Assessment Report for
Florida, SPS Experiment 5

Visit date: December 4, 2003

List of Tables

List of Figures

1 Executive Summary

A visit was made to the Florida SPS-5 site on December 4, 2003 for the purpose of conducting an assessment of the WIM system located on US Route 1, located 4.5 miles north of State Route 706. The LTPP lane is the driving lane in the southern direction and is identified as lane number 4 in the WIM controller. This site is conditionally recommended for a site validation.

The site is instrumented with Kistler Quartz weighing sensors. The WIM system utilizes a PAT America DAW-190 WIM Controller. All of the WIM system components are in working order.

Sufficient data was collected to provide a Sheet 16 for classification verification at this site. There are two-percent unclassified vehicles. This is the limiting percentage defined as the criteria for research data. Class 5s had an error rate of 35 % exceeding the threshold of 2% of matches missed for truck classes. The classification verification needs to be repeated during the next assessment or validation whether or not the algorithm is modified. The agency is aware and is currently working on the classification issue.

The pavement condition is satisfactory for conducting a performance evaluation. The WIM index was exceeded at three locations none of which are thought to have a significant impact on equipment performance as they are at the rightmost edge of the lane. There were no distresses observed that would influence truck motions significantly.

A review of the speed information collected on-site and provided prior to the visit indicates that the range of truck speeds to be covered during an evaluation is 45 to 55 mph. The posted speed limit is 55 mph.

This site has 10 years of classification data and 9 years of weight data. Based on available information and review of the data submitted through last year, this site still needs 5 years of weight data to meet the need for 5 years of research quality data. This site does not have validation information as of the June 2003 upload.

2 Corrective Actions Recommended

No repair of system equipment is required at this time.

A correction to the system classification algorithm needs to be performed to circumvent type 5 vehicles being classified as Class 3 vehicles. This can be achieved by reducing the minimum axle spacing of Class 5 vehicles, decreasing the maximum axle spacing of Class 3 vehicles and including weight characteristics in the classification process for these two vehicle types. The agency is aware of this problem and is taking steps to correct it. A date for the corrections of this system has not been provided.

Since the values above the threshold are in the right wheel path in the extreme right side of the lane, grinding can be considered as a potential remediation option.

The November 1996 classification data consists of only Class 13 vehicles and should probably be removed from the database due to its irregularity.

Due to the dominance of Class 5 vehicles in the fleet mix, and essentially no Class 9s at this site, data evaluation characteristics based on Class 5 vehicles should be considered for future data reviews. The determination of the typical values however should be held pending resolution of the classification algorithm issues.

3 Equipment inspection and diagnostics

The site is instrumented with Kistler Quartz weighing sensors, installed in a staggered configuration, 16 feet apart. A 6-foot by 6-foot loop sensor is installed between the quartz sensors for vehicle presence detection. The WIM system utilizes a PAT America DAW-190 WIM Controller for signal processing, data storage, user interface and remote operation. All of the WIM system components are in working order.

A complete electrical check of all support service components including the solar power equipment and telephone service was performed. All support equipment is operating properly.

An electronic check of all WIM components was performed. All in-road sensors and WIM controller components are working properly.

A visual inspection of all system components, including in-road sensors, cabinet, pull boxes, service mast, solar panels and conduit as well as the telephone service components was conducted. All components are in excellent physical condition.

4 Classification Verification with test truck recommendations

The agency uses of the FHWA 13-bin classification scheme.

A sample of 3 hours of data was collected at the site. Video was taken at the site to provide ground truth for the evaluation. Based on a 100 percent sample it was determined that there are 0 percent unknown vehicles and 2 percent unclassified vehicles. The unclassified vehicle was a Class 15.

The second check is the ability of the algorithm to correctly distinguish between truck classes with no more than 2% errors in such classifications. The following are the error rates by class:

Table 1 Error rates for Truck Classification

Class	Error rate	Class	Error rate	Class	Error rate
4	N/A	5	35	6	0
7	N/A				
8	0	9	0	10	N/A
11	N/A	12	N/A	13	N/A

The equipment is identifying many Class 5s as Class 3s.

