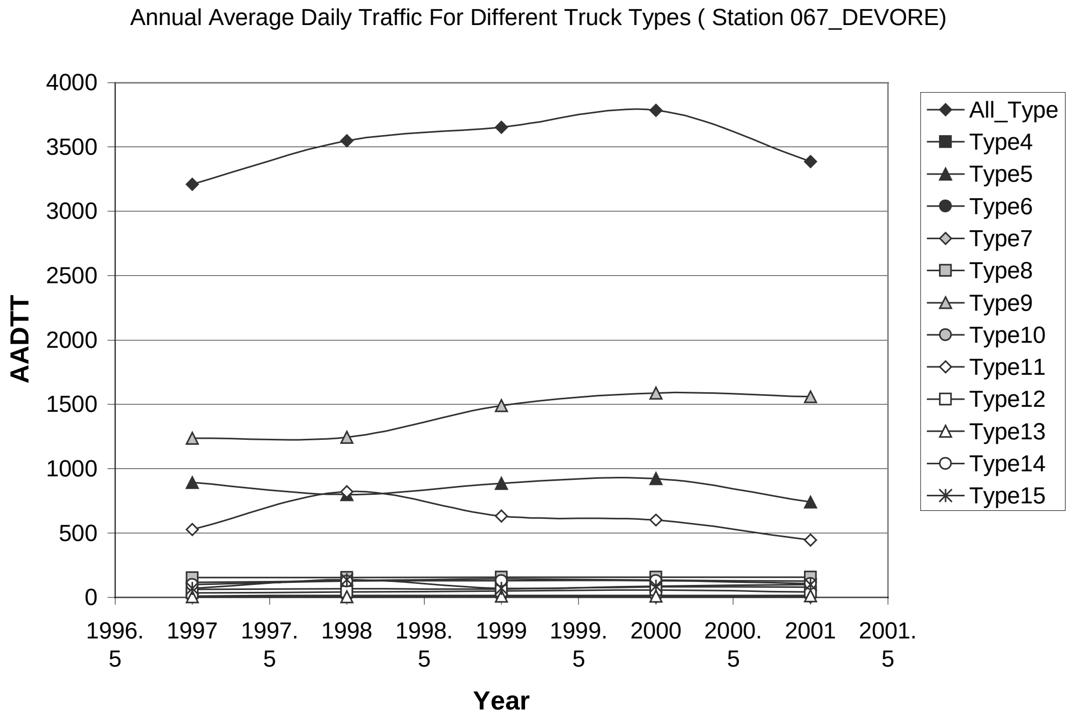

Annual Average Daily Traffic For Different Truck Types ( Station 066_CALICO)
AADTT
7000
6000
5000
4000
3000
2000
1000
0
1995
1996
1997
1998
1999
2000
2001
2002
Year
All_Type
Type4
Type5
Type6
Type7
Type8
Type9
Type10
Type11
Type12
Type13
Type14
Type15

## STATION 67 DEVORE

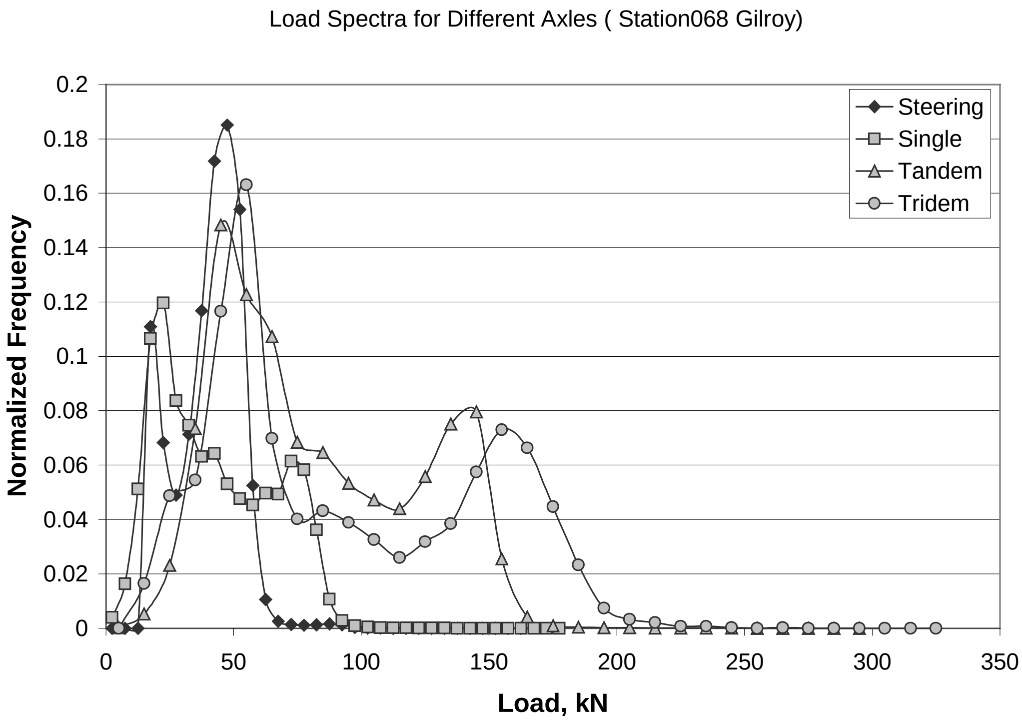



### Average Annual Daily Traffic for Different Truck Types

| Year | Truck Type | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **All** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **11** | **12** | **13** | **14** | **15** |
| 1997 | 3210 | 61 | 892 | 117 | 3 | 153 | 1238 | 11 | 527 | 33 | 4 | 99 | 71 |
| 1998 | 3547 | 68 | 799 | 129 | 2 | 155 | 1245 | 16 | 822 | 43 | 5 | 125 | 138 |
| 1999 | 3654 | 66 | 886 | 144 | 10 | 156 | 1490 | 14 | 631 | 49 | 9 | 130 | 70 |
| 2000 | 3785 | 81 | 923 | 133 | 2 | 156 | 1589 | 16 | 601 | 59 | 9 | 130 | 87 |
| 2001 | 3387 | 79 | 741 | 128 | 2 | 158 | 1559 | 15 | 444 | 41 | 13 | 107 | 100 |


Annual Average Daily Traffic For Different Truck Types ( Station 067_DEVORE)
AADTT
4000
3500
3000
2500
2000
1500
1000
500
0
1996.5
1997
1997.5
1998
1998.5
1999
1999.5
2000
2000.5
2001
2001.5
Year
All_Type
Type4
Type5
Type6
Type7
Type8
Type9
Type10
Type11
Type12
Type13
Type14
Type15

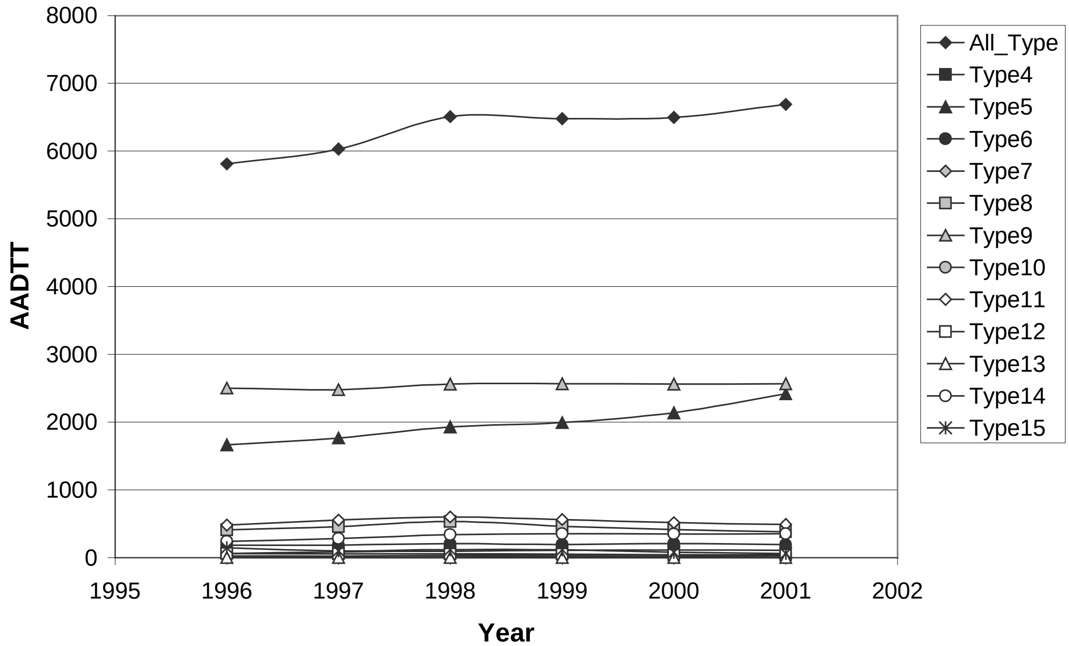
## STATION 68 GILROY



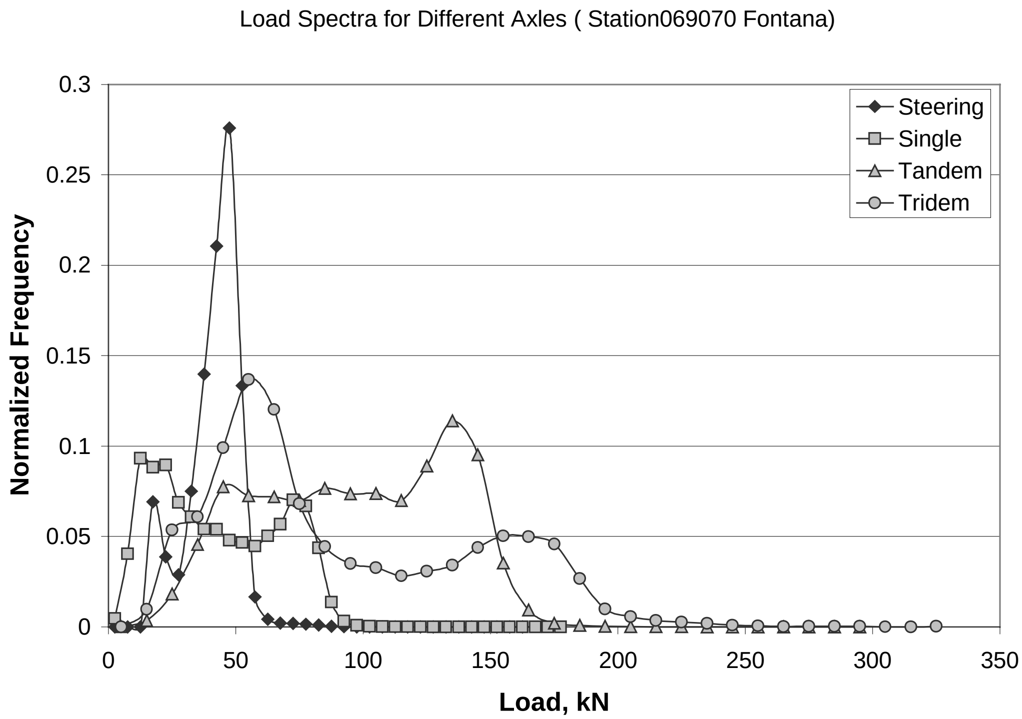

### Average Annual Daily Traffic for Different Truck Types

| Year | Truck Type | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **All** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **11** | **12** | **13** | **14** | **15** |
| 1996 | 5812 | 65 | 1667 | 182 | 26 | 410 | 2504 | 24 | 482 | 62 | 2 | 242 | 146 |
| 1997 | 6029 | 88 | 1767 | 187 | 19 | 460 | 2480 | 27 | 556 | 59 | 3 | 281 | 102 |
| 1998 | 6509 | 97 | 1930 | 206 | 23 | 535 | 2564 | 34 | 602 | 54 | 4 | 341 | 120 |
| 1999 | 6479 | 111 | 1995 | 194 | 18 | 465 | 2568 | 40 | 563 | 53 | 4 | 355 | 115 |
| 2000 | 6496 | 112 | 2139 | 210 | 19 | 417 | 2564 | 40 | 518 | 42 | 3 | 351 | 80 |
| 2001 | 6690 | 111 | 2419 | 196 | 22 | 384 | 2567 | 40 | 491 | 39 | 3 | 355 | 63 |

Annual Average Daily Traffic For Different Truck Types ( Station 068_GILROY)

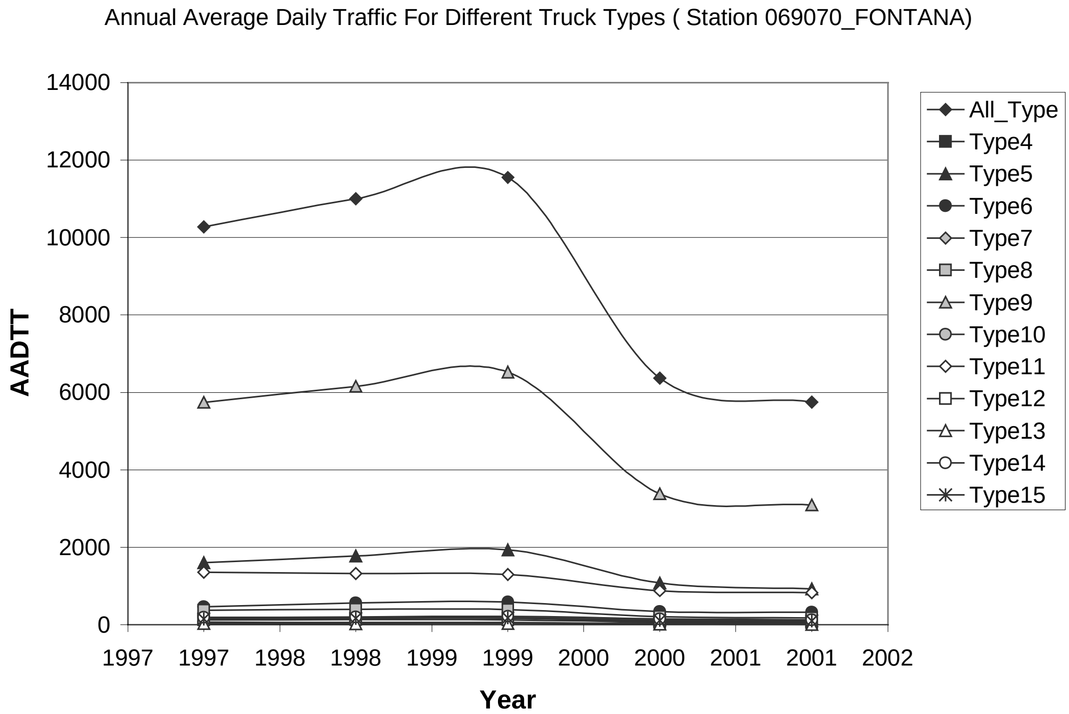


## STATION 69&70 FONTANA



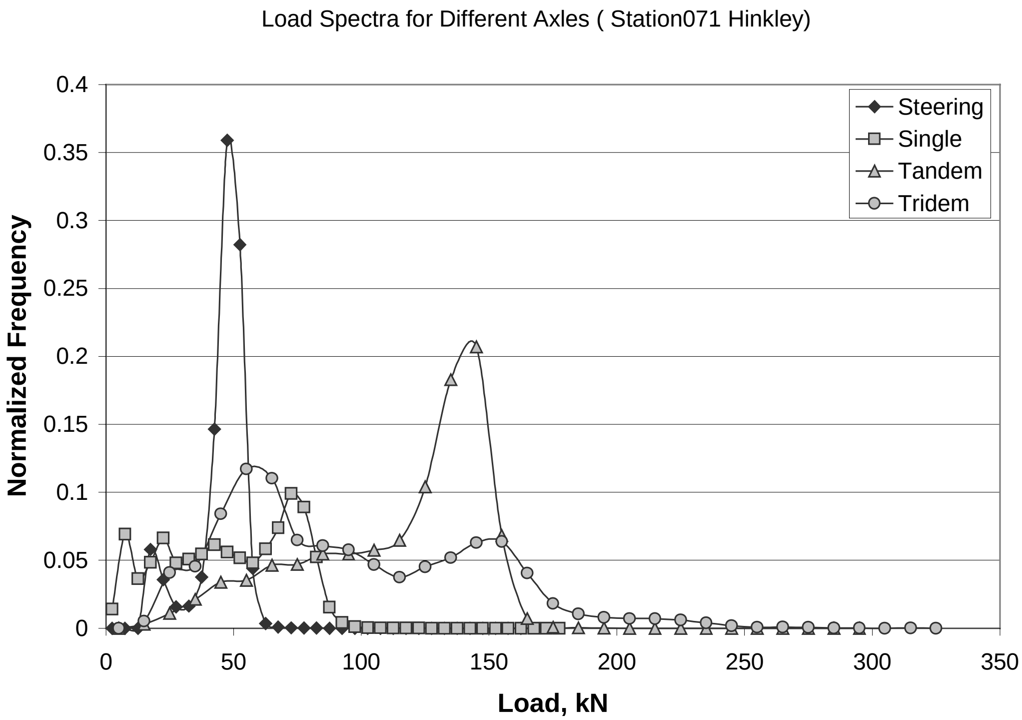

### Average Annual Daily Traffic for Different Truck Types

| Year | Truck Type | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **All** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **11** | **12** | **13** | **14** | **15** |
| 1997 | 10273 | 151 | 1603 | 462 | 26 | 374 | 5744 | 66 | 1354 | 120 | 31 | 191 | 150 |
| 1998 | 11000 | 167 | 1777 | 561 | 43 | 397 | 6158 | 58 | 1321 | 134 | 24 | 199 | 163 |
| 1999 | 11548 | 166 | 1933 | 587 | 47 | 391 | 6522 | 55 | 1298 | 125 | 31 | 219 | 176 |
| 2000 | 6367 | 87 | 1076 | 340 | 26 | 207 | 3382 | 28 | 878 | 62 | 16 | 153 | 113 |
| 2001 | 5747 | 76 | 928 | 320 | 12 | 180 | 3091 | 26 | 830 | 49 | 9 | 122 | 103 |



Annual Average Daily Traffic For Different Truck Types ( Station 069070_FONTANA)
AADTT
14000
12000
10000
8000
6000
4000
2000
0
1997
1997
1998
1998
1999
1999
2000
2000
2001
2001
2002
Year
All_Type
Type4
Type5
Type6
Type7
Type8
Type9
Type10
Type11
Type12
Type13
Type14
Type15