A review of the site data both collected on site and previously submitted by the agency indicated that Class 5sconstitute more than 60 percent of the truck population. Based on this information in addition to the air-suspension 3S2, the second vehicle used for evaluation should be a Class 5. Agency provided data indicates the two loading peaks for Class 5s are around 8,000 and 16,000 pounds.

Due to the length of the truck turn-around no additional vehicles are required.

5 Profile Evaluation

The WIM site is a section of pavement that is 305 meters long with the WIM scale located at 274.5 meters from the beginning of the test section. An ICC profiler was used to collect longitudinal profiles of the test section with a sampling interval of 25 millimeters. The Long Range Index (LRI) incorporates the pavement profile starting 25.8 m prior to the scale and ending 3.2 m after the scale in the direction of travel. The short Range Index (SRI) incorporates a shorter section of pavement profile beginning 2.7 m prior to the WIM scale and ending 0.5 m after the scale.

Profile data collected at the SPS WIM location by Fugro BRE Inc. on November 12, 2003 was processed through the LTPP SPS WIM Index software. This WIM scale is installed on an asphalt concrete pavement. The results are shown in Table 2.

A total of 7 profiler passes were conducted over the WIM site. Since the issuance of the LTPP directive on collection of longitudinal profile data for SPS WIM section, the requirements have been a minimum of 3 passes in the center of the lane and one shifted to each side. For this site the RSC has done 4 passes at the center of the lane, 1 pass shifted to the left side of the lane, and 2 passes shifted to the right side of the lane. Shifts to the sides of the lanes were made such that data were collected as close to the lane edges as was safely possible. For each profiler pass, profiles were recorded under the left wheel path (LWP), and the right wheel path (RWP).

Table 2 shows the computed index values for all the 7 profiler passes for this WIM site. The average values over the passes at each path were also calculated when three or more passes are completed. These are shown in the right most column of the table. Values above the index limits are presented in italics.

Table 2 Long Range Index (LRI) and Short Range Index (SRI)

Profiler Passes			**Pass 1**	**Pass 2**	**Pass 3**	**Pass 4**	**Ave.**
Center	LWP	LRI (m/km)	0.636	0.638	0.519	0.576	**0.592**
		SRI (m/km)	0.402	0.437	0.225	0.371	**0.359**
	RWP	LRI (m/km)	0.567	0.615	0.626	0.681	**0.622**
		SRI (m/km)	0.480	0.600	0.572	0.627	**0.570**
Left Shift	LWP	LRI (m/km)	0.555				
		SRI (m/km)	0.454				
	RWP	LRI (m/km)	0.509				
		SRI (m/km)	0.348				
Right Shift	LWP	LRI (m/km)	0.734	0.591			
		SRI (m/km)	0.638	0.416			
	RWP	LRI (m/km)	*0.806*	*0.866*			
		SRI (m/km)	*1.288*	0.618			

There are only3 locations at which the WIM Index value of 0.789 m/km is exceeded as can be seen in the table. When all values are less than 0.789 it is presumed unlikely that pavement conditions will significantly influence sensor output. Values above that level may or may not influence the reported weights and potentially vehicle spacings. Since the values above the threshold are in the right wheel path in the extreme right side of the lane, grinding could be considered as a potential remediation option.

6 Distress survey and any applicable photos

A visual inspection of the pavement 425 feet in advance of the WIM area and 75 feet following the WIM area was conducted. A prior installation of WIM components was found immediately following the present sensor installation. The distress to the pavement resulting from this has been repaired. No significant pavement distress that would affect the performance of the WIM scales was detected.

The pavement is in good condition with little or no distress. Figure 13-1 shows the condition of the pavement in the downstream direction and Figure 13-2 shows the condition of the pavement in the upstream direction.

7 Vehicle-pavement interaction discussion

There were no distresses observed that would influence truck motions significantly. There is no visible motion of trucks while approaching or leaving the sensor area.

Daylight cannot be seen between the tires indicating that the trucks are touching the sensors fully.

8 Speed data with speed range recommendations for evaluation

Based on the data provided by the State prior to the visit and collected on site the 15th and 85th percentile speeds for Class 5s are 50 and 55 mph respectively. The upper end of the range meets the posted speed limit. This range does not vary significantly for other truck classes. As a result the recommended speeds for test trucks in an evaluation are 45, 50 and 55 mph.