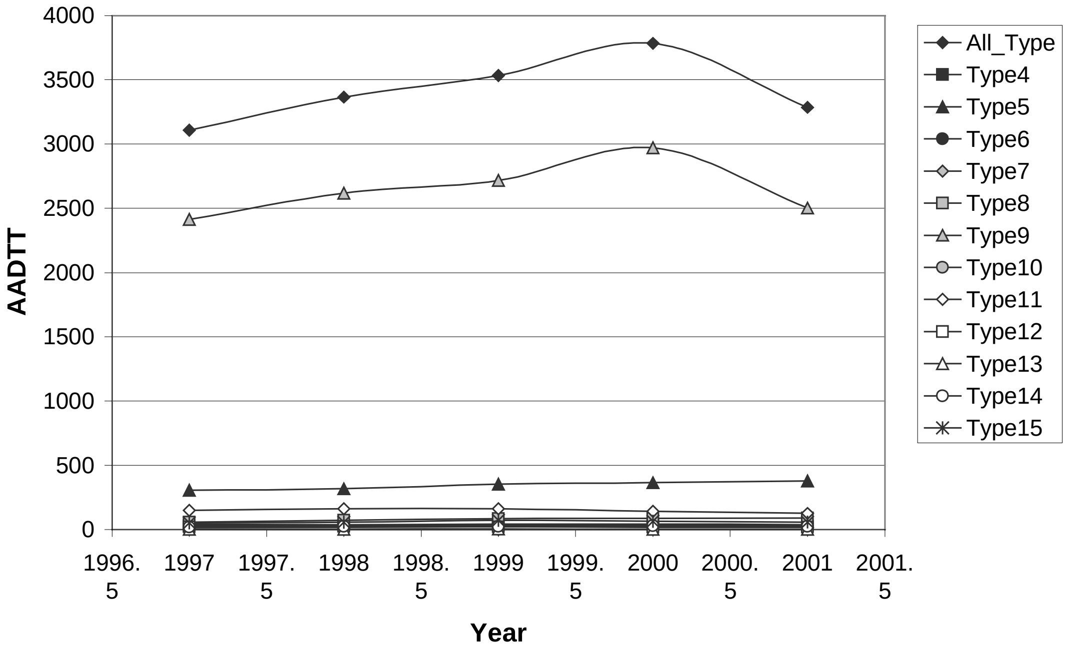
## STATION 71 HINKLEY



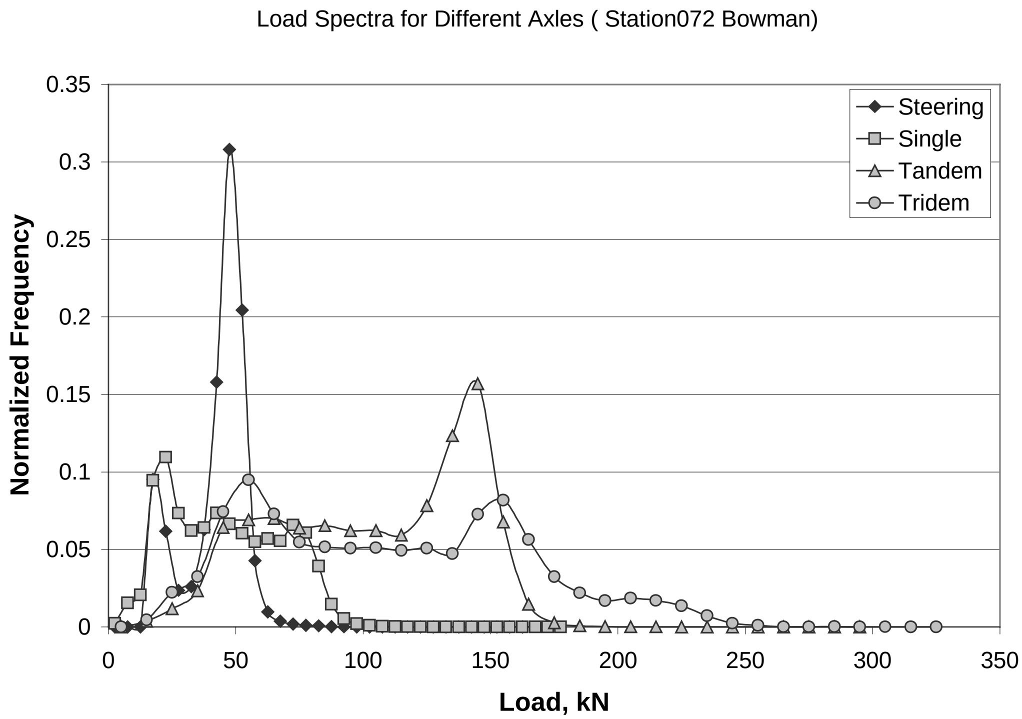

### Average Annual Daily Traffic for Different Truck Types

| Year | Truck Type | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **All** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **11** | **12** | **13** | **14** | **15** |
| 1997 | 3108 | 31 | 306 | 41 | 0 | 59 | 2413 | 16 | 148 | 22 | 2 | 18 | 52 |
| 1998 | 3365 | 31 | 317 | 39 | 0 | 72 | 2618 | 19 | 162 | 24 | 3 | 24 | 56 |
| 1999 | 3534 | 33 | 352 | 42 | 0 | 86 | 2716 | 22 | 161 | 22 | 4 | 25 | 72 |
| 2000 | 3784 | 35 | 365 | 43 | 0 | 87 | 2972 | 21 | 143 | 19 | 2 | 30 | 65 |
| 2001 | 3286 | 28 | 378 | 39 | 0 | 91 | 2502 | 22 | 125 | 19 | 1 | 24 | 59 |

Annual Average Daily Traffic For Different Truck Types ( Station 071_HINKLEY)



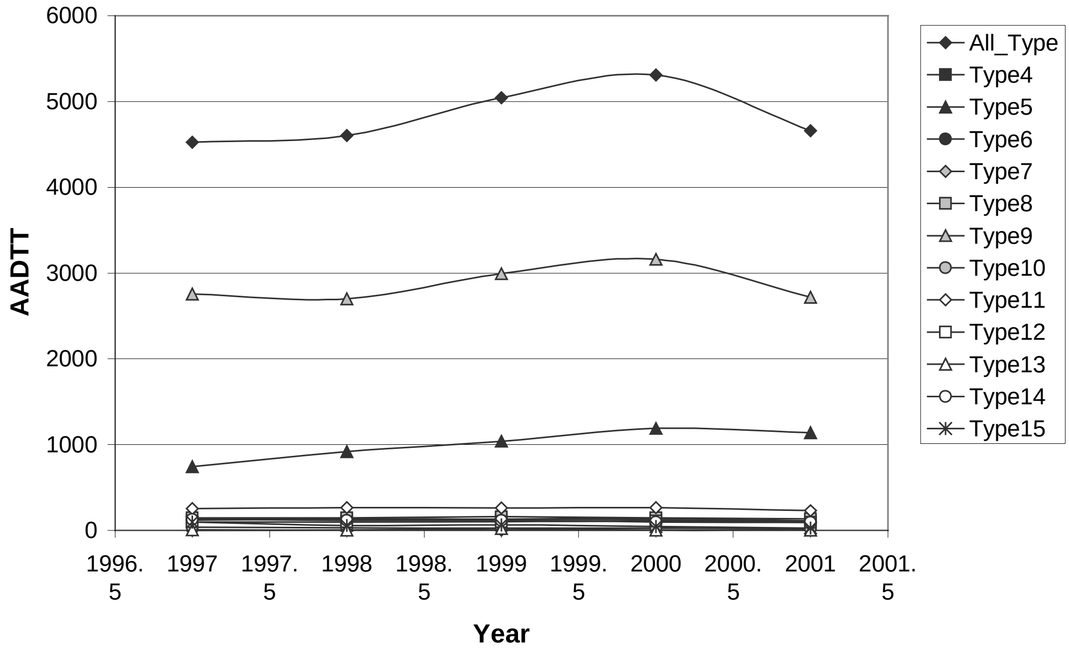
## STATION 72 BOWMAN



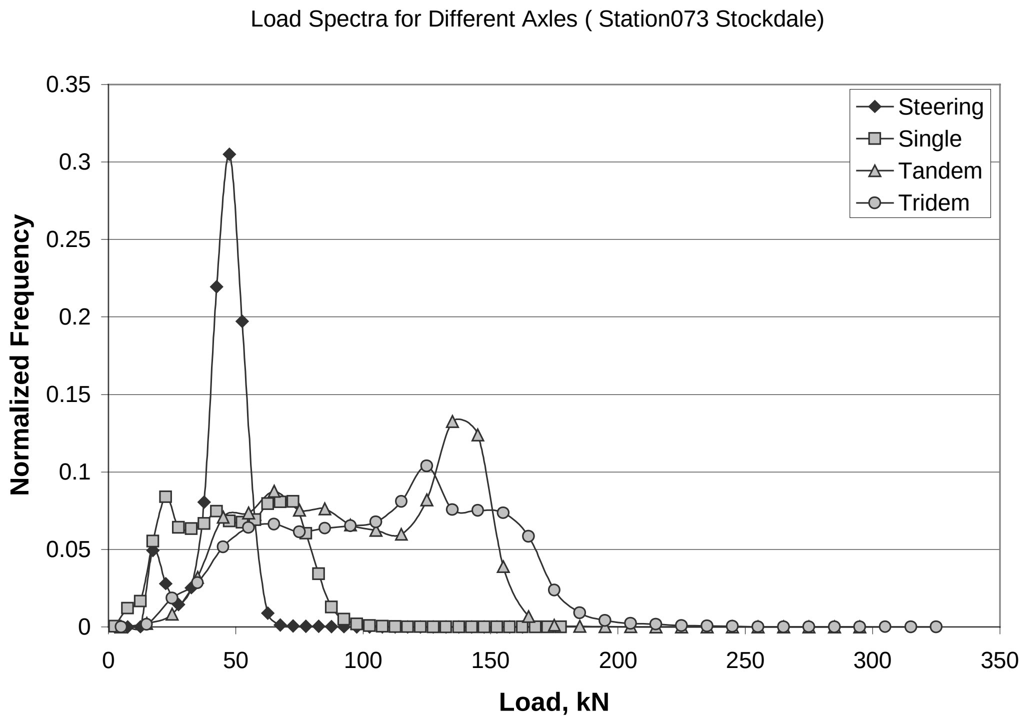

### Average Annual Daily Traffic for Different Truck Types

| Year | Truck Type | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **All** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **11** | **12** | **13** | **14** | **15** |
| 1997 | 4523 | 119 | 742 | 139 | 1 | 144 | 2755 | 40 | 254 | 98 | 7 | 126 | 97 |
| 1998 | 4602 | 136 | 918 | 126 | 2 | 147 | 2700 | 30 | 265 | 98 | 5 | 117 | 58 |
| 1999 | 5043 | 130 | 1039 | 129 | 3 | 158 | 2992 | 28 | 262 | 102 | 21 | 115 | 64 |
| 2000 | 5308 | 140 | 1189 | 124 | 2 | 146 | 3159 | 26 | 265 | 109 | 3 | 100 | 45 |
| 2001 | 4659 | 112 | 1139 | 91 | 2 | 133 | 2718 | 19 | 231 | 91 | 2 | 93 | 28 |

Annual Average Daily Traffic For Different Truck Types ( Station 072_BOWMAN)



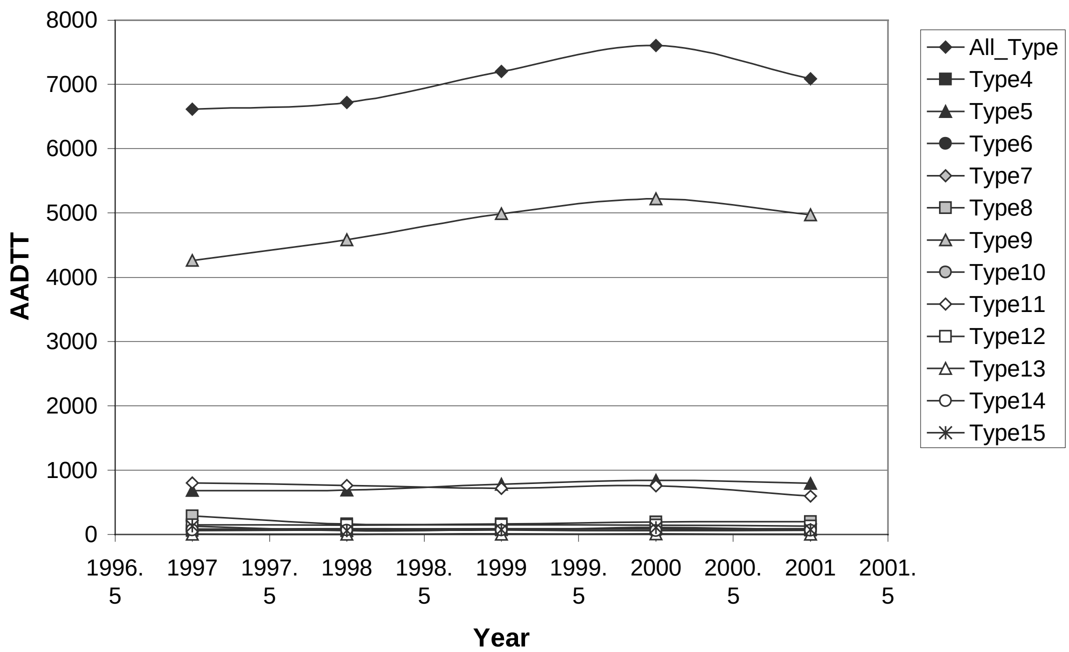
## STATION 73 STOCKDALE



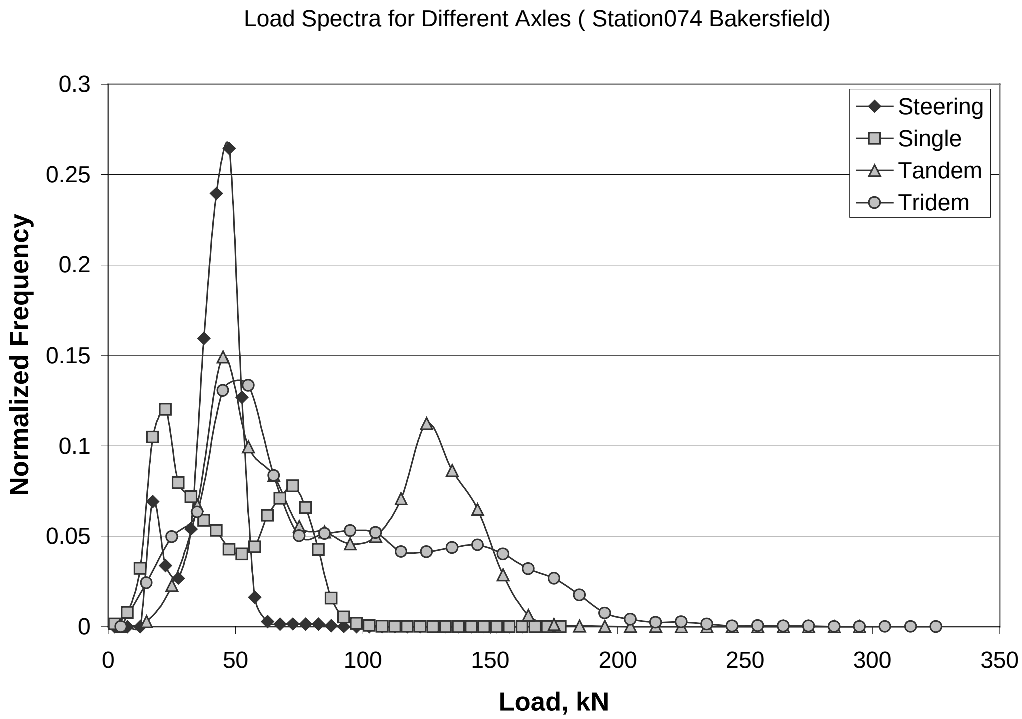

### Average Annual Daily Traffic for Different Truck Types

| Year | Truck Type | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **All** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **11** | **12** | **13** | **14** | **15** |
| 1997 | 6614 | 60 | 684 | 83 | 2 | 288 | 4263 | 80 | 803 | 149 | 4 | 69 | 131 |
| 1998 | 6719 | 70 | 689 | 85 | 1 | 163 | 4585 | 92 | 763 | 143 | 4 | 68 | 58 |
| 1999 | 7200 | 79 | 783 | 88 | 8 | 165 | 4988 | 81 | 717 | 149 | 4 | 66 | 73 |
| 2000 | 7604 | 83 | 844 | 91 | 4 | 196 | 5218 | 92 | 758 | 145 | 8 | 58 | 108 |
| 2001 | 7085 | 71 | 794 | 87 | 1 | 199 | 4975 | 91 | 594 | 131 | 4 | 63 | 75 |

Annual Average Daily Traffic For Different Truck Types ( Station 073_STOCKDALE)



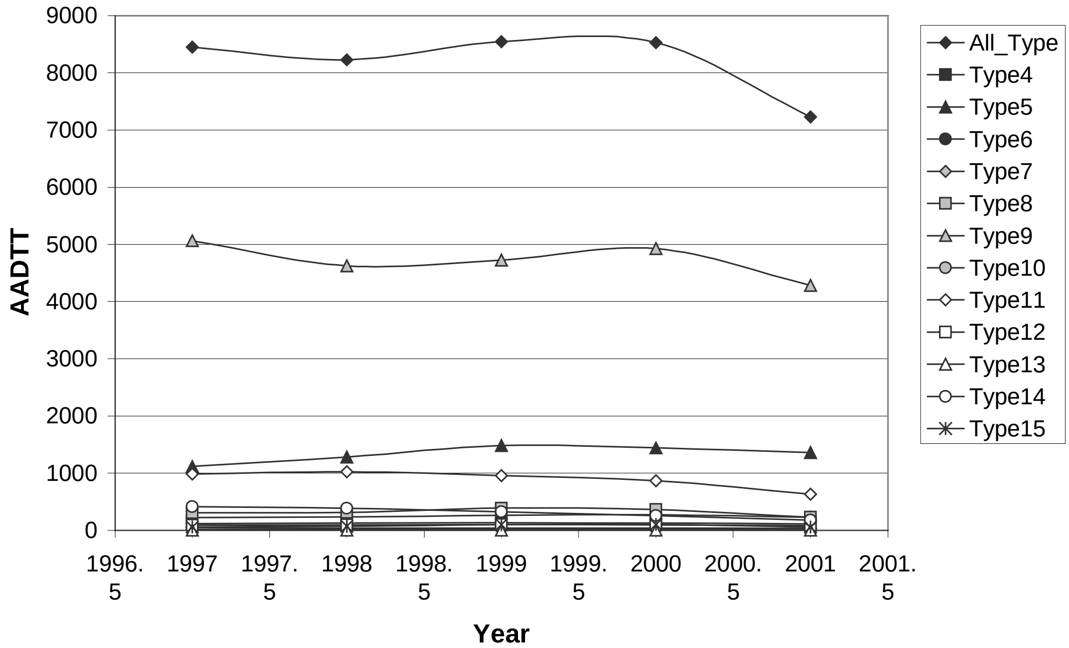
## STATION 74 BAKERSFIELD



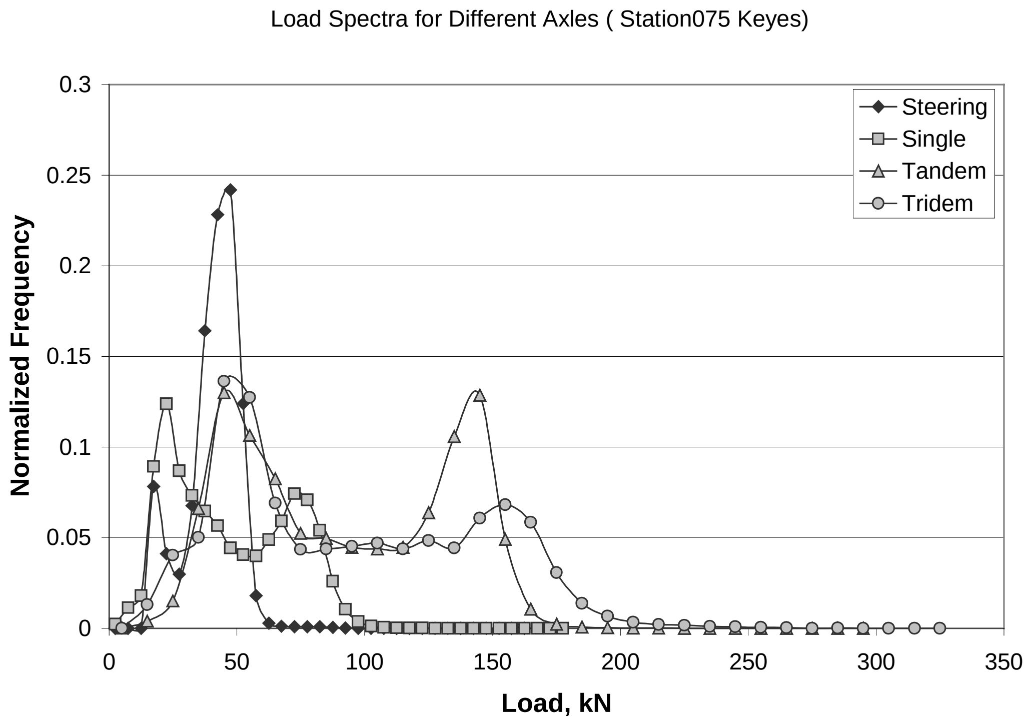

## Average Annual Daily Traffic for Different Truck Types

| Year | Truck Type | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **All** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **11** | **12** | **13** | **14** | **15** |
| 1997 | 8449 | 118 | 1116 | 223 | 16 | 307 | 5063 | 51 | 986 | 90 | 4 | 415 | 60 |
| 1998 | 8229 | 131 | 1282 | 236 | 20 | 315 | 4626 | 39 | 1023 | 96 | 4 | 385 | 72 |
| 1999 | 8546 | 133 | 1485 | 262 | 21 | 390 | 4725 | 43 | 960 | 99 | 3 | 324 | 100 |
| 2000 | 8529 | 129 | 1441 | 271 | 27 | 362 | 4927 | 40 | 869 | 98 | 4 | 260 | 103 |
| 2001 | 7226 | 111 | 1363 | 228 | 30 | 227 | 4285 | 31 | 630 | 82 | 3 | 178 | 57 |

Annual Average Daily Traffic For Different Truck Types ( Station 074_BAKERSFIELD)

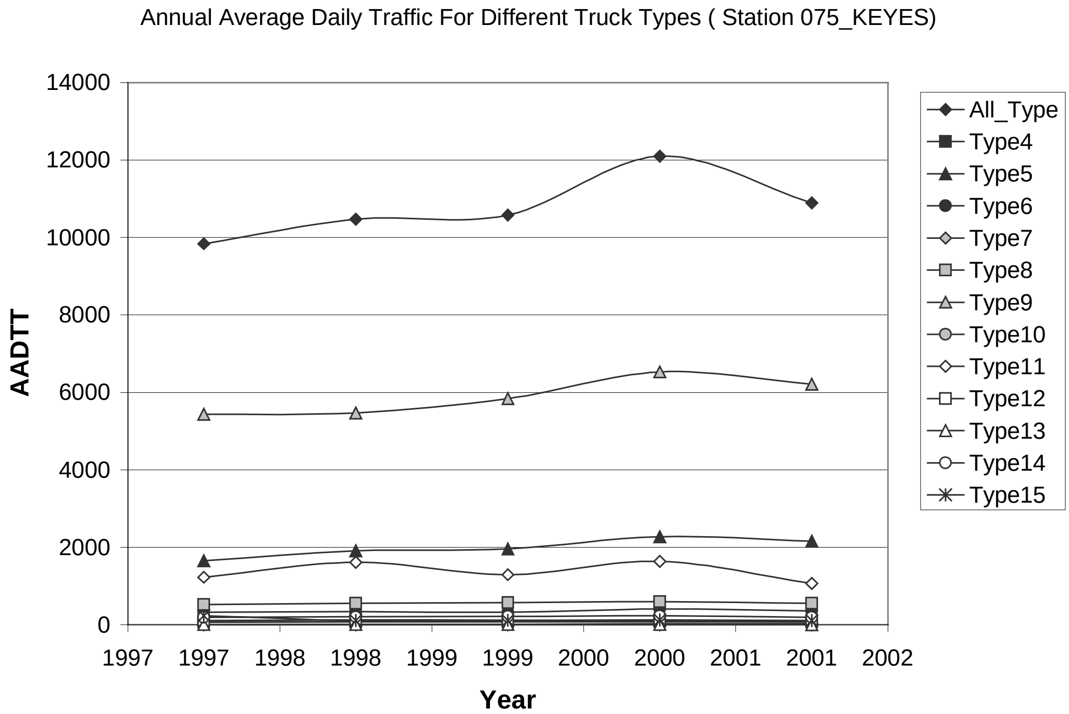


## STATION 75 KEYES

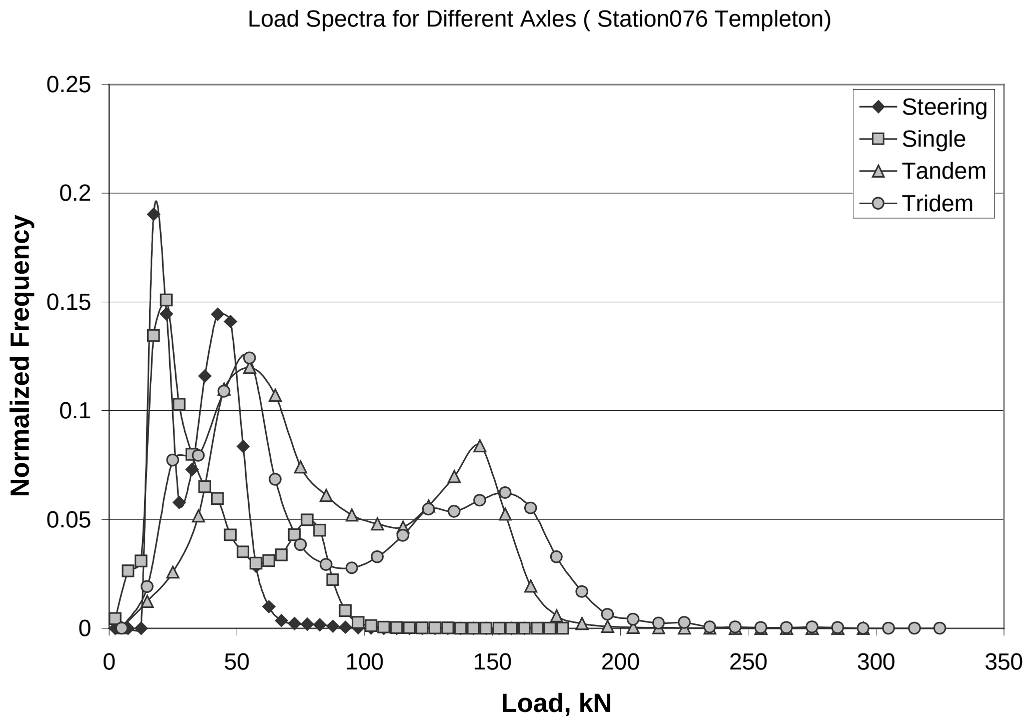



### Average Annual Daily Traffic for Different Truck Types

| Year | Truck Type | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **All** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **11** | **12** | **13** | **14** | **15** |
| 1997 | 9839 | 64 | 1654 | 328 | 7 | 523 | 5432 | 65 | 1224 | 113 | 3 | 193 | 233 |
| 1998 | 10471 | 69 | 1906 | 338 | 10 | 556 | 5469 | 70 | 1614 | 122 | 5 | 204 | 109 |
| 1999 | 10578 | 73 | 1961 | 325 | 11 | 568 | 5838 | 69 | 1290 | 117 | 4 | 213 | 110 |
| 2000 | 12097 | 89 | 2272 | 407 | 26 | 595 | 6526 | 75 | 1636 | 118 | 4 | 227 | 120 |
| 2001 | 10890 | 69 | 2156 | 356 | 24 | 555 | 6212 | 65 | 1062 | 97 | 2 | 188 | 105 |

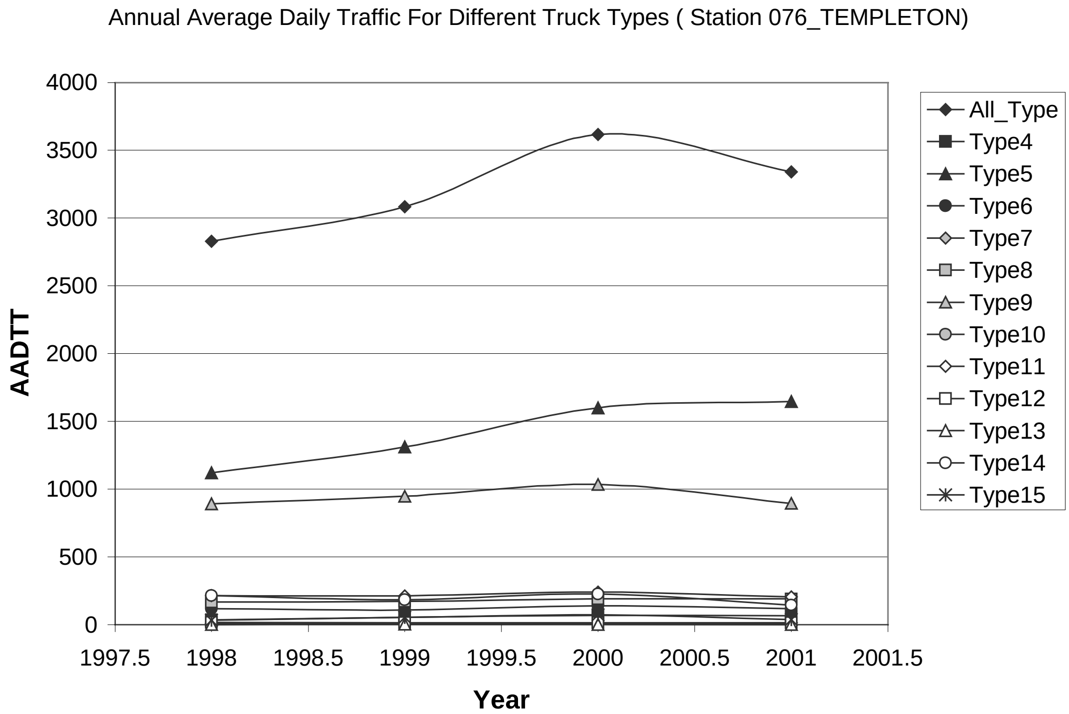

Annual Average Daily Traffic For Different Truck Types ( Station 075_KEYES)
14000
12000
10000
8000
6000
4000
2000
0
AADTT
1997
1997
1998
1998
1999
1999
2000
2000
2001
2001
2002
Year
All_Type
Type4
Type5
Type6
Type7
Type8
Type9
Type10
Type11
Type12
Type13
Type14
Type15

## STATION 76 TEMPLETON

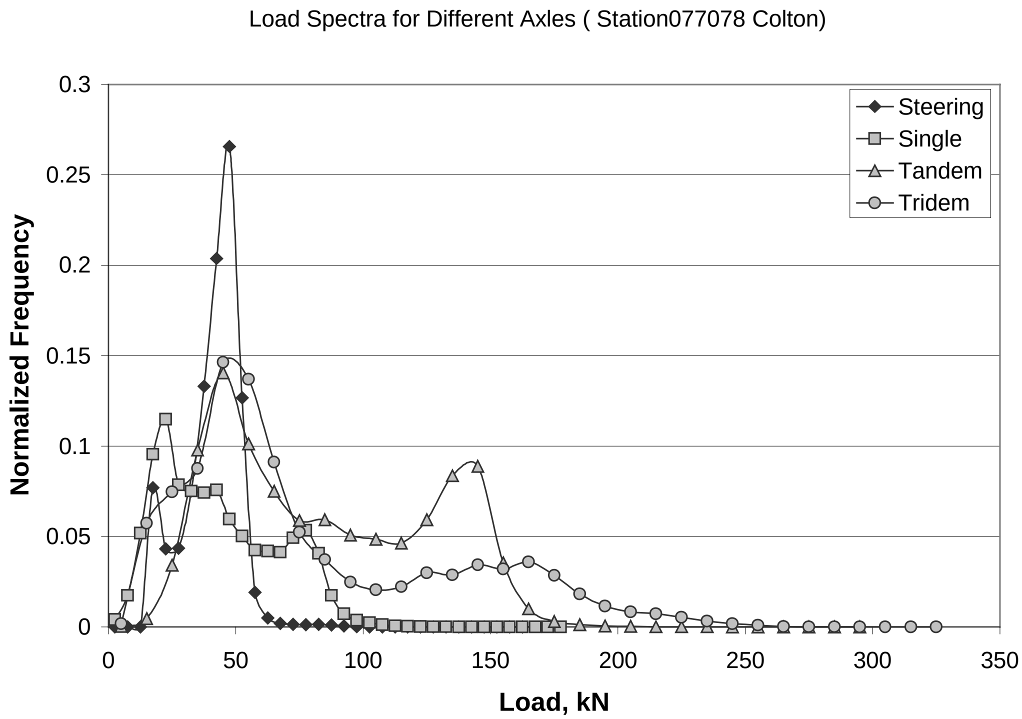



### Average Annual Daily Traffic for Different Truck Types

| Year | Truck Type | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **All** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **11** | **12** | **13** | **14** | **15** |
| 1998 | 2828 | 35 | 1121 | 118 | 9 | 168 | 892 | 6 | 215 | 16 | 2 | 215 | 33 |
| 1999 | 3085 | 55 | 1311 | 109 | 8 | 172 | 948 | 10 | 213 | 14 | 6 | 184 | 54 |
| 2000 | 3616 | 69 | 1601 | 140 | 11 | 191 | 1035 | 11 | 241 | 14 | 3 | 227 | 72 |
| 2001 | 3340 | 65 | 1647 | 118 | 14 | 191 | 895 | 7 | 205 | 14 | 2 | 146 | 38 |


Annual Average Daily Traffic For Different Truck Types ( Station 076_TEMPLETON)
AADTT
4000
3500
3000
2500
2000
1500
1000
500
0
1997.5
1998
1998.5
1999
1999.5
2000
2000.5
2001
2001.5
Year
All_Type
Type4
Type5
Type6
Type7
Type8
Type9
Type10
Type11
Type12
Type13
Type14
Type15

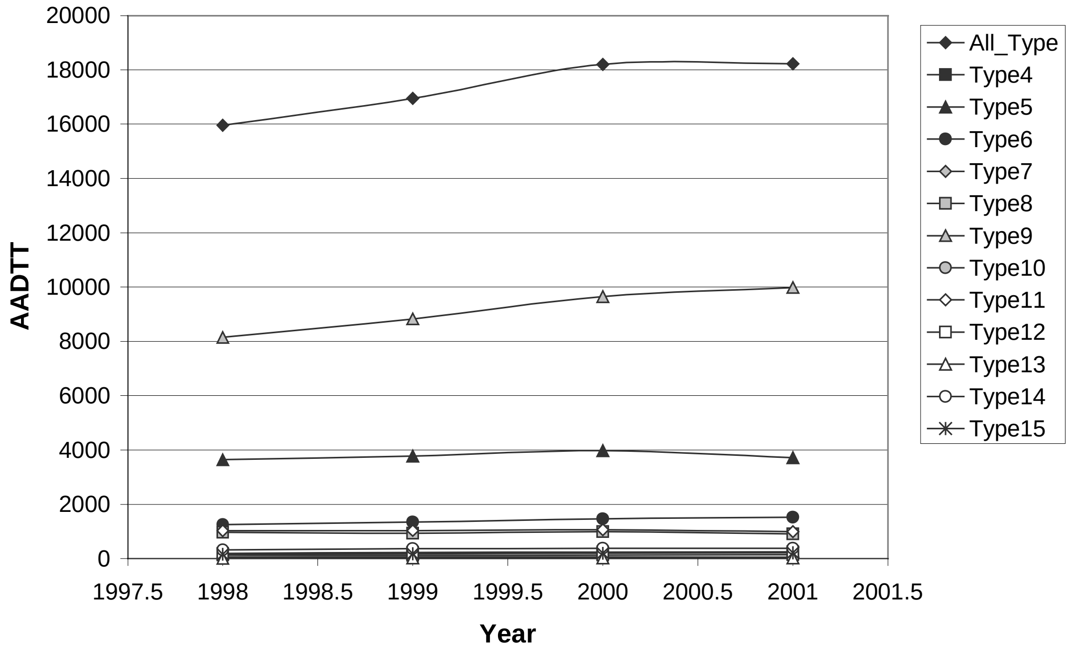
## STATIONS 77&78 COLTON



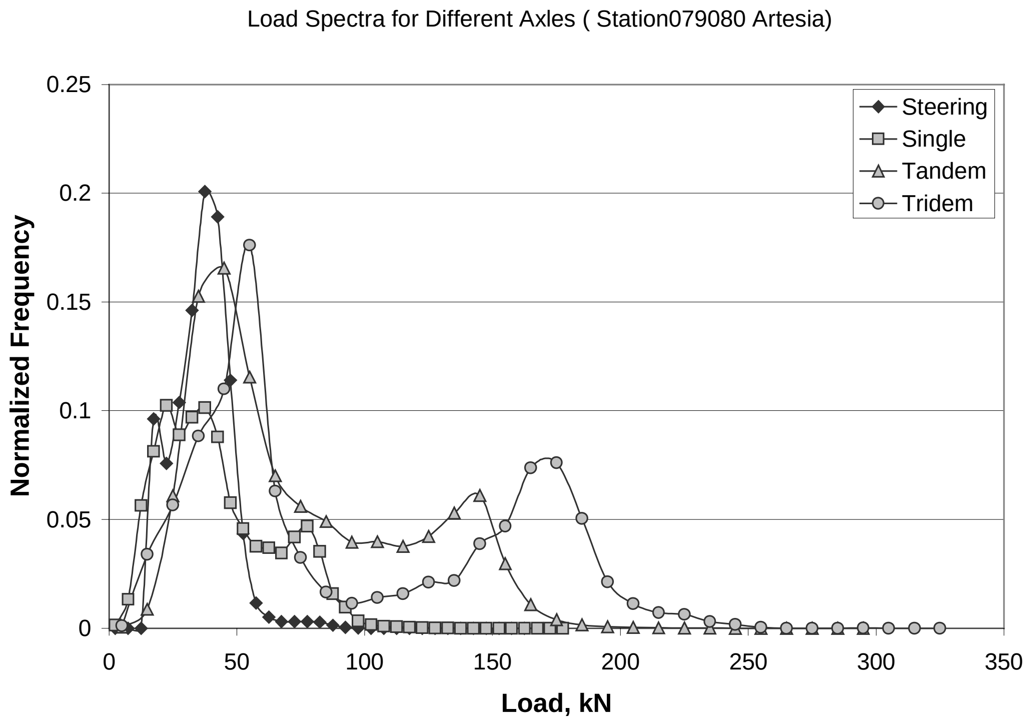

### Average Annual Daily Traffic for Different Truck Types

| Year | Truck Type | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **All** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **11** | **12** | **13** | **14** | **15** |
| 1998 | 15961 | 189 | 3644 | 1250 | 53 | 967 | 8146 | 58 | 1024 | 132 | 17 | 322 | 159 |
| 1999 | 16946 | 222 | 3778 | 1348 | 48 | 941 | 8828 | 64 | 1035 | 124 | 20 | 360 | 179 |
| 2000 | 18208 | 239 | 3972 | 1465 | 51 | 987 | 9652 | 60 | 1062 | 130 | 20 | 375 | 194 |
| 2001 | 18225 | 250 | 3724 | 1520 | 44 | 909 | 9986 | 54 | 985 | 144 | 22 | 380 | 209 |

Annual Average Daily Traffic For Different Truck Types ( Station 077078_COLTON)



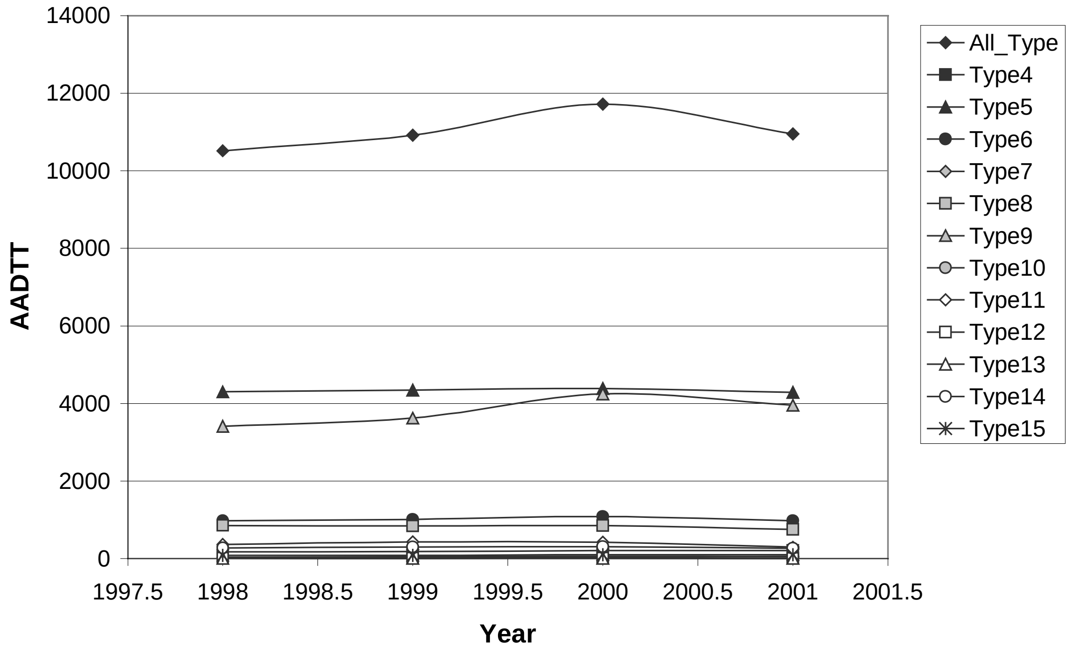
## STATIONS 79&80 ARTESIA



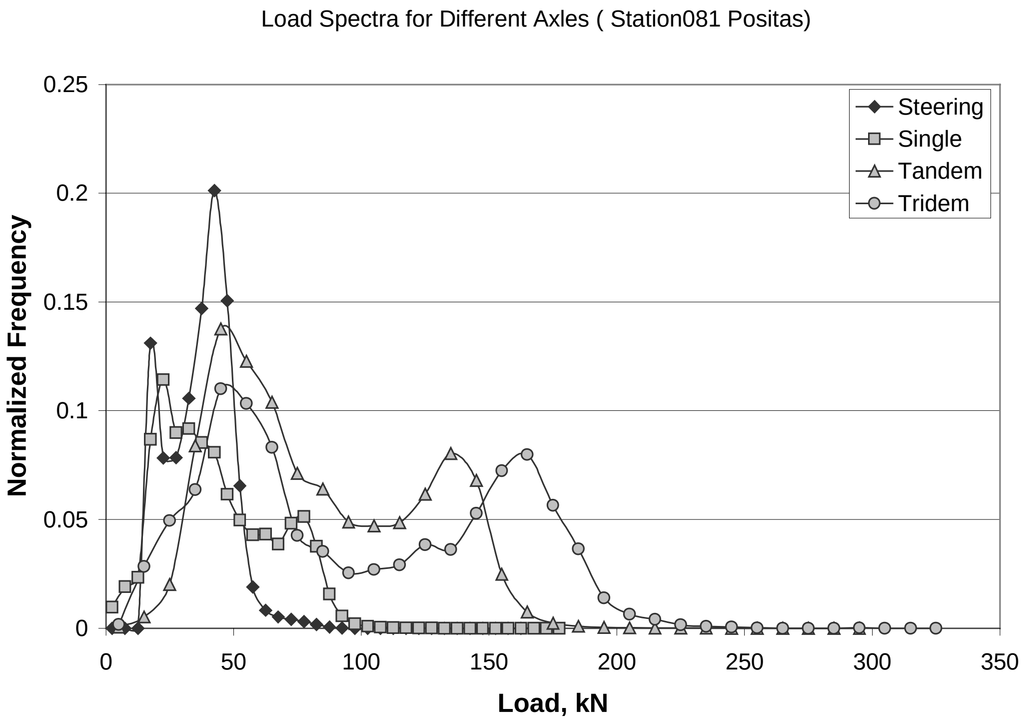

## Average Annual Daily Traffic for Different Truck Types

| Year | Truck Type | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **All** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **11** | **12** | **13** | **14** | **15** |
| 1998 | 10514 | 173 | 4298 | 975 | 28 | 853 | 3416 | 30 | 368 | 11 | 8 | 277 | 79 |
| 1999 | 10915 | 185 | 4346 | 1014 | 53 | 839 | 3620 | 36 | 425 | 9 | 6 | 299 | 82 |
| 2000 | 11717 | 201 | 4385 | 1083 | 62 | 849 | 4247 | 46 | 424 | 9 | 8 | 303 | 100 |
| 2001 | 10949 | 209 | 4286 | 976 | 48 | 755 | 3951 | 55 | 296 | 5 | 5 | 262 | 102 |