Measurements of speeds on-site indicated that the equipment is currently measuring speeds with a bias of 0.1 mph and an associated standard deviation of 0.6 mph.

The review of drive axle spacings for Class 9 vehicles or other tractor drive tandems could not be completed as there were only one Class 9 truck utilizing this site during the course of our visit.

9 Traffic Data review: Overall Quantity and Sufficiency

As of December 4, 2003 this site does not have at least 5 years of research quality data. Research quality data is defined to be at least 210 days in a year of data of known calibration meeting LTPP's precision requirements. The precision requirements are shown in Table 3. There is no calibration information for this site in the traffic database as of the June 2003 upload.

Table 3 Precision and Bias Requirements for Weight Data

Pooled Fund Site	95 Percent Confidence Limit of Error
Single Axles	± 20 percent
Axle groups	± 15 percent
Gross Vehicle Weight	± 10 percent
Vehicle Speed	±1 mph (2 kph)
Axle Spacing	± 0.5 ft (150 mm)

Data that has validation information available is reviewed in light of the patterns present in the two weeks immediately following a validation/calibration activity. A determination of research quality data is based on the consistency with the validation pattern. Data that follows consistent and rational patterns in the absence of calibration information may be considered nominally of research quality pending validation information with which to compare it. Data that is inconsistent with expected patterns and has no supporting validation information is not considered research quality.

The amount and coverage for the site is shown in Table 4. The value for months is a measure of the seasonal variation in the data. The indicator of coverage indicates whether day of week variation has been accounted for on an annual basis. As can be seen from the table only 1994, 1997, 1998, 2000 and 2001 have a sufficient quantity of classification data and 1998 and 1999 have a sufficient quantity of weight data to be considered complete years of data. In the absence of previously gathered validation information it can be seen that at least 5 years of research quality data are needed to meet the goal of a minimum of 5 years of research weight data.

Table 4 Amount of Traffic Data Available

Year	Classification Days	Months	Coverage	Weight Days	Months	Coverage
1991	32	3	Complete Week	14	2	Complete Week
1992	183	8	Complete Week	21	3	Complete Week
1993	N/A	N/A	N/A	7	2	Week Days and Weekend
1994	244	8	Complete Week	15	2	Complete Week
1995	57	2	Complete Week	N/A	N/A	N/A
1996	98	5	Complete Week	87	7	Complete Week
1997	280	11	Complete Week	21	3	Complete Week
1998	347	12	Complete Week	357	12	Complete Week
1999	257	9	Complete Week	270	9	Complete Week
2000	362	12	Complete Week	31	1	Complete Week
2001	355	12	Complete Week	N/A	N/A	N/A

To evaluate the consistency of the existing data and determine its probable quality a series of reports and graphs have been generated. They include the SPS Summary report, vehicle distribution graphs, GVW distributions both over all years and by month within years, average daily steering axle weights for Class 9 vehicles, and ESAL graphs.

9.1 SPS Summary Report

The overall report is the SPS Summary Report. This report uses sets of benchmark data based on calibration information or consistent, rational data patterns. The report shows the trend in some basic statistics at the site over time. It provides a numeric equivalent to the graphs typically run for the comparison evaluation process. It includes the number of days of data and statistics associated with Class 9 vehicles. They include the average volumes, average ESALs, the average steering axle weight and mean loaded and unloaded weight on a monthly basis. Class Days and Percent Class 9s are generated from classification data submissions. All other values come from the weight data submissions. Counts derived from weight data are available for all months. Steering axle and weight statistics are only present when that data was loaded through LTPP's new traffic analysis software, since it is the only software that calculates them. The data is separated into blocks that depend on when the site was validated. Where there is no validation record an initial time point has been picked at which continuous data exists and that data is used as the basis for comparison. Excluded months have no data.

Table 5 SPS Summary Report

Florida 0500

South Lane 1

Comparison Date Weight - 01-January-1991 Classification - 01-January-1991

Month-Year	Class Days	Percent Class 9s	Weight Days	Average No. Class 9s	Avg.ESALs Per Class 9	Average Class 9 Steering	Mean Loaded Weight	Mean Unloaded Weight
Comparison values		0.2		7		9,963	57,631	35,153
JUL 1991	18	0.3						
AUG 1991	3	0.2						
SEP 1991	11	0.3	7	37	1.00	9,921	57,889	31,323
DEC 1991			7	16	1.29	9,736	82,372	34,441
JAN 1992	18	0.2						
FEB 1992	12	0.2	7	14	1.55	10,486	78,467	31,122
MAR 1992	28	0.2						
APR 1992	27	0.2						
MAY 1992	28	0.2						
JUN 1992	27	0.2						
JUL 1992	24	0.3						
AUG 1992	19	0.3	7	15	0.91	9,729	62,260	31,981
NOV 1992			7	16	0.91	9,171	62,183	34,939
APR 1993			4	21	0.94	9,350	66,284	33,531
MAY 1993			3	12	1.45	9,833	71,180	33,820
MAR 1994			8	13	1.00	10,275	58,435	33,850
APR 1994			7	15	1.08	10,107	65,872	33,827
MAY 1994	31	0.2						
JUN 1994	30	0.2						
JUL 1994	31	0.2						
AUG 1994	31	0.3						
SEP 1994	29	0.2						
OCT 1994	31	0.5						
NOV 1994	30	0.2						
DEC 1994	31	0.2						
JAN 1995	31	0.2						
FEB 1995	26	0.2						
JAN 1996			7	13	1.09	9,750	64,815	25,256
APR 1996			7	8	0.83	9,907	58,225	30,664
JUL 1996	31	0.2	8	9	0.85	10,363	57,171	37,560
AUG 1996	26	0.1	28	7	0.85	9,850	57,623	36,215
SEP 1996	26	0.0	30		0.22	11,250	*	35,200
OCT 1996	12	0.1	5	8	1.24	9,800	72,042	
NOV 1996	3		2	14	1.00	9,475	60,009	35,100
JAN 1997	31	0.0	7	12	1.18	9,043	61,273	30,950
FEB 1997	24							
MAR 1997	4	0.0						
APR 1997	21	0.0						

MAY 1997			7	12	1.45	10,443	77,341	27,482
JUL 1997	29	0.2	7	9	1.07	9,850	76,844	35,900
AUG 1997	30	0.1						
SEP 1997	30	0.2						
OCT 1997	31	0.2						
NOV 1997	30	0.2						
DEC 1997	31	0.2						
JAN 1998	31	0.2	31	9	1.12	9,843	57,864	35,678
FEB 1998	28	0.1	28	8	1.15	10,111	57,226	37,177
MAR 1998	31	0.1	31	8	1.35	10,194	64,584	37,100
APR 1998	29	0.1	29	7	1.54	10,366	61,605	36,850
MAY 1998	31	0.1	31	5	1.20	10,283	65,139	37,245
JUN 1998	30	0.1	30	6	1.37	10,025	57,472	37,219
JUL 1998	29	0.1	29	4	1.36	10,738	57,484	35,660
AUG 1998	30	0.1	31	5	1.26	10,310	56,947	36,350
SEP 1998	25	0.1	29	6	1.62	10,220	57,796	36,183
OCT 1998	30	0.1	31	6	1.58	10,016	62,185	37,067
NOV 1998	25	0.1	29	4	1.18	10,306	58,011	27,000
DEC 1998	28	0.1	28	4	1.22	10,135	56,920	36,353
APR 1999	27	0.1	30	3	1.05	10,085	56,654	36,867
MAY 1999	30	0.0	31	2	1.74	9,740	57,062	35,920
JUN 1999	29	0.1	30	3	1.49	10,070	61,553	34,600
JUL 1999	30	0.0	31	2	0.68	9,040	57,006	36,764
AUG 1999	30	0.1	31	3	1.84	10,252	57,462	36,322
SEP 1999	29	0.1	30	2	1.48	9,665	56,700	36,088
OCT 1999	30	0.1	31	3	1.54	10,417	56,242	34,138
NOV 1999	28	0.1	30	4	1.20	10,352	57,304	34,878
DEC 1999	24	0.1	26	5	1.01	9,967	57,188	35,617
JAN 2000	31	0.0						
FEB 2000	28	0.0						
MAR 2000	31	0.0						
APR 2000	28	0.0						
MAY 2000	31	0.0	31	1	2.48	10,154	56,133	34,250
JUN 2000	29	0.0						
JUL 2000	31	0.0						
AUG 2000	31	0.0						
SEP 2000	30	0.0						
OCT 2000	31	0.0						
NOV 2000	30	0.0						
DEC 2000	31	0.0						
JAN 2001	31	0.0						
FEB 2001	28	0.0						
MAR 2001	31	0.0						
APR 2001	30	0.0						
MAY 2001	31	0.0						
JUN 2001	29	0.0						
JUL 2001	29							
AUG 2001	24	0.0						
SEP 2001	30	0.0						
OCT 2001	31	0.0						
NOV 2001	30	0.0						
DEC 2001	31	0.0						