Annual Average Daily Traffic For Different Truck Types ( Station 080_ARTESIA)



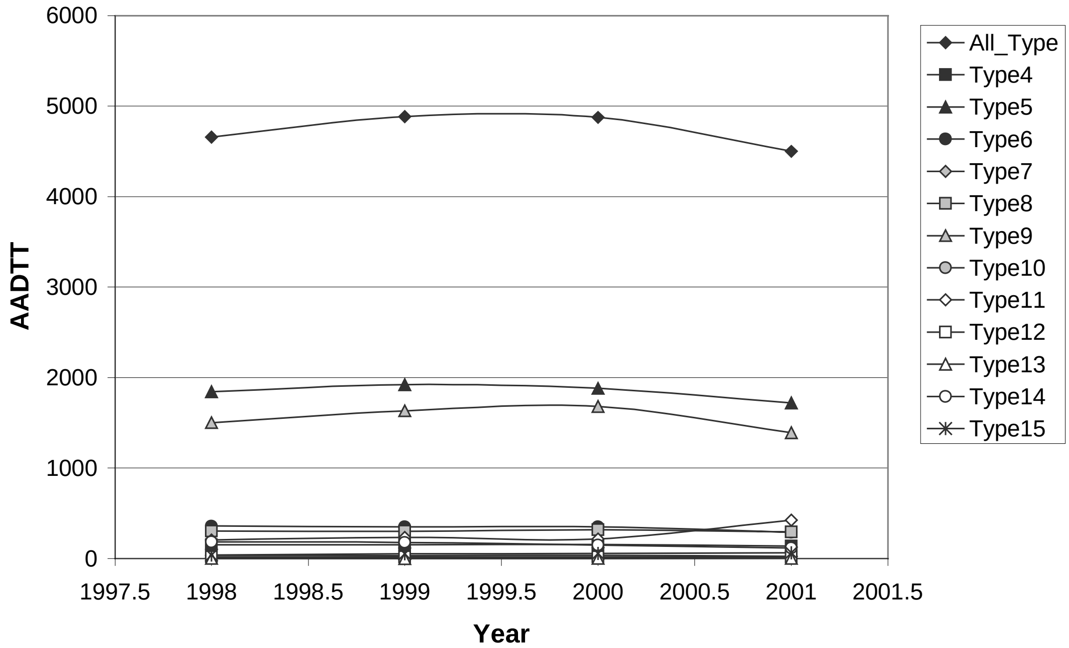
## STATION 81 POSITAS



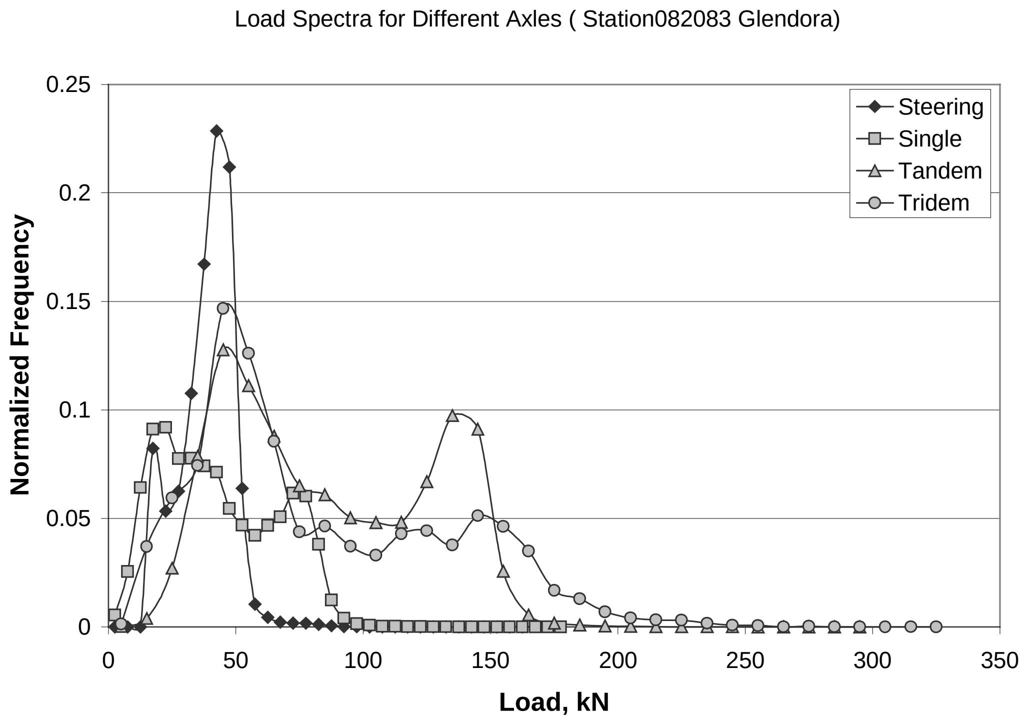

## Average Annual Daily Traffic for Different Truck Types

| **Year** | **Truck Type** | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **All** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **11** | **12** | **13** | **14** | **15** |
| 1998 | 4658 | 152 | 1844 | 360 | 38 | 302 | 1503 | 5 | 208 | 19 | 2 | 186 | 40 |
| 1999 | 4883 | 152 | 1922 | 350 | 33 | 300 | 1634 | 6 | 236 | 18 | 1 | 178 | 52 |
| 2000 | 4875 | 155 | 1882 | 351 | 35 | 318 | 1682 | 7 | 217 | 19 | 3 | 148 | 57 |
| 2001 | 4501 | 140 | 1721 | 289 | 27 | 294 | 1392 | 8 | 425 | 18 | 5 | 118 | 64 |

Annual Average Daily Traffic For Different Truck Types ( Station 081_POSITAS)

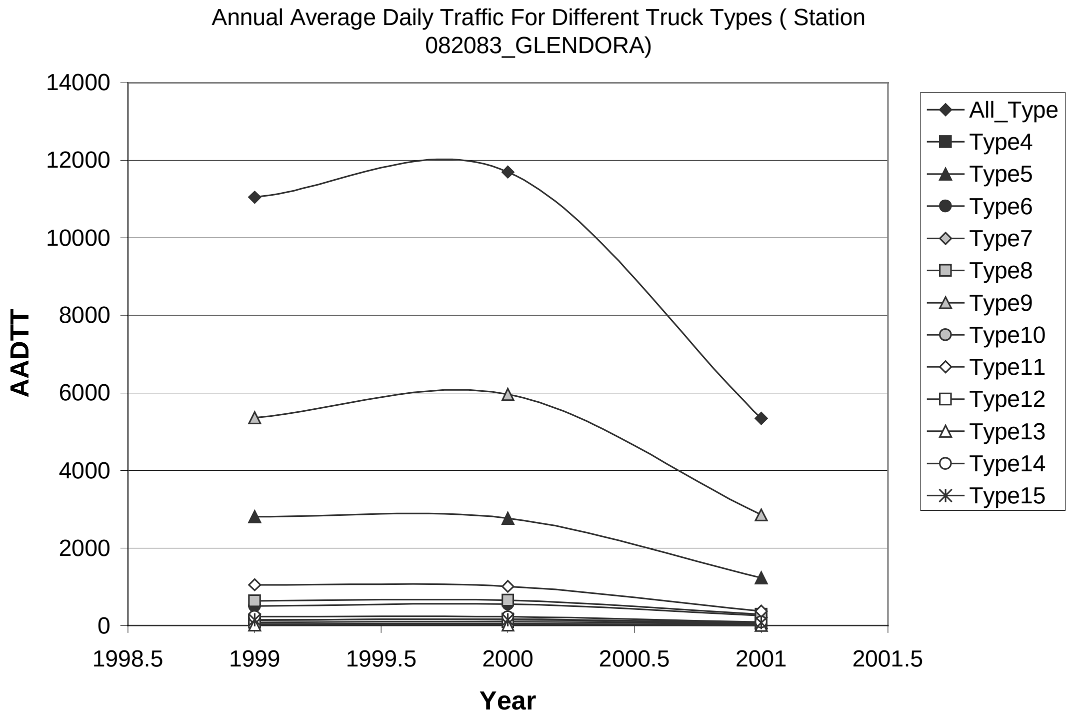


## STATIONS 82&83 GLENDORA

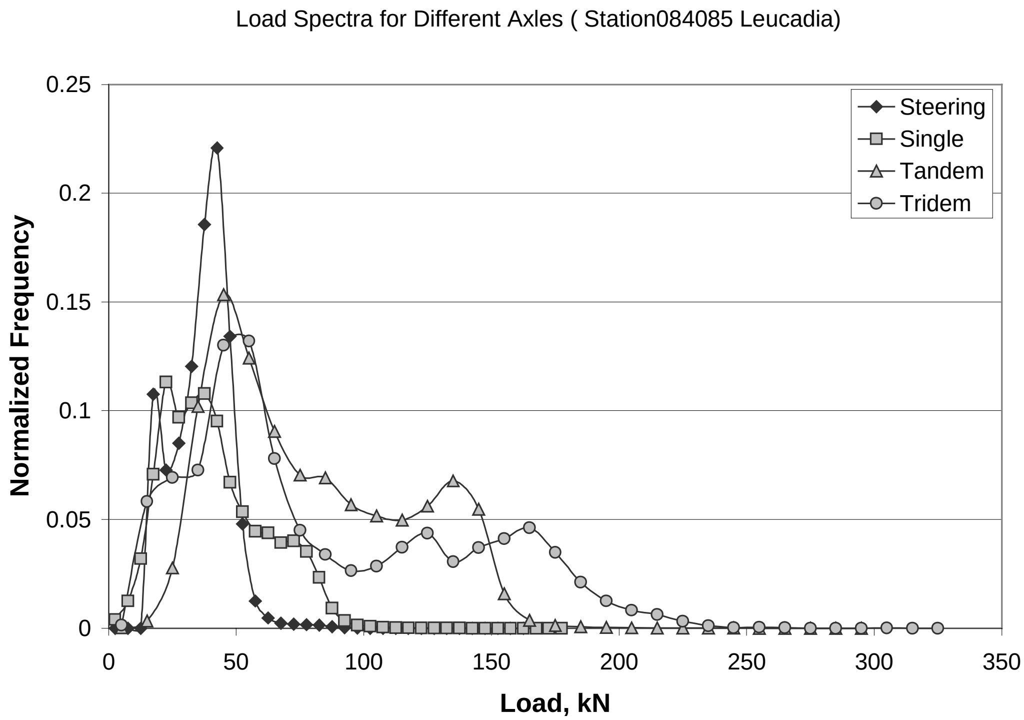



### Average Annual Daily Traffic for Different Truck Types

| Year | Truck Type | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **All** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **11** | **12** | **13** | **14** | **15** |
| 1999 | 11042 | 137 | 2806 | 503 | 22 | 636 | 5355 | 48 | 1052 | 87 | 18 | 233 | 145 |
| 2000 | 11693 | 167 | 2765 | 554 | 25 | 652 | 5964 | 51 | 1014 | 101 | 18 | 230 | 153 |
| 2001 | 5340 | 71 | 1232 | 258 | 10 | 292 | 2853 | 29 | 371 | 52 | 7 | 93 | 72 |


Annual Average Daily Traffic For Different Truck Types ( Station 082083_GLENDORA)
AADTT
14000
12000
10000
8000
6000
4000
2000
0
1998.5
1999
1999.5
2000
2000.5
2001
2001.5
Year
All_Type
Type4
Type5
Type6
Type7
Type8
Type9
Type10
Type11
Type12
Type13
Type14
Type15

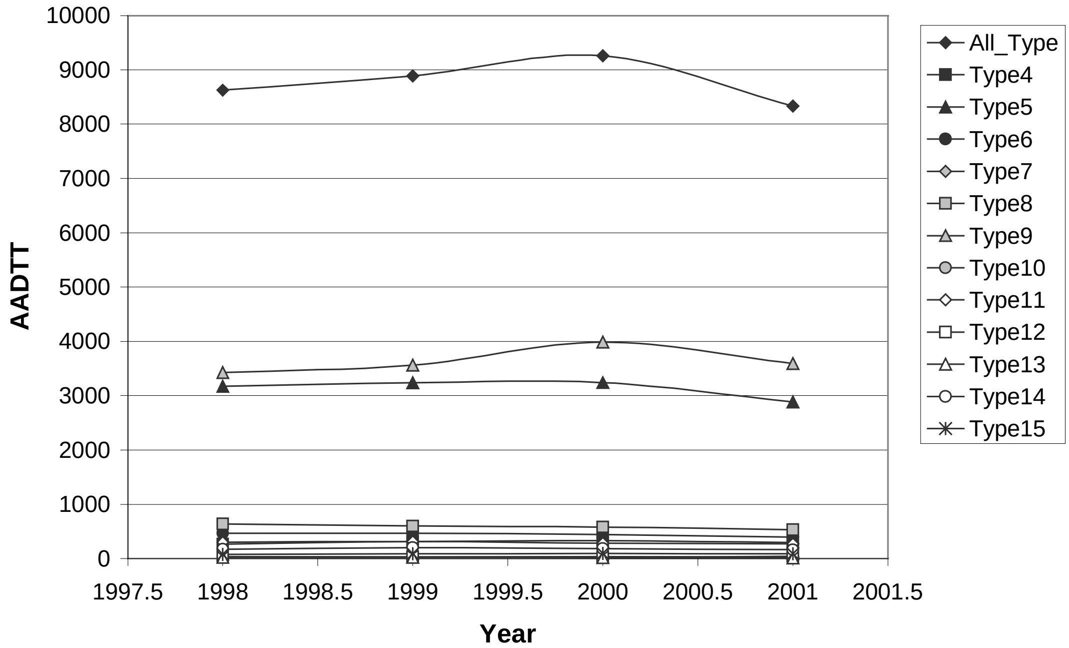
## STATIONS 84&85 LEUCADIA



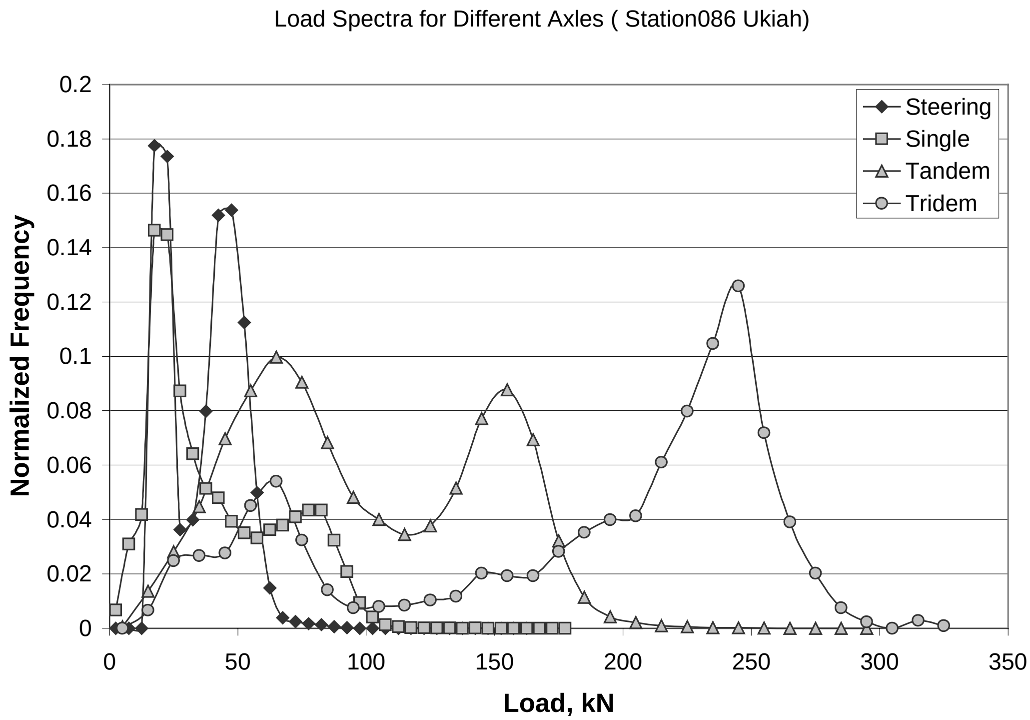

## Average Annual Daily Traffic for Different Truck Types

| Year | Truck Type | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | All | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| 1998 | 8627 | 265 | 3174 | 468 | 28 | 635 | 3427 | 20 | 301 | 36 | 24 | 174 | 76 |
| 1999 | 8888 | 316 | 3238 | 465 | 29 | 601 | 3561 | 25 | 315 | 33 | 21 | 199 | 86 |
| 2000 | 9259 | 332 | 3240 | 442 | 37 | 582 | 3986 | 28 | 285 | 29 | 17 | 186 | 95 |
| 2001 | 8332 | 298 | 2886 | 396 | 25 | 531 | 3592 | 28 | 273 | 40 | 14 | 162 | 86 |

Annual Average Daily Traffic For Different Truck Types ( Station 084085_LEUCADIA)