* An entry under Mean Loaded Weight when data is present requires vehicles weighing 60,000 pounds or more.

As seen from Table 5, the number of Class 9s is very small in the classification data as well as the weight data. From the classification data it appears that the percent of Class 9s remained essentially stable all the years. Also, the percentage was similar to the comparison value set using March 1992 data. From the weight data, it appears that the number of Class 9s decreased as the years progressed. The average ESALs per Class 9 essentially remained stable till December 1999. However, it increased more than two fold in May 2000. The average steering axle weight was essentially stable for all the years of data. The mean loaded and unloaded weights tend to fluctuate within relatively narrow ranges.

9.2 Vehicle Distribution

The vehicle distribution graphs indicate whether the fleet mix is stable over time and any day of week or seasonal patterns that may exist. The vehicle distribution graphs contain two types of comparisons, one between data types and one over time. The between types comparison is represented by the two columns for every time unit present. The column on the left labeled with a 4 is for classification data. The right hand column of the pair is for weight data. Whether or not the data is equivalent is perhaps more important than the variation over time.

Figure 14-1 and Figure 14-2 show a by year pattern for classification data. From the graphs it appears that the average volume for Class 5s is stable from 1991 to 1997 but increased significantly from 1998 to 2000 and then decreased in 2001. The reason for this drastic variation is unknown. The volume of Class 8s was high from 1991 to 1995 but decreased substantially after as shown by the difference in volumes in Figure 14-5 and Figure 14-7. This variation is worth investigating. Class 13s were the only trucks reported in November 1996. (See Figure 14-6.) This is not considered rational. This month's data is recommended to be eliminated from the database.

Figure 14-3 shows the vehicle distribution by percentage for weight data. The figure shows that the percentage is variable over the years. There is a distinct shift in the proportion of Class 9s between the years prior to 1996 and those after that period. Figure 14-4 shows the vehicle distribution graph by average volume for weight data.

Figure 14-7 shows that the WIM equipment is reporting significantly fewer trucks compared to the classifier. From Figure 14-4 it appears that the average volumes of Class 5s almost double from 1998 to 2001 compared to the average volume from 1991 to 1993. The average volume of Class 5s was similar from 1991 to 1997. Figure 14-4 reflects representative volumes using the data from 1991 to 1993.

Figure 14-6 shows the vehicle distribution by month for the year 1996. From the graph it is shown that the Class 13s are higher compared to other classes. As discussed earlier, this data should be eliminated from the database.

Figure 14-7 shows the typical pattern for vehicle distribution by month by year for the data collected from the classifier versus the data collected by the WIM equipment. From the graph it is clear that the data collected from the classifier does not match the data collected by the WIM equipment. The WIM equipment is collecting significantly less data compared to the classifier. The data collected by the classifier also shows that there is seasonal variation in the vehicle distribution, which is not the same for the data collected by the WIM equipment. Note that the difference is essentially all in the Class 5 volumes. The issue of Class 5 versus Class 3 classification has been discussed previously and is a critical issue on a site where Class 5s are the dominant truck class.

Figure 14-8 shows the heavy truck vehicle distribution by month for the years 1992 and 2001. The figure shows that the Class 8 volumes decreased drastically over the years. The reason for this change is unknown at present. However, the data collected on site during the assessment suggests that the current volume of Class 8s is low.

9.3 GVW Distributions for Class 9s

The Class 9 GVW graph is a generally accepted way to evaluate loading data reported at a site. A typical graph has two peaks, one between 28,000 and 36,000 pounds and the other between 72,000 and 80,000 pounds. The first is the unloaded peak. The second, the loaded peak, reflects the legal weight limit for a 5-axle tractor-trailer vehicle on the interstate highway system. Additionally, it is expected that less than 3 percent of the trucks will be excessively light (less than 12,000 pounds) and less than 5 percent will be significantly overweight (in excess of 96,000 pounds). Data that falls outside of the expected conditions needs a record of validation to verify that the pattern is in fact correct for the location. Data meeting the expected patterns is not automatically considered to be of research quality, merely rational as bias in scale measurements may shift the peaks in the data from their true values.

The overall assessment of loading patterns is done using a Class 9 GVW graph by year over the available years. As seen from Figure 14-9 thru Figure 14-11 it is clear that there is a lot of variation in the data especially with the low volume of Class 9s utilizing this site. In view of that, assessments based on Class 9 loading distributions must be qualitative in nature. It should be noted that the unimodal distribution observed is not what is normally expected for the class.

To investigate any seasonal variations the Class 9 GVW distributions are graphed by month by year. There are insufficient Class 9s in any given month to produce enough information to discuss seasonality of loading.

9.4 Axle Distributions

GVW graphs were not available for 1996, 2000 and 2001. For 1996 distribution graphs for Class 9 vehicles had to be substituted. However, even the axle distribution graphs were not available for 2000 and 2001 due to small sample sizes. As can be seen in Figure 14-12 there is a lot of variation similar to the GVW distribution graph. Accordingly, no conclusions are made at present.

9.5 ESALs per year

Average ESALs for Class 9 vehicles are a very crude method of identifying loading shifts. Figure 14-13 shows the average Class 9 ESALs per month for this location. To remove the influence of changing pavement structure all ESAL values have been computed with and SN = 5 and a p_t of 2.5. Average ESALs per Class 9 are not used as an indicator of research quality data. From the graph it can be seen that the data is highly variable in part due to small sample sizes.

9.6 Average Daily Steering Axle Weight

A frequently used statistic for checking scale calibration and doing auto-calibration of WIM equipment is the weight of the front axle. This value is site specific and should be relatively constant particularly for loaded Class 9s (vehicles in excess of 60,000 lbs.). Typically when auto calibration is used this value either cycles repeatedly or with very large truck volumes results in an essentially straight line for the mean. As shown in Figure 14-14 there is a considerable in the two standard deviation limits of the daily steering axle weights. However, the average is essentially stable.

9.7 GVW Distributions for Class 5 Vehicles

Given the dominance of Class 5 vehicles in the weight data a GVW investigation was conducted for the class. Figure 14-15 through Figure 14-17 show how the loading has shifted over time. The most recently available data in the database (2000) has a pattern that does not match that of data received for the assessment. Where previous data peaked around 8,000 pounds the current data set has a significant peak at 16,000 pounds. This is in line with the data from the early 1990s.

The Class 5 GVW graphs were also used to investigate seasonality. The first year for which sufficient coverage existed was 1998. The graph in Figure 14-19 is essentially identical to all other months in the year. For the successive years, there is also the same minimal month-to-month variation. There would appear to be no seasonality in loads for this site.

10 Updated handout guide and Sheet 17

A copy of the handout has been included following page 24. It includes a current Sheet 17 with all applicable maps and photographs. There are no significant changes in the information provided.

11 Updated Sheet 18

A current Sheet 18 indicating the contact, conditions for assessments and evaluations has been attached following the updated handout guide.

12 Traffic Sheet 16(s) (Classification Verification only)

Sufficient classification information was collected between 10.20 a.m. and 1.30 p.m. on December 4, 2003 to complete a Sheet 16. A copy is attached.