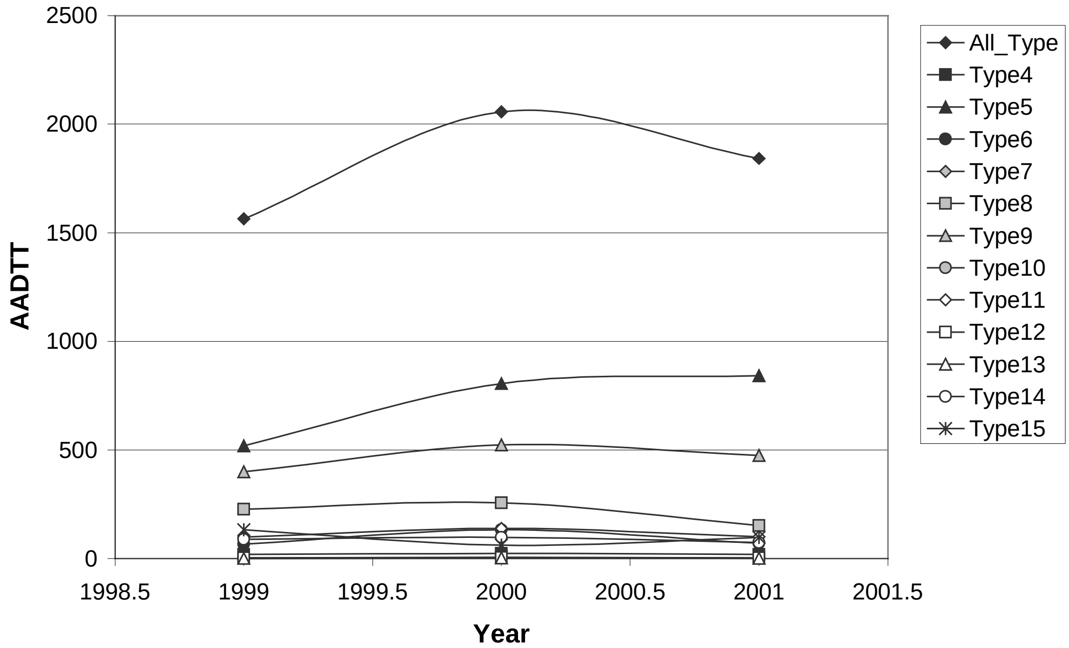
## STATION 86 UKIAH



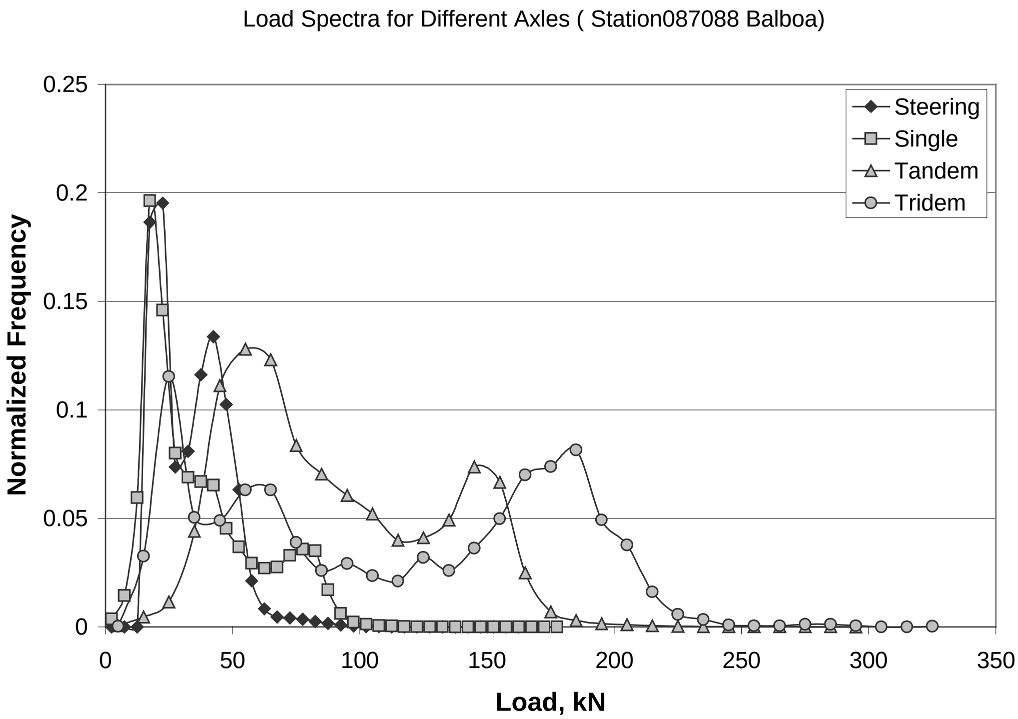

### Average Annual Daily Traffic for Different Truck Types

| Year | Truck Type | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **All** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **11** | **12** | **13** | **14** | **15** |
| 1999 | 1564 | 19 | 520 | 66 | 3 | 227 | 400 | 2 | 99 | 4 | 1 | 89 | 133 |
| 2000 | 2057 | 24 | 806 | 133 | 3 | 257 | 523 | 3 | 139 | 5 | 3 | 98 | 62 |
| 2001 | 1842 | 20 | 842 | 71 | 2 | 152 | 475 | 3 | 101 | 3 | 2 | 74 | 97 |

Annual Average Daily Traffic For Different Truck Types ( Station 086_UKIAH)



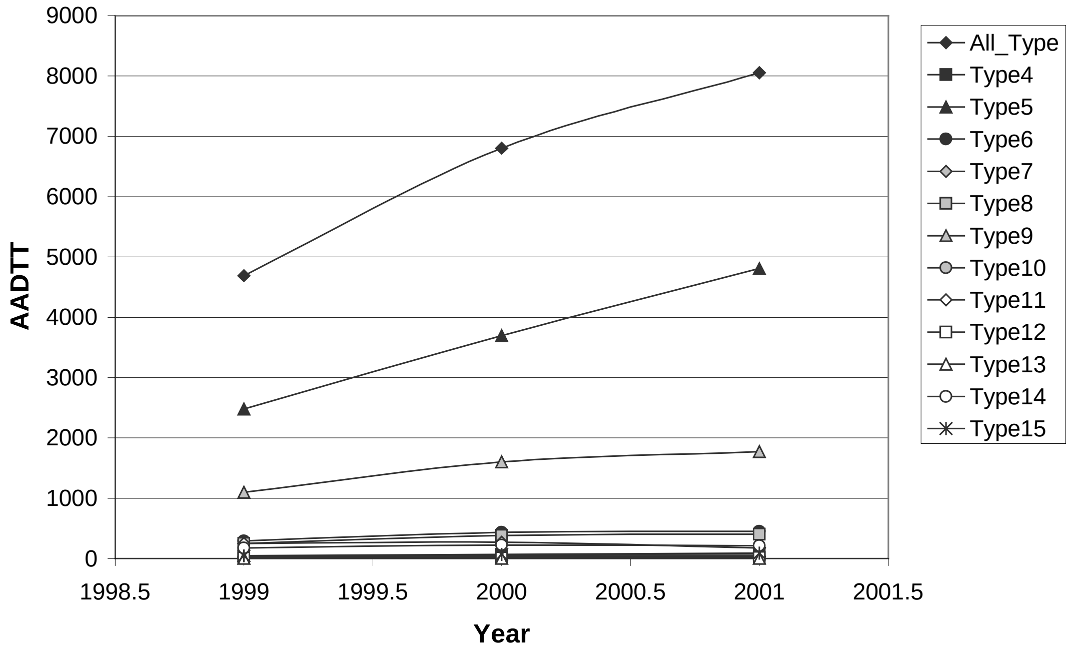
## STATIONS 87&88 BALBOA



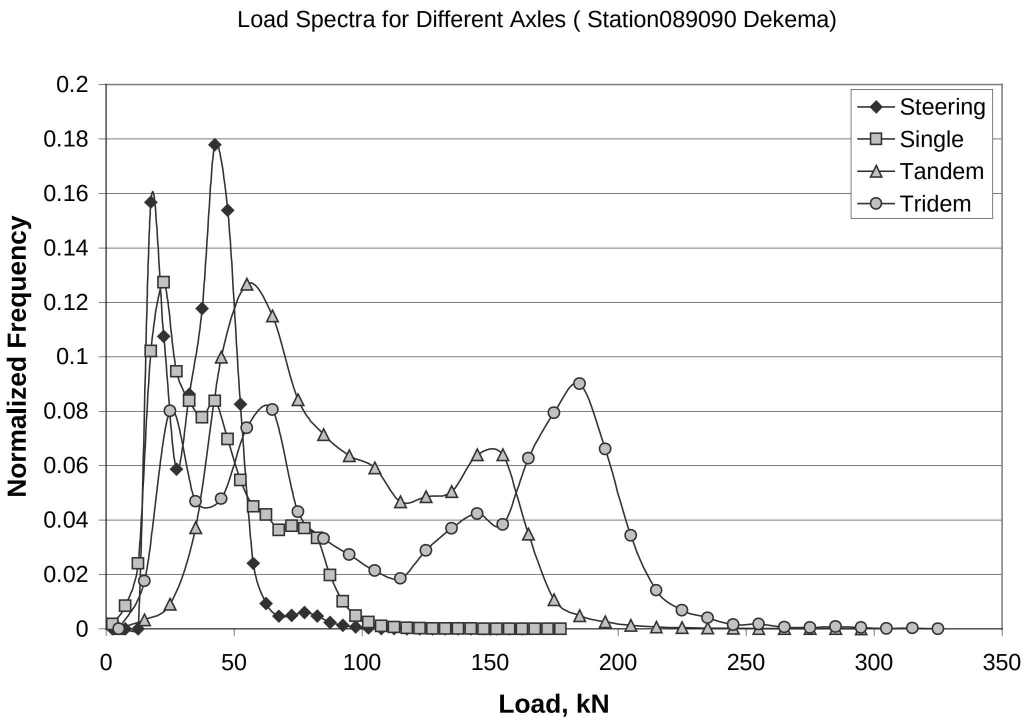

### Average Annual Daily Traffic for Different Truck Types

| Year | Truck Type | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **All** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **11** | **12** | **13** | **14** | **15** |
| 1999 | 4690 | 41 | 2479 | 294 | 26 | 253 | 1099 | 8 | 253 | 9 | 5 | 178 | 45 |
| 2000 | 6802 | 57 | 3697 | 435 | 34 | 384 | 1601 | 11 | 271 | 14 | 5 | 225 | 69 |
| 2001 | 8053 | 60 | 4808 | 451 | 36 | 404 | 1773 | 14 | 177 | 17 | 5 | 213 | 93 |

Annual Average Daily Traffic For Different Truck Types ( Station 087088_BALBOA)



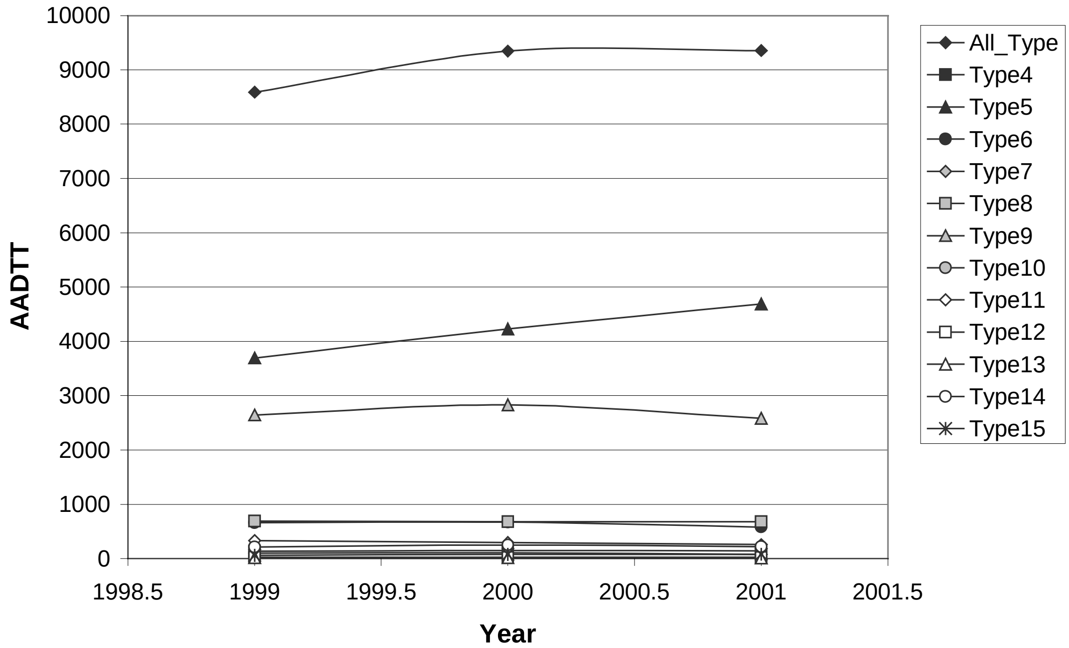
## STATIONS 89&90 DEKEMA



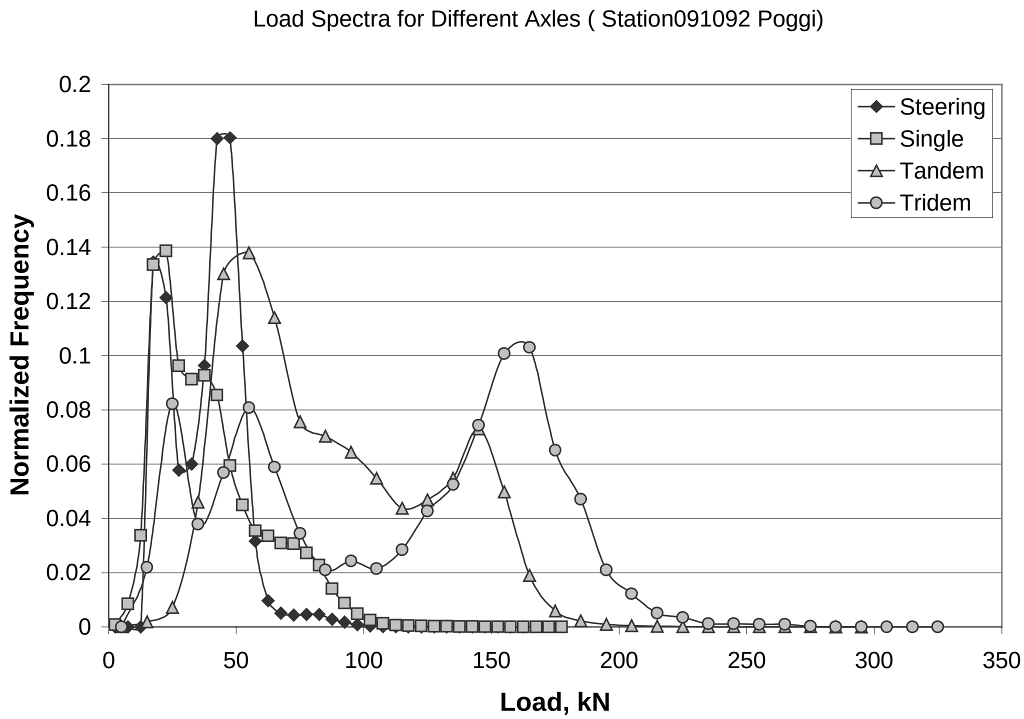

## Average Annual Daily Traffic for Different Truck Types

| Year | Truck Type | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **All** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **11** | **12** | **13** | **14** | **15** |
| 1999 | 8591 | 134 | 3697 | 662 | 98 | 689 | 2644 | 14 | 331 | 27 | 18 | 214 | 62 |
| 2000 | 9347 | 149 | 4231 | 673 | 107 | 680 | 2832 | 21 | 293 | 17 | 18 | 249 | 76 |
| 2001 | 9358 | 141 | 4686 | 582 | 79 | 678 | 2585 | 21 | 257 | 17 | 16 | 217 | 79 |

Annual Average Daily Traffic For Different Truck Types ( Station 089090_DEKEMA)

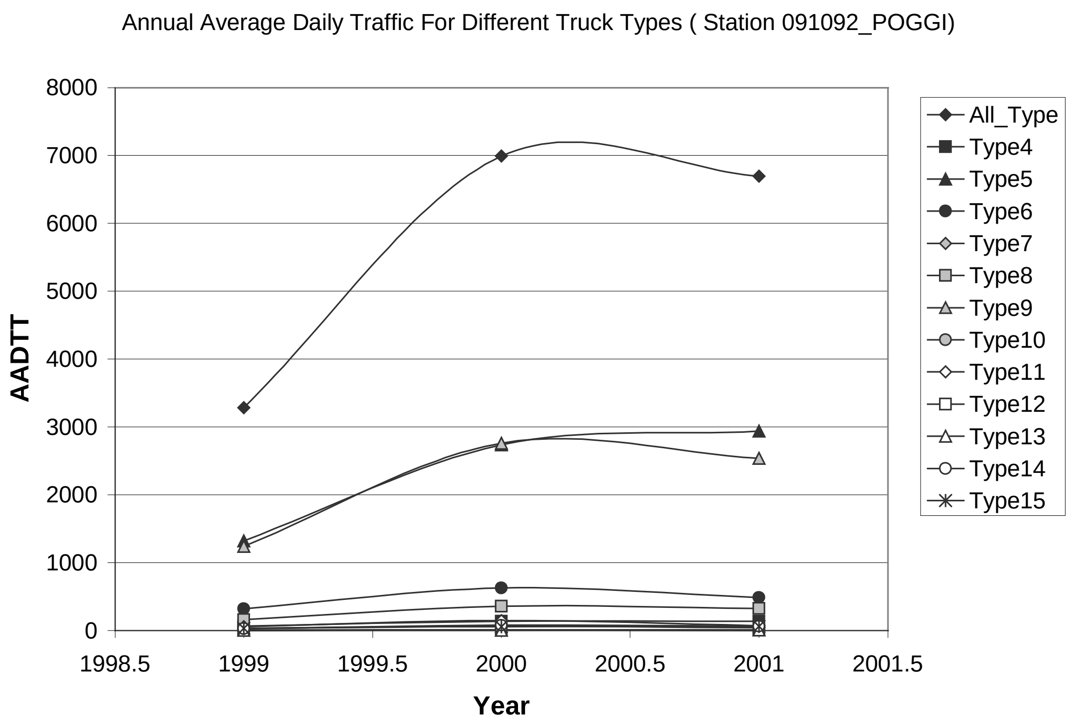


## STATIONS 91&92 POGGI



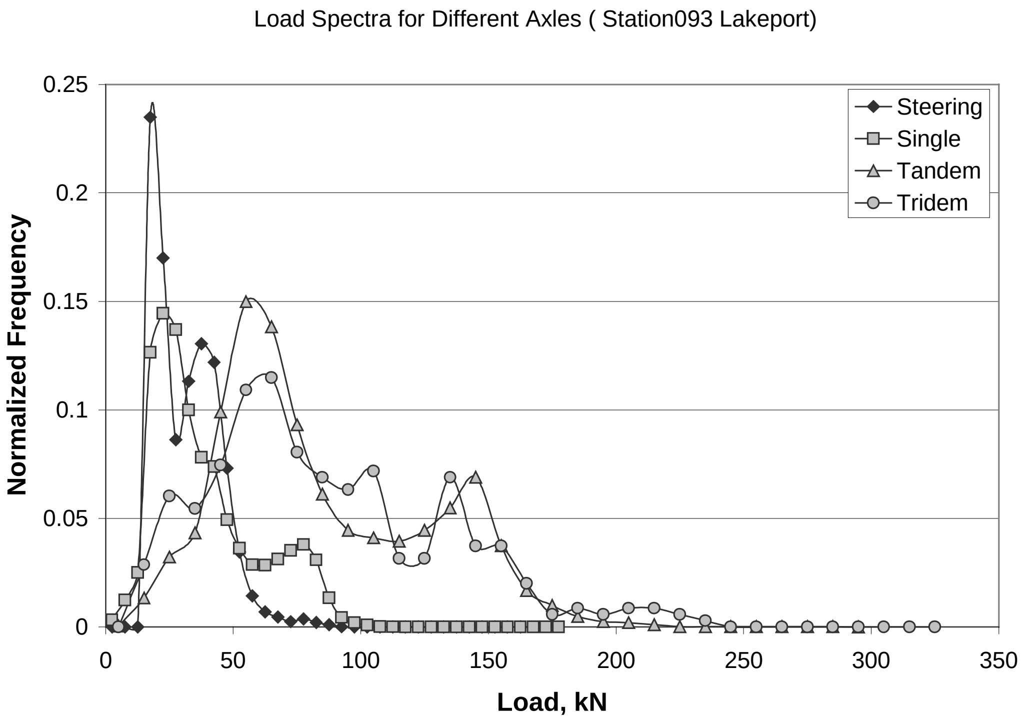

### Average Annual Daily Traffic for Different Truck Types

| Year | Truck Type | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **All** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **11** | **12** | **13** | **14** | **15** |
| 1999 | 3286 | 68 | 1323 | 322 | 31 | 163 | 1240 | 4 | 57 | 10 | 3 | 28 | 34 |
| 2000 | 6992 | 137 | 2736 | 627 | 64 | 359 | 2762 | 11 | 147 | 8 | 7 | 79 | 57 |
| 2001 | 6695 | 139 | 2940 | 489 | 41 | 327 | 2537 | 12 | 73 | 4 | 8 | 63 | 62 |



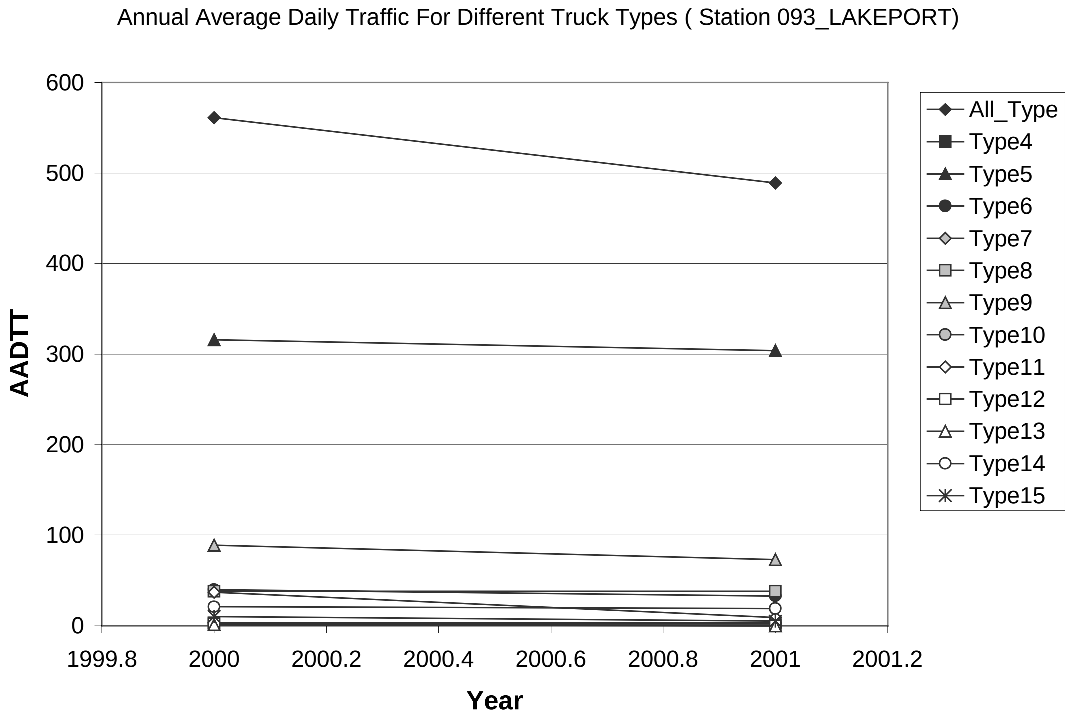
Annual Average Daily Traffic For Different Truck Types ( Station 091092_POGGI)
AADTT
8000
7000
6000
5000
4000
3000
2000
1000
0
1998.5
1999
1999.5
2000
2000.5
2001
2001.5
Year
All_Type
Type4
Type5
Type6
Type7
Type8
Type9
Type10
Type11
Type12
Type13
Type14
Type15

## STATION 93 LAKEPORT



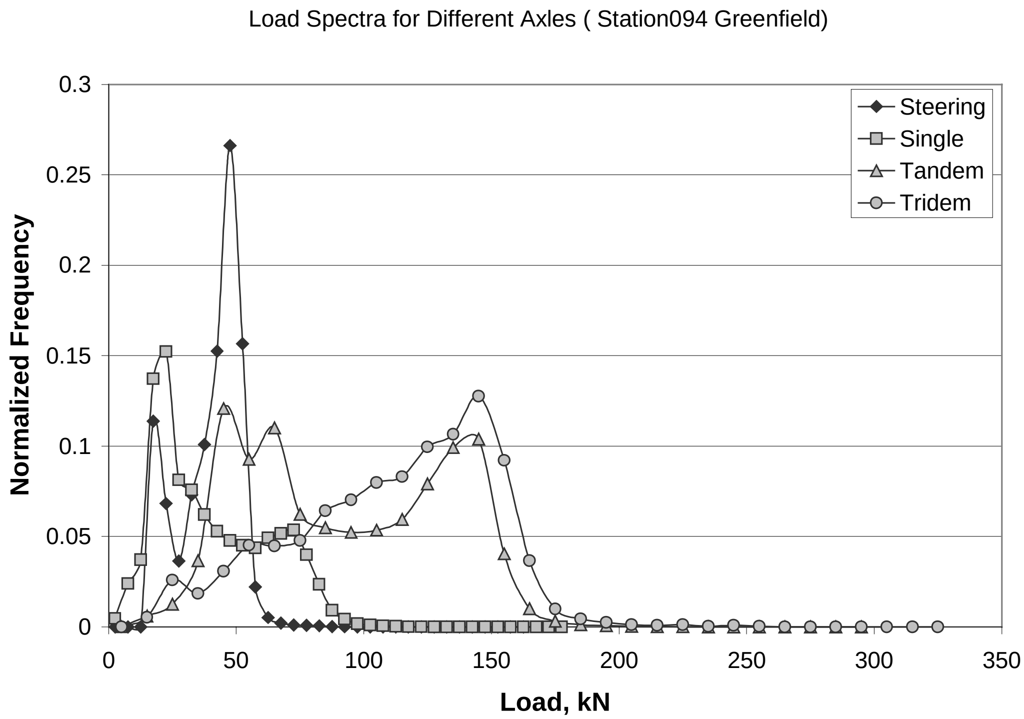

### Average Annual Daily Traffic for Different Truck Types

| Year | Truck Type | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **All** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **11** | **12** | **13** | **14** | **15** |
| 2000 | 561 | 3 | 316 | 40 | 3 | 38 | 89 | 2 | 37 | 2 | 1 | 21 | 10 |
| 2001 | 489 | 3 | 304 | 33 | 3 | 38 | 73 | 2 | 9 | 0 | 0 | 19 | 5 |



Annual Average Daily Traffic For Different Truck Types ( Station 093_LAKEPORT)
AADTT
600
500
400
300
200
100
0
1999.8
2000
2000.2
2000.4
2000.6
2000.8
2001
2001.2
Year
All_Type
Type4
Type5
Type6
Type7
Type8
Type9
Type10
Type11
Type12
Type13
Type14
Type15

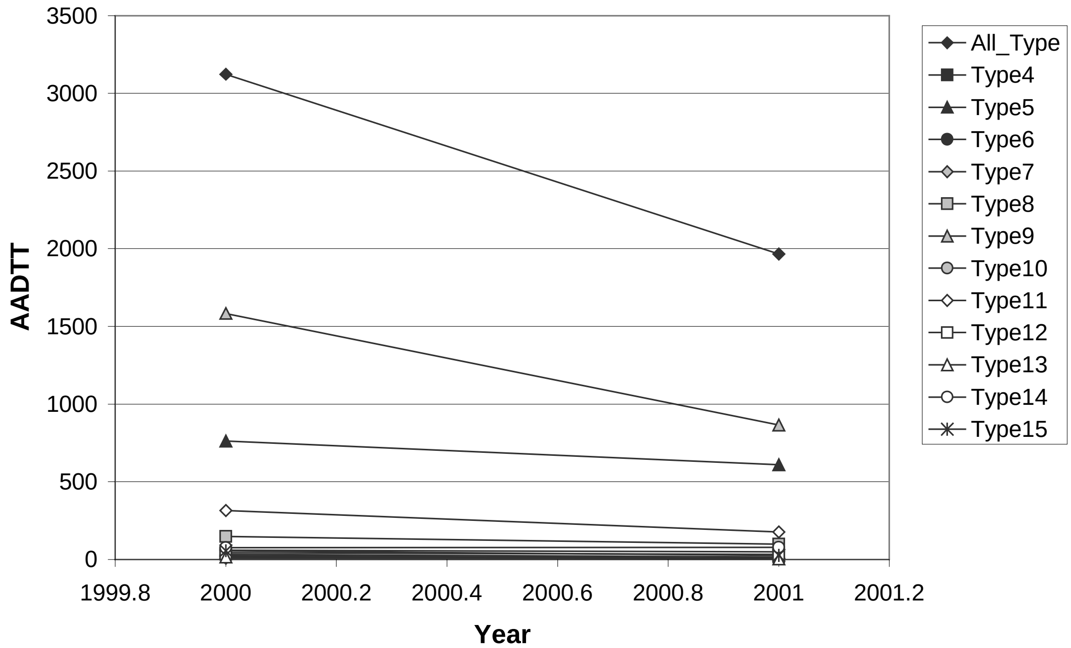
## STATION 94 GREENFIELD



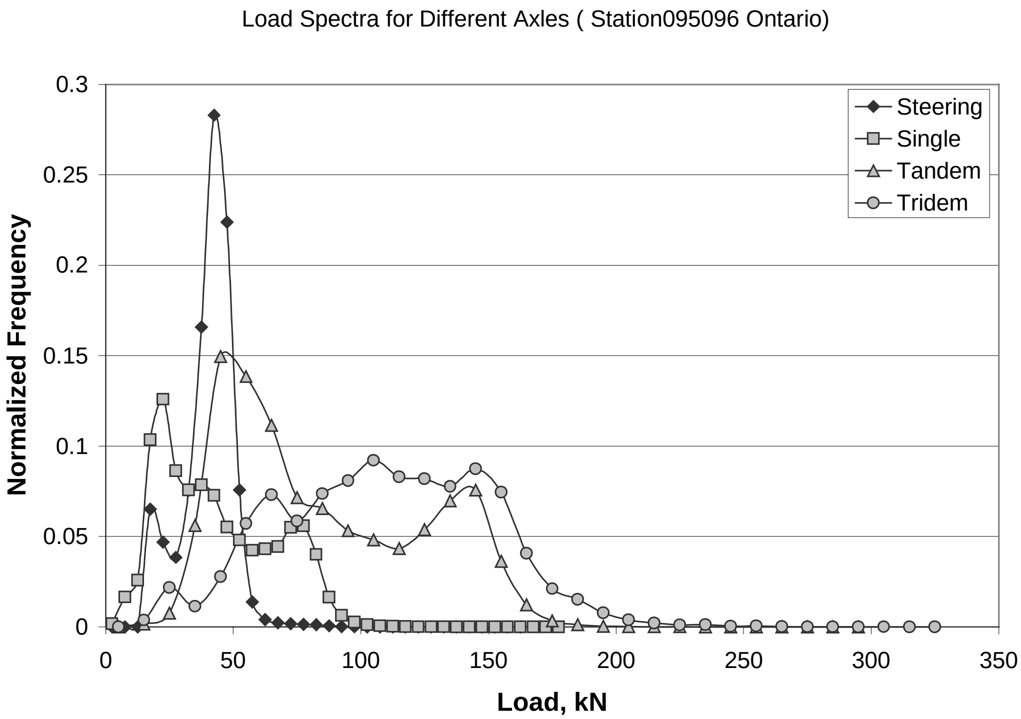

## Average Annual Daily Traffic for Different Truck Types

| Year | Truck Type | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **All** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **11** | **12** | **13** | **14** | **15** |
| 2000 | 3123 | 43 | 762 | 60 | 7 | 147 | 1584 | 24 | 316 | 32 | 17 | 75 | 56 |
| 2001 | 1966 | 33 | 609 | 48 | 5 | 98 | 865 | 8 | 177 | 17 | 2 | 77 | 26 |

Annual Average Daily Traffic For Different Truck Types ( Station 094_GREENFIELD)



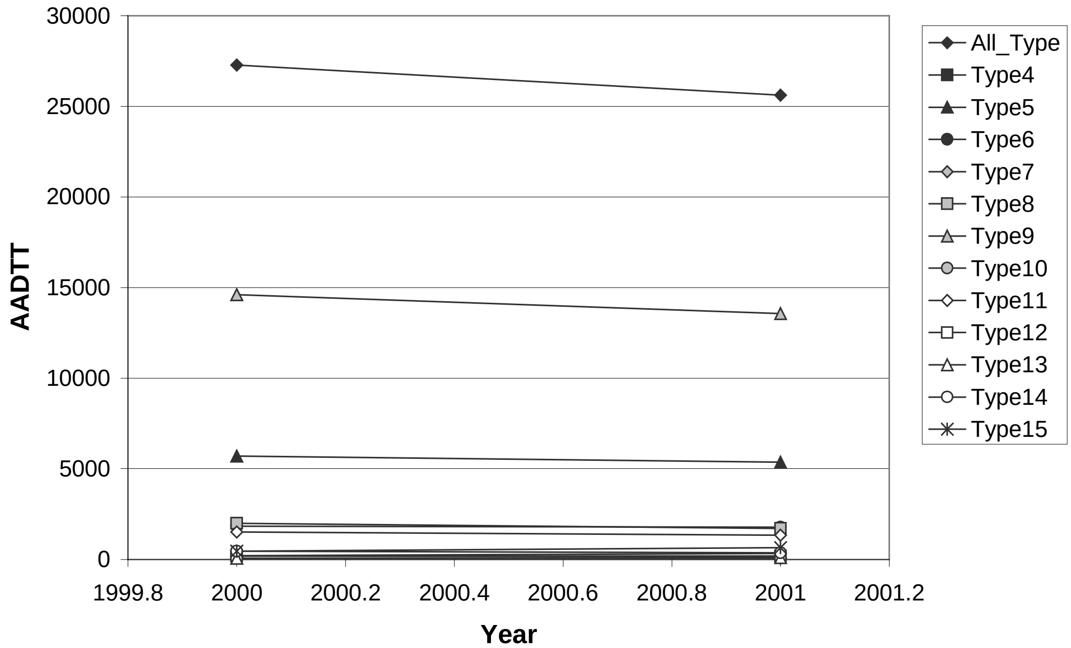
## STATIONS 95&96 ONTARIO



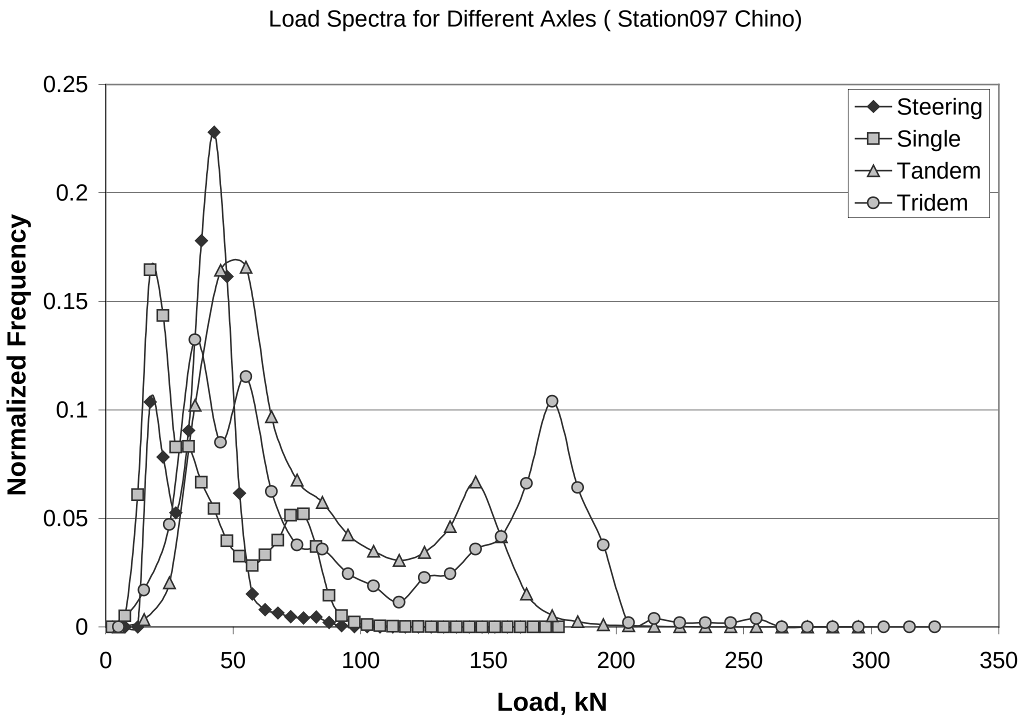

### Average Annual Daily Traffic for Different Truck Types

| Year | Truck Type | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **All** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **11** | **12** | **13** | **14** | **15** |
| 2000 | 27279 | 194 | 5704 | 1833 | 61 | 1996 | 14609 | 211 | 1510 | 185 | 64 | 455 | 456 |
| 2001 | 25615 | 190 | 5359 | 1773 | 61 | 1716 | 13565 | 338 | 1337 | 150 | 100 | 368 | 659 |

Annual Average Daily Traffic For Different Truck Types ( Station 095096_ONTARIO)

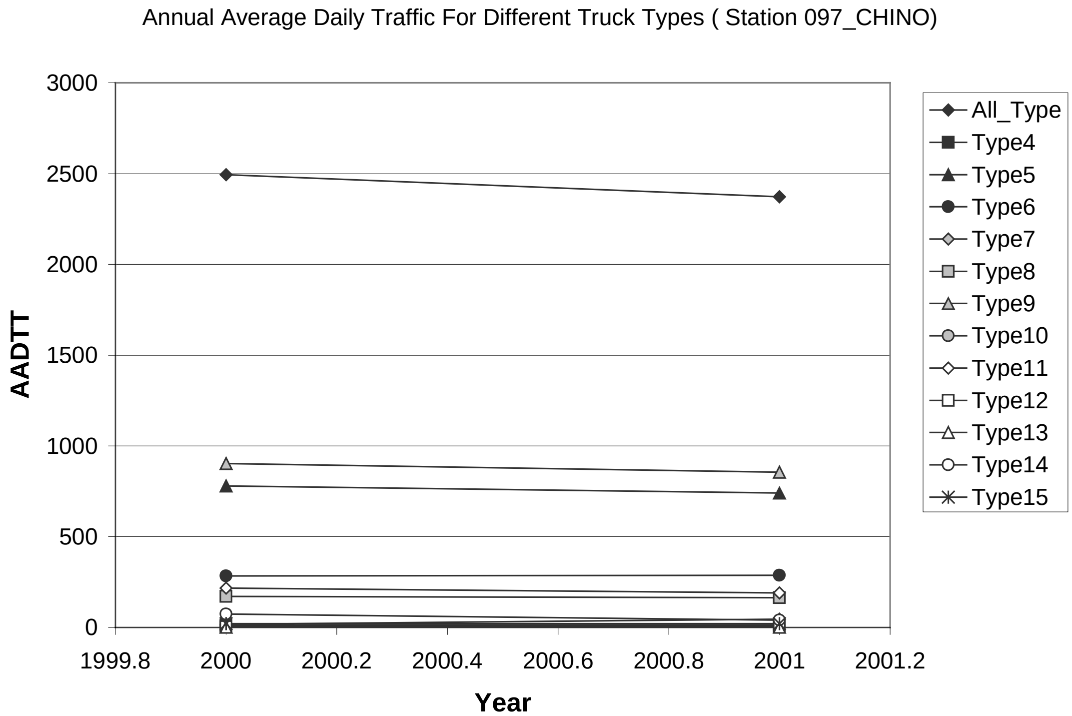


**STATION 97 CHINO**

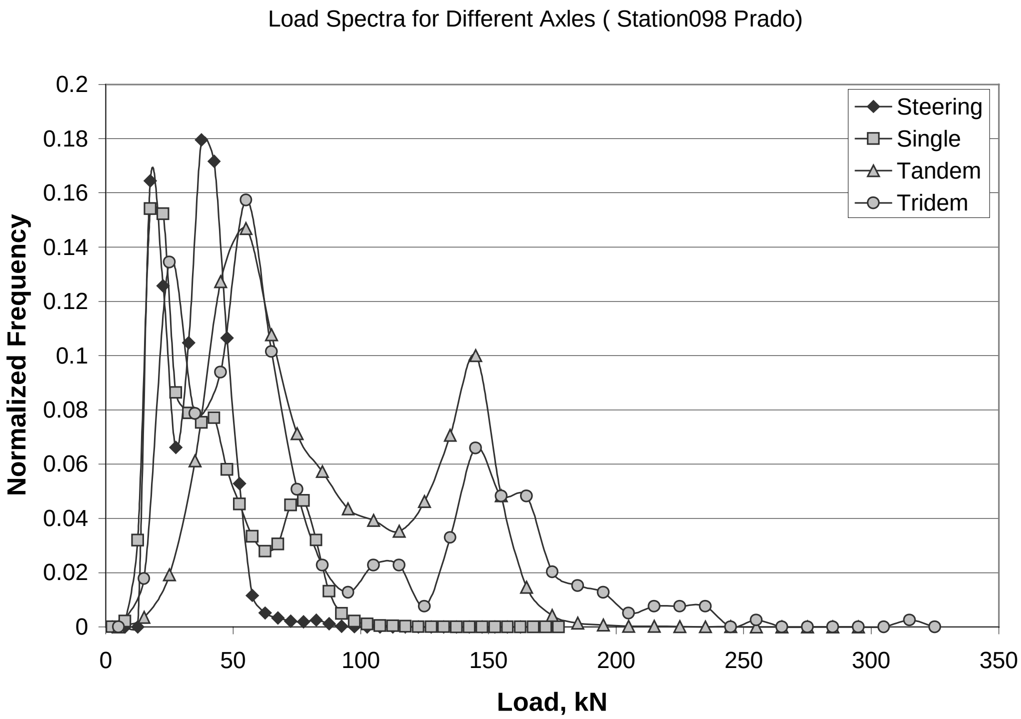



**Average Annual Daily Traffic for Different Truck Types**

| Year | Truck Type | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **All** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **11** | **12** | **13** | **14** | **15** |
| 2000 | 2495 | 12 | 781 | 285 | 17 | 171 | 903 | 6 | 217 | 4 | 2 | 74 | 22 |
| 2001 | 2373 | 12 | 740 | 288 | 46 | 165 | 856 | 6 | 191 | 4 | 2 | 41 | 21 |