13 Distress Photographs

Figure 13-1 Pavement Condition of 120500 in Downstream Direction

Figure 13-2 Pavement Condition of 120500 in Upstream Direction

14 Traffic Graphs

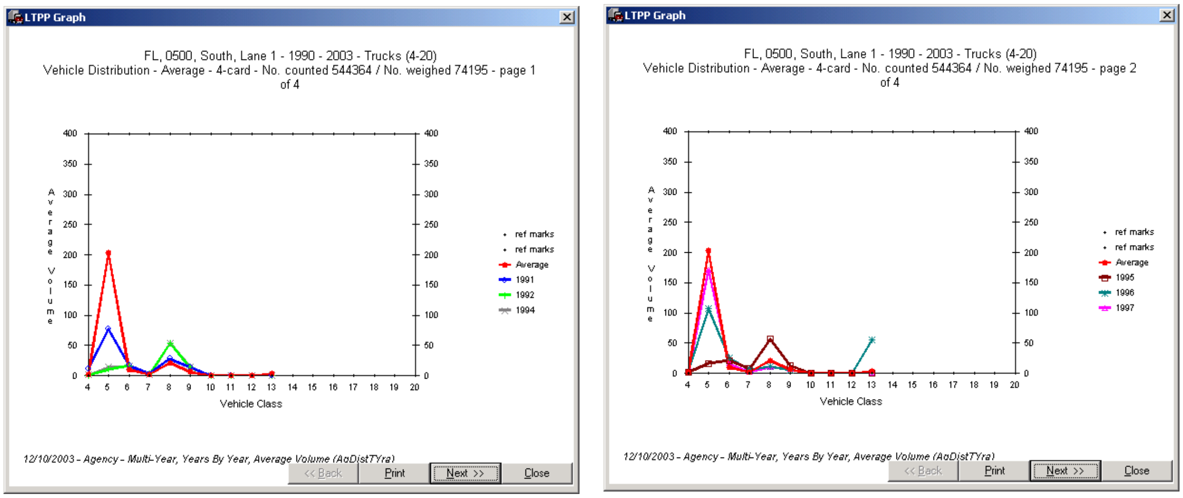


Figure 14-1 Vehicle Distribution Pattern by Average Volume for Classification Data – 1991 to 1997 at 120500

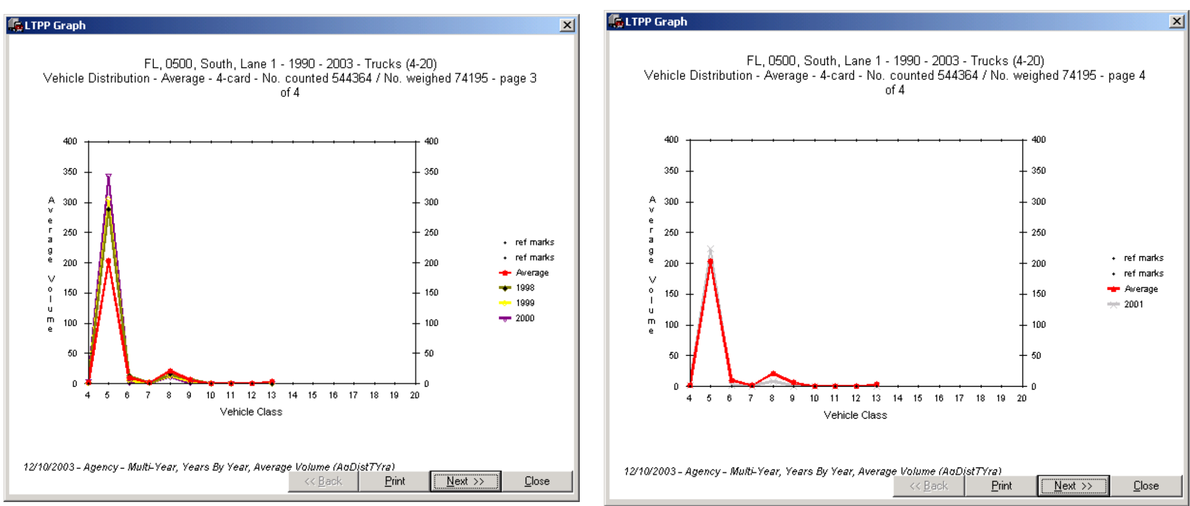


Figure 14-2 Vehicle Distribution Pattern by Average Volume for Classification Data – 1998 to 2000 at 120500