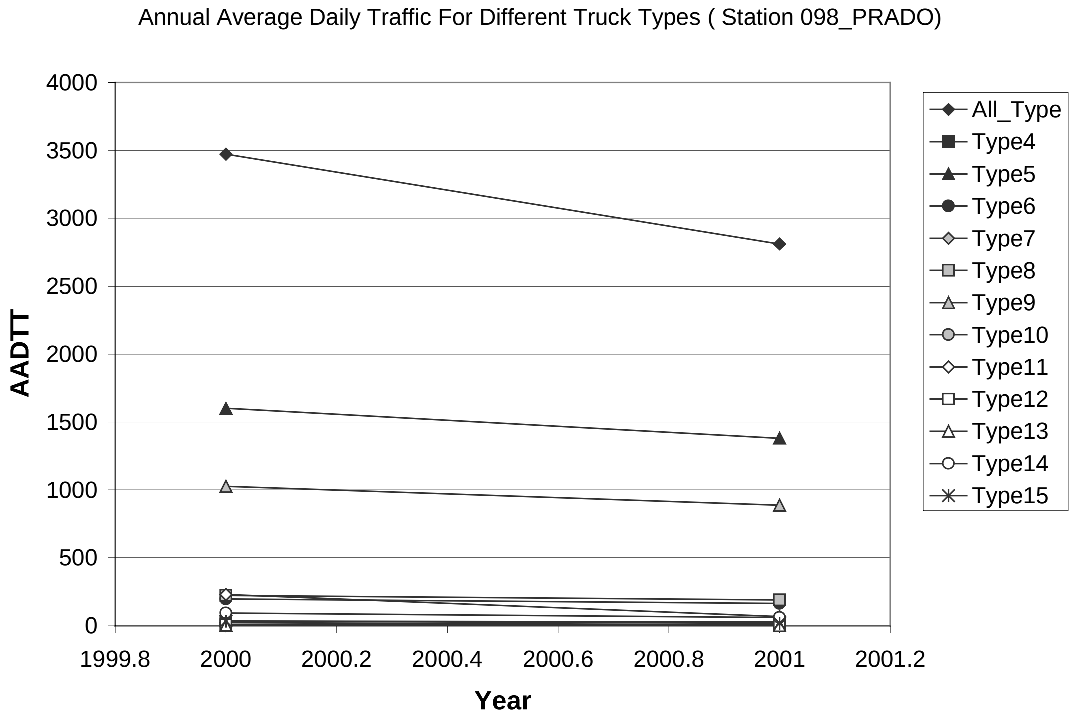

Annual Average Daily Traffic For Different Truck Types ( Station 097_CHINO)
AADTT
3000
2500
2000
1500
1000
500
0
1999.8
2000
2000.2
2000.4
2000.6
2000.8
2001
2001.2
Year
All_Type
Type4
Type5
Type6
Type7
Type8
Type9
Type10
Type11
Type12
Type13
Type14
Type15

## STATION 98 PRADO

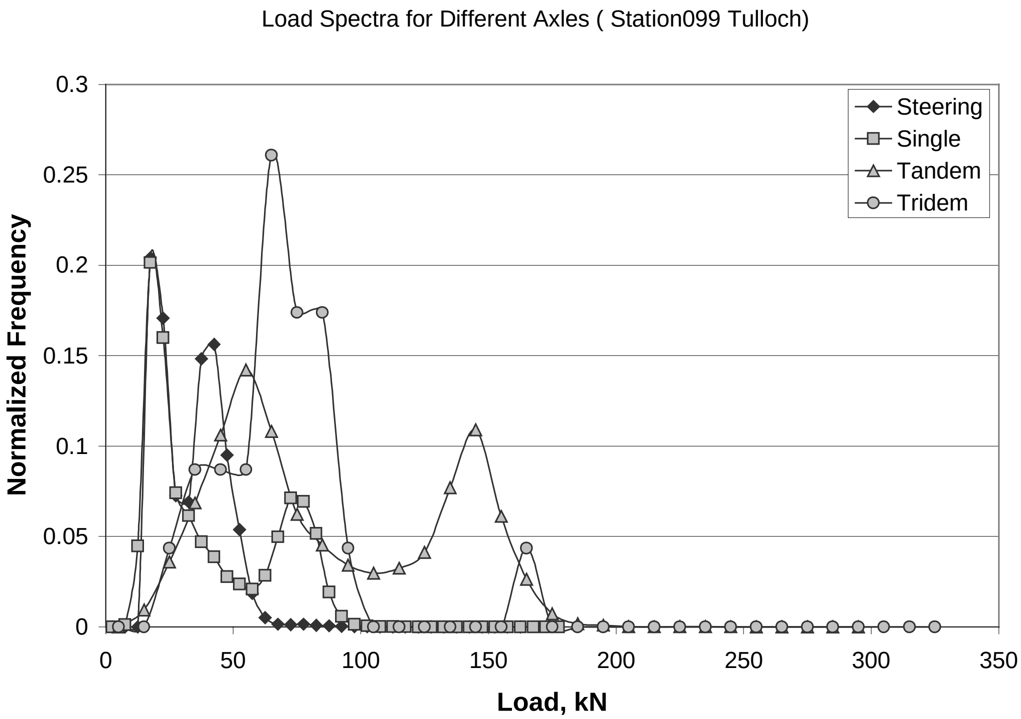



## Average Annual Daily Traffic for Different Truck Types

| Year | Truck Type | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **All** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **11** | **12** | **13** | **14** | **15** |
| 2000 | 3472 | 34 | 1600 | 197 | 22 | 223 | 1026 | 5 | 229 | 7 | 3 | 94 | 33 |
| 2001 | 2811 | 28 | 1381 | 164 | 6 | 191 | 886 | 5 | 67 | 4 | 2 | 59 | 19 |


Annual Average Daily Traffic For Different Truck Types ( Station 098_PRADO)
4000
3500
3000
2500
2000
1500
1000
500
0
AADTT
1999.8
2000
2000.2
2000.4
2000.6
2000.8
2001
2001.2
Year
All_Type
Type4
Type5
Type6
Type7
Type8
Type9
Type10
Type11
Type12
Type13
Type14
Type15

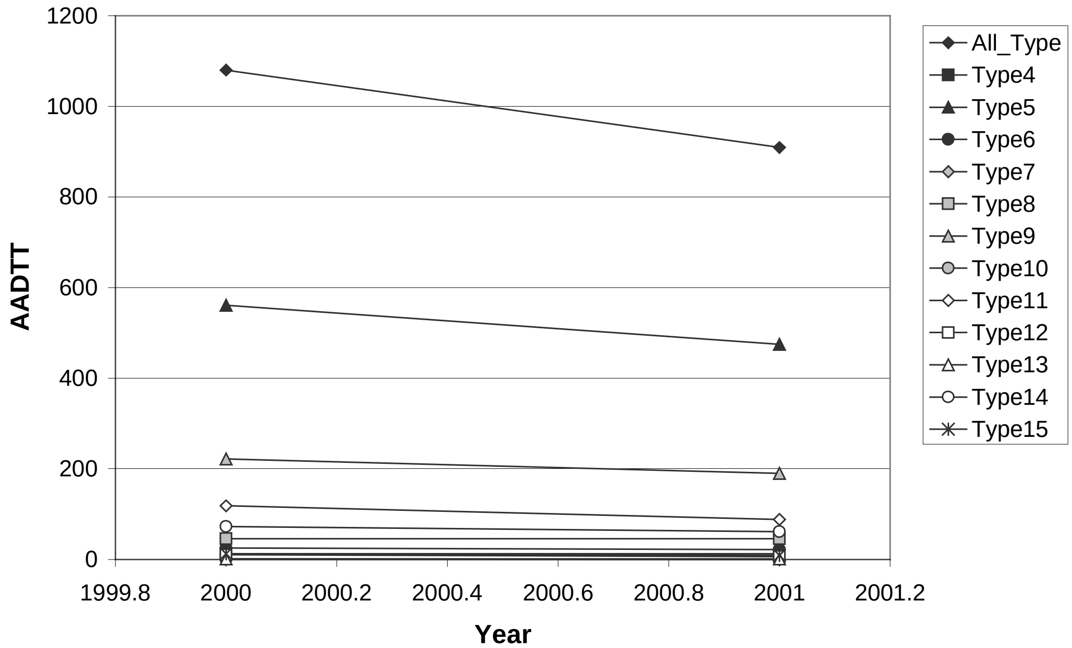
## STATION 99 TULLOCH



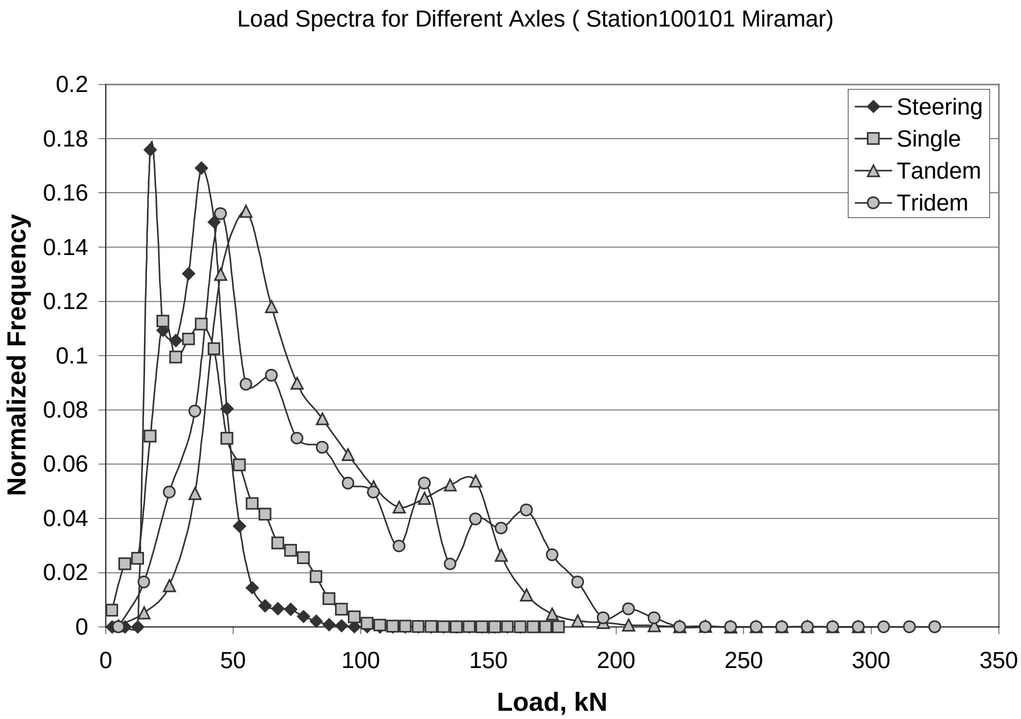

### Average Annual Daily Traffic for Different Truck Types

| Year | Truck Type | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | All | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| 2000 | 1080 | 12 | 561 | 25 | 1 | 46 | 222 | 0 | 118 | 10 | 1 | 73 | 12 |
| 2001 | 909 | 12 | 475 | 22 | 0 | 46 | 190 | 0 | 88 | 6 | 1 | 61 | 9 |

Annual Average Daily Traffic For Different Truck Types ( Station 099_TULLOCH)

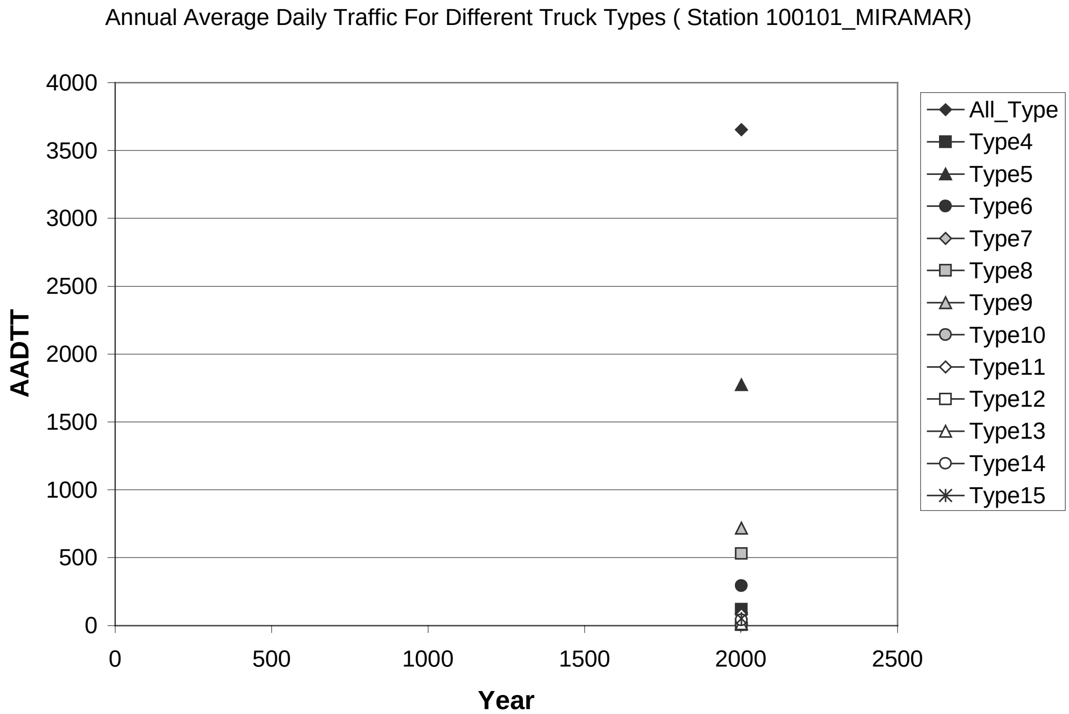


## STATIONS 100&101 MIRAMAR




## Average Annual Daily Traffic for Different Truck Types

| Year | Truck Type | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **All** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **11** | **12** | **13** | **14** | **15** |
| 2001 | 3653 | 119 | 1775 | 293 | 20 | 530 | 718 | 5 | 81 | 6 | 13 | 42 | 51 |


Annual Average Daily Traffic For Different Truck Types ( Station 100101_MIRAMAR)
AADTT
4000
3500
3000
2500
2000
1500
1000
500
0
0
500
1000
1500
2000
2500
Year
All_Type
Type4
Type5
Type6
Type7
Type8
Type9
Type10
Type11
Type12
Type13
Type14
Type15

# APPENDIX I:

# TRUCK LANEWISE DISTRIBUTION FACTOR AND

# ESALs PER TRUCK TYPE FOR ALL STATIONS

## Truck Lanewise Distribution Factor

| Station | Location | Southbound | | | | | | Northbound | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Lane1 | Lane2 | Lane3 | Lane4 | Lane5 | Lane6 | Lane1 | Lane2 | Lane3 | Lane4 | Lane5 | Lane6 |
| 1 | Lodi | 0.0938 | 0.9062 | - | - | - | - | 0.1004 | 0.8996 | - | - | - | - |
| 2 | Redding | 0.0716 | 0.9284 | - | - | - | - | 0.0723 | 0.9277 | - | - | - | - |
| 6 | Newhall | - | - | - | - | - | - | 0.5798 | 0.4202 | - | - | - | - |
| 7 | Santa Nella | 0.0795 | 0.9205 | - | - | - | - | 0.0781 | 0.9219 | - | - | - | - |
| 8&9 | Conejo | - | - | 0.2653 | 0.7347 | - | - | - | - | 0.1594 | 0.8406 | - | - |
| 10 | Fresno | - | 0.3533 | 0.6467 | - | - | - | - | 0.3506 | 0.6494 | - | - | - |
| 12&13 | Van Nuys | - | - | 0.5669 | 0.4331 | - | - | - | - | 0.5815 | 0.4185 | - | - |
| 15&16 | Irvine | - | - | - | 0.125 | 0.5036 | 0.3714 | - | - | - | 0.2021 | 0.4874 | 0.3105 |
| 17&18 | Hayward | - | 0.0688 | 0.532 | 0.3992 | - | - | - | 0.0489 | 0.4897 | 0.4613 | - | - |
| 20 | Loleta | 0.0552 | 0.9448 | - | - | - | - | 0.0493 | 0.9507 | - | - | - | - |
| 27 | Tracy | 0.0543 | 0.9457 | - | - | - | - | 0.0595 | 0.9405 | - | - | - | - |
| 28 | Macdoel | 1 | | - | - | - | - | 1 | - | - | - | - | - |
| 29 | Arco | | 0.4645 | 0.5355 | - | - | - | - | - | - | - | - | - |
| 30 | Mt. Shasta | 0.0612 | 0.9388 | - | - | - | - | 0.0696 | 0.9304 | - | - | - | - |
| 31&32 | Woodside | - | 0.0653 | 0.3282 | 0.6065 | - | - | - | 0.0856 | 0.3032 | 0.6113 | - | - |
| 33&34 | Burlingame | - | 0.1035 | 0.5001 | 0.3964 | - | - | - | 0.0812 | 0.5326 | 0.3862 | - | - |
| 37&38 | Elsinore | - | 0.1586 | 0.8407 | 0.0007 | - | - | - | 0.1614 | 0.838 | 0.0006 | - | - |
| 40 | Cochella | 0.0763 | 0.9237 | - | - | - | - | 0.0415 | 0.9585 | - | - | - | - |
| 46 | Galt | 0.102 | 0.898 | - | - | - | - | 0.1226 | 0.8774 | - | - | - | - |
| 47&48 | Castaic | - | 0.0229 | 0.3789 | 0.5982 | - | - | - | 0.0224 | 0.2741 | 0.7035 | - | - |
| 49 | Auburn | 0.1226 | 0.8774 | - | - | - | - | 0.1476 | 0.8524 | - | - | - | - |
| 50 | Elmira | 0.0853 | 0.9147 | - | - | - | - | 0.0507 | 0.9493 | - | - | - | - |
| 55&56 | Dublin | - | 0.0734 | 0.3779 | 0.5487 | - | - | - | 0.019 | 0.2135 | 0.7675 | - | - |
| 59&60 | LA-710 | - | 0.0423 | 0.6461 | 0.3116 | - | - | 0.0569 | 0.5259 | 0.2946 | 0.1227 | - | - |
| 63 | Murrieta | 0.1196 | 0.8804 | - | - | - | - | 0.0773 | 0.9227 | - | - | - | - |
| 66 | Calico | 0.1301 | 0.8699 | - | - | - | - | 0.0901 | 0.9099 | - | - | - | - |
| 67 | Devore | 0.0695 | 0.9305 | - | - | - | - | 0.1028 | 0.8972 | - | - | - | - |
| 68 | Gilroy | - | 0.1437 | 0.8563 | - | - | - | - | 0.206 | 0.794 | - | - | - |
| 69&70 | Fontana | - | 0.0448 | 0.4013 | 0.5538 | - | - | - | 0.0456 | 0.4638 | 0.4906 | - | - |
| 73 | Stockdale | 0.0913 | 0.9087 | - | - | - | - | 0.0788 | 0.9212 | - | - | - | - |
| 74 | Bakersfield | - | 0.3039 | 0.6961 | - | - | - | - | 0.3146 | 0.6854 | - | - | - |
| 75 | Keyes | - | 0.2436 | 0.7564 | - | - | - | - | 0.2697 | 0.7303 | - | - | - |
| 76 | Templeton | 0.157 | 0.843 | - | - | - | - | 0.1532 | 0.8468 | - | - | - | - |
| 81 | Positas | - | 0.4666 | 0.5334 | - | - | - | - | 0.5066 | 0.4934 | - | - | - |
| 84&85 | Leucadia | - | 0.0705 | 0.484 | 0.4454 | - | - | - | 0.0794 | 0.4869 | 0.4336 | - | - |
| 86 | Ukiah | 0.0563 | 0.9437 | | | - | - | 0.0565 | 0.9435 | - | - | - | - |
| 87&88 | Balboa | - | 0.1011 | 0.2836 | 0.6154 | - | - | - | 0.0628 | 0.4164 | 0.5209 | - | - |
| 89&90 | Dekema | - | 0.0696 | 0.4174 | 0.513 | - | - | - | 0.0653 | 0.3957 | 0.539 | - | - |
| 91&92 | Poggi | - | 0.0708 | 0.449 | 0.4802 | - | - | - | 0.0588 | 0.4629 | 0.4782 | - | - |
| 93 | Lakeport | 0.0803 | 0.9197 | - | - | - | - | 0.0797 | 0.9203 | - | - | - | - |
| 94 | Greenfield | 0.0663 | 0.9337 | - | - | - | - | 0.0694 | 0.9306 | - | - | - | - |

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 97 | Chino | 0.1927 | 0.8073 | - | - | - | - | 0.1736 | 0.8264 | - | - | - | - |
| 98 | Prado | - | 0.1201 | 0.8799 | - | - | - | - | 0.1328 | 0.8672 | - | - | - |
| 100&101 | Miramar | - | - | 0.2316 | 0.518 | 0.2504 | - | - | 0.0513 | 0.2985 | 0.6503 | - | - |

| **Station** | **Location** | **Westbound** | | | | | | **Eastbound** | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | **Lane1** | **Lane2** | **Lane3** | **Lane4** | **Lane5** | **Lane6** | **Lane1** | **Lane2** | **Lane3** | **Lane4** | **Lane5** | **Lane6** |
| 3&4 | Antelope | - | - | 0.4843 | 0.5157 | - | - | - | - | 0.3265 | 0.6735 | - | - |
| 5 | Indio | 0.085 | 0.915 | - | - | - | - | 0.107 | 0.893 | - | - | - | - |
| 11 | Sonoma | 0.077 | 0.923 | - | - | - | - | 0.15 | 0.85 | - | - | - | - |
| 14 | San Marcos | - | 0.3068 | 0.6932 | - | - | - | - | 0.3264 | 0.6736 | - | - | - |
| 21 | Mojave | 0.0659 | 0.9341 | - | - | - | - | 0.0708 | 0.9292 | - | - | - | - |
| 22 | Jeffrey | 0.0305 | 0.9695 | - | - | - | - | 0.0297 | 0.9703 | - | - | - | - |
| 23 | El Centro | 0.1075 | 0.8925 | - | - | - | - | 0.0765 | 0.9235 | - | - | - | - |
| 24 | Napa | 1 | - | - | - | - | - | 1 | - | - | - | - | - |
| 25 | Newberry | 0.0709 | 0.9291 | - | - | - | - | 0.0946 | 0.9054 | - | - | - | - |
| 26 | Cameron | 0.0454 | 0.9546 | - | - | - | - | 0.0739 | 0.9261 | - | - | - | - |
| 35 | Pacheco | 0.0522 | 0.9478 | - | - | - | - | 0.0631 | 0.9369 | - | - | - | - |
| 36 | Los Banos | 0.0623 | 0.9377 | - | - | - | - | 0.1289 | 0.8711 | - | - | - | - |
| 39 | Redlands | 0.1154 | 0.8846 | - | - | - | - | 0.1824 | 0.8176 | - | - | - | - |
| 41&42 | Vacaville | 0.047 | 0.213 | 0.5176 | 0.2224 | - | - | 0.04 | 0.2537 | 0.7001 | 0.0062 | - | - |
| 43 | Cholame | 1 | - | - | - | - | - | 1 | - | - | - | - | - |
| 44 | Banta | 0.0956 | 0.9044 | - | - | - | - | 0.103 | 0.897 | - | - | - | - |
| 45 | Carbona | 0.0654 | 0.9346 | - | - | - | - | 0.0638 | 0.9362 | - | - | - | - |
| 51&52 | WestSac | - | 0.1117 | 0.5587 | 0.3296 | - | - | - | 0.1049 | 0.5212 | 0.3739 | - | - |
| 57&58 | Pinole | - | 0.0322 | 0.3566 | 0.6113 | - | - | - | 0.0551 | 0.4816 | 0.4634 | - | - |
| 61&62 | Peralta | - | 0.0628 | 0.3644 | 0.5728 | - | - | - | 0.0354 | 0.3284 | 0.6362 | - | - |
| 64 | Foster City | - | 0.3195 | 0.6805 | - | - | - | - | 0.4889 | 0.5111 | - | - | - |
| 65 | Piru | 0.0732 | 0.9268 | - | - | - | - | 0.0858 | 0.9142 | - | - | - | - |
| 71 | Hinkley | 0.0726 | 0.9274 | - | - | - | - | 0.0599 | 0.9401 | - | - | - | - |
| 72 | Bowman | - | 0.2373 | 0.7627 | - | - | - | - | 0.2492 | 0.7508 | - | - | - |
| 77&78 | Colton | - | 0.036 | 0.3807 | 0.5833 | - | - | - | 0.0426 | 0.3666 | 0.5909 | - | - |
| 79&80 | Artesia | - | 0.0388 | 0.3631 | 0.5981 | - | - | - | 0.0356 | 0.3637 | 0.6007 | - | - |
| 82&83 | Glendora | - | 0.0354 | 0.3683 | 0.5963 | - | - | - | 0.0273 | 0.3366 | 0.6361 | - | - |
| 95&96 | Ontario | 0.0542 | 0.5047 | 0.4411 | - | - | - | 0.0608 | 0.5249 | 0.4143 | - | - | - |
| 99 | Tulloch | 0.1097 | 0.8903 | - | - | - | - | 0.0912 | 0.9088 | - | - | - | - |

## ESAL/1000 Trucks

| Station | Location | Truck Type | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | **All** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **11** | **12** | **13** | **14** | **15** |
| 1 | Lodi | 1238.4 | 611.9 | 150.4 | 388.6 | 999.5 | 423.7 | 1520.1 | 920.4 | 1672.1 | 701.8 | 6032 | 1691.7 | 648.9 |
| 2 | Redding | 1374 | 745 | 128.8 | 410.6 | 2066 | 354.4 | 1750.6 | 956.3 | 1501.8 | 712 | 2383.1 | 1704.7 | 641.8 |
| 3&4 | Antelope | 778.7 | 611.1 | 110.4 | 381.7 | 2313.3 | 336 | 1100.7 | 769.1 | 1194.9 | 612.7 | 3569.2 | 1143.7 | 654.3 |
| 5 | Indio | 1229.6 | 821.4 | 148.9 | 460.2 | 1384.2 | 331.7 | 1408.3 | 940.8 | 1495.7 | 612.4 | 6920.4 | 1838.3 | 486.3 |
| 6 | Newhall | 983.2 | 472.4 | 240.5 | 597.4 | 2363.1 | 482.6 | 1186.2 | 770.8 | 1469.9 | 860.9 | 2360.2 | 1751.8 | 643.7 |
| 7 | Santa Nella | 1339.3 | 924.5 | 217.3 | 1179.9 | 1981.7 | 526.4 | 1573 | 933.9 | 1412.9 | 563.3 | 8973.1 | 1749.5 | 729.9 |
| 8&9 | Conejo | 497.4 | 356.2 | 154.1 | 433.2 | 2731.9 | 310.9 | 721.1 | 572.5 | 938.3 | 513.8 | 3799 | 1367 | 610.9 |
| 10 | Fresno | 1061.2 | 1239.7 | 210.6 | 1194.4 | 3074 | 723.2 | 1282.9 | 782 | 1539.5 | 759.8 | 2276.7 | 1620.1 | 983.6 |
| 11 | Sonoma | 920.6 | 637.7 | 192.5 | 550.2 | 2435 | 309.7 | 1234.5 | 887.1 | 1841.1 | 653.4 | 6629.4 | 1798.9 | 506 |
| 12&13 | Van Nuys | 665.7 | 774.5 | 192.5 | 846.9 | 1915.4 | 391.4 | 1008.3 | 720.2 | 1445.8 | 610.4 | 1992.2 | 1513.6 | 684.1 |
| 14 | San Marcos | 545.6 | 949.7 | 161 | 730.1 | 2433.7 | 437.3 | 751.3 | 543.8 | 1384.3 | 697.6 | 1775.7 | 1354.8 | 586.2 |
| 15&16 | Irvine | 648.7 | 955 | 181.6 | 883.4 | 3266.3 | 583.3 | 941.3 | 702.3 | 1040 | 519.3 | 2460.9 | 1757.8 | 577 |
| 17&18 | Hayward | 506.5 | 581.5 | 182.6 | 451.7 | 2029.6 | 412.6 | 766.3 | 612.8 | 971.2 | 453.6 | 3746.7 | 1418 | 615.4 |
| 20 | Loleta | 1171.8 | 851.5 | 191.8 | 454.2 | 2888.7 | 461.2 | 2087.7 | 897.3 | 1731.3 | 669.1 | 6077.9 | 2354.2 | 389.4 |
| 21 | Mojave | 1197 | 413.7 | 139 | 444.2 | 705 | 297 | 1385.8 | 876.2 | 1414.3 | 544.9 | 5423.4 | 1266.2 | 443.1 |
| 22 | Jeffrey | 725.7 | 428.8 | 111.9 | 347.8 | 2119.6 | 301.8 | 933.5 | 835.9 | 1273 | 495.8 | 4894 | 1326.2 | 482.1 |
| 23 | El Centro | 787.3 | 370.1 | 164 | 321.8 | 2422 | 322.5 | 994.7 | 920 | 1295.2 | 685.6 | 4497.3 | 1607.1 | 355.7 |
| 24 | Napa | 584.5 | 627.1 | 145.5 | 529.8 | 2965 | 375.6 | 958.5 | 699.5 | 1410.6 | 449.4 | 2217.6 | 1359.7 | 324.6 |
| 25 | Newberry | 1464.4 | 675 | 112.4 | 641.9 | 1553.9 | 275.3 | 1632.4 | 1114.4 | 1940.8 | 1068.5 | 4503.5 | 1492.8 | 479.4 |
| 26 | Cameron | 656.8 | 460.1 | 174.8 | 641.7 | 1189.3 | 343.8 | 906.9 | 896.5 | 1061.2 | 480.3 | 5157.5 | 1215.7 | 305.7 |
| 27 | Tracy | 942.3 | 461.4 | 113.7 | 401 | 1111.4 | 271.1 | 1084.4 | 662.6 | 1069.9 | 504.4 | 5527 | 1191.3 | 497.6 |
| 28 | Macdoel | 1447 | 495.3 | 162.2 | 401.6 | 577.5 | 604.9 | 1688.9 | 909.2 | 1754 | 926.8 | 2559.6 | 1710.2 | 1045.2 |
| 29 | Arco | 1189.9 | 694.2 | 145.7 | 424.9 | 2492.3 | 428.3 | 1449.8 | 808.1 | 2090.6 | 839.4 | 4571.2 | 1281.8 | 992.7 |
| 30 | Mt. Shasta | 1374.4 | 552.4 | 174.4 | 338.5 | 699.3 | 435.9 | 1694.6 | 950.4 | 1290.7 | 722.4 | 2754.2 | 1608.7 | 882.1 |
| 31&32 | Woodside | 335.4 | 631.7 | 111.4 | 597.5 | 1815.6 | 292.5 | 676.4 | 683.1 | 974.1 | 450.8 | 8024.6 | 1129.3 | 300.4 |
| 33&34 | Burlingame | 456.9 | 696 | 171.6 | 603 | 3373.3 | 500.3 | 866.2 | 793.8 | 1097.3 | 469.8 | 4019.5 | 1509.7 | 629.9 |
| 35 | Pacheco | 907 | 557.9 | 152.5 | 777.3 | 302.6 | 418.1 | 1048.7 | 791.7 | 1240.1 | 545.9 | 3869.2 | 1222.9 | 537 |
| 36 | Los Banos | 726.2 | 549.1 | 200 | 818.5 | 1992.6 | 418.4 | 936.7 | 668.2 | 1214.2 | 437 | 6919.2 | 1288.4 | 354.7 |
| 37&38 | Elsinore | 683.6 | 521.5 | 178.3 | 466.8 | 2721.4 | 362.9 | 858.3 | 623.7 | 1338.9 | 602.3 | 4605.1 | 1414.6 | 521.5 |
| 39 | Redlands | 887.4 | 690.9 | 210.9 | 662.8 | 2917.8 | 633.4 | 1336.5 | 1462.6 | 1978.2 | 1093.5 | 5859.7 | 1665.3 | 600.8 |
| 40 | Cochella | 991.2 | 399 | 171.5 | 382 | 2510.8 | 375.3 | 1027.7 | 791.5 | 1488.3 | 840.4 | 3142.7 | 1391.2 | 372.8 |
| 41&42 | Vacaville | 650.1 | 729.2 | 125.1 | 459.2 | 2438.4 | 454.9 | 941.2 | 639.1 | 1227.8 | 590.5 | 3156.5 | 1251.5 | 959.4 |
| 43 | Cholame | 998 | 559 | 118.7 | 449.2 | 942.6 | 423.3 | 1227.5 | 806.1 | 1396.1 | 630.7 | 8526.6 | 1488.4 | 400 |
| 44 | Banta | 651.6 | 660.3 | 173.8 | 433.4 | 1491.7 | 412.7 | 822.3 | 652.2 | 1046.5 | 488.8 | 3267.8 | 1073.1 | 441.3 |
| 45 | Carbona | 836.4 | 575.4 | 147.9 | 531.1 | 1251.1 | 395.4 | 1041.1 | 793 | 934 | 426.9 | 8743.7 | 1211.3 | 707.1 |
| 46 | Galt | 838.9 | 566.7 | 145.1 | 468.5 | 1726.4 | 475.9 | 1132.6 | 726.3 | 1271.8 | 732.2 | 1266.3 | 1327.7 | 695 |
| 47&48 | Castaic | 924.9 | 389.1 | 158.8 | 503.5 | 2111.2 | 417.4 | 1092.2 | 707.5 | 1116.2 | 501.6 | 4210.6 | 1375 | 625.5 |
| 49 | Auburn | 358.4 | 317.8 | 128.8 | 485.1 | 2945.3 | 284.5 | 734 | 916.3 | 836.9 | 416.3 | 3280.4 | 1243.7 | 349.5 |
| 50 | Elmira | 1118 | 771.3 | 120.8 | 474.3 | 2445 | 458.7 | 1394.9 | 975.9 | 1702.9 | 734.7 | 3872.1 | 1669.9 | 1211.2 |
| 51&52 | WestSac | 581.4 | 601.1 | 135.1 | 340.6 | 2082.5 | 375.5 | 770.5 | 551.9 | 1196.3 | 498.1 | 5203.6 | 1024 | 1640.9 |

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 55&56 | Dublin | 678.8 | 712.4 | 163.6 | 616.3 | 2838.7 | 557.6 | 977.6 | 765.9 | 1616.3 | 556.8 | 7862.2 | 1528.6 | 918.1 |
| 57&58 | Pinole | 633.9 | 933.6 | 194.3 | 677 | 1777.3 | 435.9 | 931.1 | 738.9 | 897.2 | 453.7 | 3257.1 | 1391 | 505.8 |
| 59&60 | LA-710 | 713.8 | 649 | 153 | 212.8 | 2754.8 | 482.7 | 902.1 | 792.2 | 1789.8 | 716.8 | 2433.4 | 1559.1 | 920.6 |
| 61&62 | Peralta | 664.9 | 510.2 | 127.9 | 317.5 | 2677.3 | 419.5 | 762.2 | 524.7 | 1456.3 | 742.3 | 1508.1 | 1290.7 | 669.5 |
| 63 | Murrieta | 569.4 | 469.2 | 155.2 | 630.8 | 2566 | 332.6 | 843.5 | 609 | 1435 | 687.9 | 5125.7 | 1436.4 | 296.6 |
| 64 | Foster City | 506.6 | 718.3 | 138.6 | 685 | 2955.4 | 468.2 | 977.4 | 994.8 | 1586.2 | 534.1 | 1009.1 | 1589 | 1619.9 |
| 65 | Piru | 760 | 562.8 | 112 | 425.6 | 1136.6 | 422.8 | 942.4 | 882.8 | 1321.2 | 794 | 1798.2 | 1131.1 | 605.3 |
| 66 | Calico | 1136 | 770 | 117.9 | 567 | 1216.4 | 724.3 | 1400.8 | 921.4 | 1803.1 | 684.3 | 6406.2 | 1528 | 615.5 |
| 67 | Devore | 848.6 | 514.1 | 104.2 | 387.6 | 2068.3 | 417.7 | 1113 | 919.6 | 1504.7 | 699.7 | 2397.9 | 1383.8 | 479.9 |
| 68 | Gilroy | 668 | 614 | 135.7 | 409.7 | 2615.6 | 567.5 | 860.9 | 716.8 | 1257.1 | 542.9 | 5694.5 | 1435.1 | 973.6 |
| 69&70 | Fontana | 973 | 664 | 122.3 | 472.5 | 2799.4 | 438.3 | 1154 | 774.4 | 1572.2 | 715.8 | 3505.5 | 1360.5 | 622.5 |
| 71 | Hinkley | 1467 | 740.8 | 100.7 | 469.2 | 1441.4 | 444.8 | 1698.2 | 1018.8 | 1779.5 | 695.9 | 6223.1 | 1612.4 | 532.6 |
| 72 | Bowman | 1111.4 | 1037.3 | 110.5 | 650 | 2543.8 | 485.3 | 1484.9 | 1042.3 | 1427.5 | 669.7 | 3332.4 | 1468 | 949 |
| 73 | Stockdale | 1099.1 | 739.4 | 143.7 | 388.3 | 2564.5 | 543.3 | 1250.2 | 808.1 | 1422.7 | 636.8 | 7032.9 | 1766.8 | 704.2 |
| 74 | Bakersfield | 843.5 | 564.4 | 168.8 | 378.4 | 2608.9 | 662.9 | 948.3 | 541 | 1398.5 | 613.8 | 3282 | 1180 | 849.4 |
| 75 | Keyes | 992.3 | 617.9 | 164.7 | 345.6 | 2437 | 494.5 | 1207.2 | 685.8 | 1605.1 | 694.5 | 1954.4 | 1443.5 | 677.9 |
| 76 | Templeton | 671 | 1000.6 | 110.3 | 600.8 | 2649.2 | 508.1 | 1059.7 | 1038.8 | 1653.4 | 704.6 | 2749.2 | 1635.6 | 622 |
| 77&78 | Colton | 774.2 | 656.9 | 189.6 | 280.9 | 2662.6 | 497.1 | 1010.4 | 824.9 | 1374 | 650.4 | 6066.8 | 1503.1 | 567 |
| 79&80 | Artesia | 529.8 | 615.5 | 187.2 | 361.9 | 2353.4 | 451.3 | 768.5 | 660.8 | 1482.4 | 595 | 4048.1 | 1431.1 | 724.8 |
| 81 | Positas | 579.2 | 644.4 | 229.1 | 563.5 | 1907.1 | 351 | 823.5 | 535.9 | 1167.3 | 556.9 | 3147.4 | 1459.9 | 447.5 |
| 82&83 | Glendora | 745.1 | 549.9 | 149.6 | 443.2 | 2128.2 | 404.6 | 979.2 | 683.3 | 1299.2 | 526.6 | 6572 | 1171.7 | 451 |
| 84&85 | Leucadia | 501.2 | 529.5 | 152.4 | 445.8 | 2427.6 | 399 | 695.1 | 546.9 | 1091.1 | 530 | 3008.4 | 1439.6 | 588.7 |
| 86 | Ukiah | 936 | 1170 | 130.4 | 789 | 3201.5 | 487.5 | 1763.9 | 1233.2 | 1797.3 | 887.6 | 3719.1 | 1974.5 | 2498.9 |
| 87&88 | Balboa | 546 | 690.5 | 103 | 755.3 | 2820.1 | 498.2 | 1068 | 872.9 | 1807.5 | 626 | 9987 | 1618.6 | 944.7 |
| 89&90 | Dekema | 702.5 | 830.4 | 179.6 | 758.4 | 3591.5 | 614.5 | 1123.6 | 888.8 | 1590.5 | 1004.6 | 5825.6 | 1930.6 | 1526.5 |
| 91&92 | Poggi | 635.5 | 709.6 | 158.3 | 539.9 | 3075 | 528.9 | 1005.8 | 758.3 | 1330.1 | 1014.5 | 9908 | 1750.4 | 566.3 |
| 93 | Lakeport | 459.4 | 744 | 129.2 | 524 | 1870.7 | 410 | 1052.8 | 973.3 | 1293.1 | 785.2 | 4268.1 | 1335.1 | 506.9 |
| 94 | Greenfield | 810.6 | 725.9 | 108.7 | 417.3 | 2266.7 | 617.7 | 1148.1 | 1137.9 | 1060.5 | 511.9 | 1027.1 | 1219.3 | 556.1 |
| 95&96 | Ontario | 735.2 | 541.3 | 165 | 325.5 | 1906.6 | 569.1 | 931.1 | 1051.4 | 1337.4 | 686.2 | 1770.5 | 1488.4 | 871.5 |
| 97 | Chino | 615.9 | 480.1 | 130.7 | 403.7 | 2896.4 | 398.3 | 846.1 | 595.9 | 1330.1 | 599.2 | 8281.1 | 1308.6 | 374.2 |
| 98 | Prado | 572.1 | 787.1 | 133.3 | 526.4 | 2456.8 | 394.2 | 1023.4 | 816.7 | 1573.9 | 536.1 | 5330.2 | 1480.4 | 730.1 |
| 99 | Tulloch | 666.2 | 1124 | 81.8 | 584.8 | 2176.4 | 395.8 | 1224.9 | 425.7 | 1958 | 1222.8 | 3359.8 | 1459.3 | 1034.8 |
| 100&101 | Miramar | 438.7 | 655.5 | 150.4 | 727.5 | 2299.3 | 394.4 | 803.2 | 565.7 | 1059.3 | 347 | 4122.6 | 1086.7 | 459.7 |