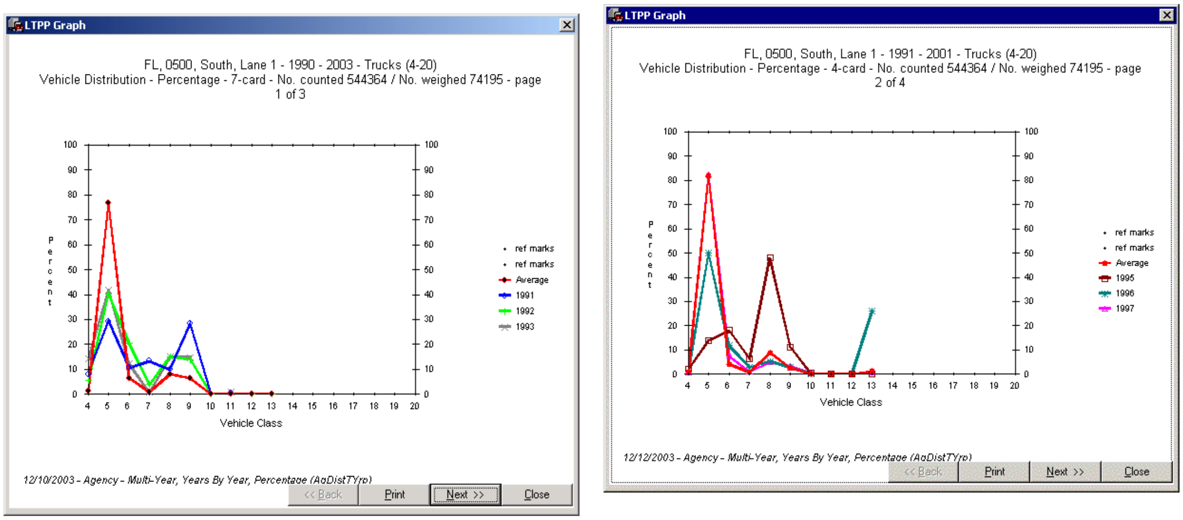


Figure 14-3 Vehicle Distribution Pattern by Percentage for Weight Data – 1991 to 1997 at 120500

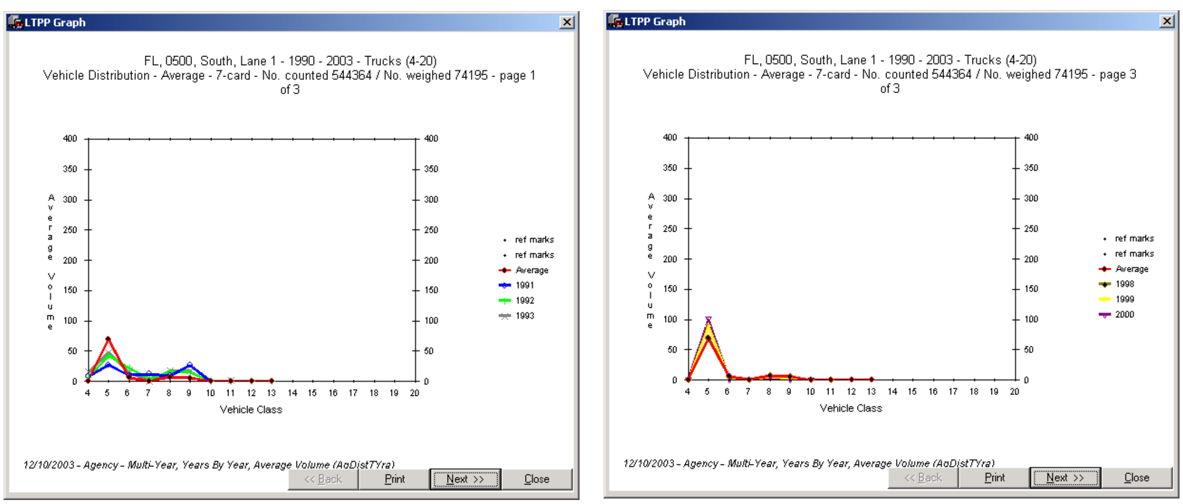


Figure 14-4 Vehicle Distribution Pattern by Average Volume for Weight Data – 1991 to 1993 and 1998 to 2001 at 120500

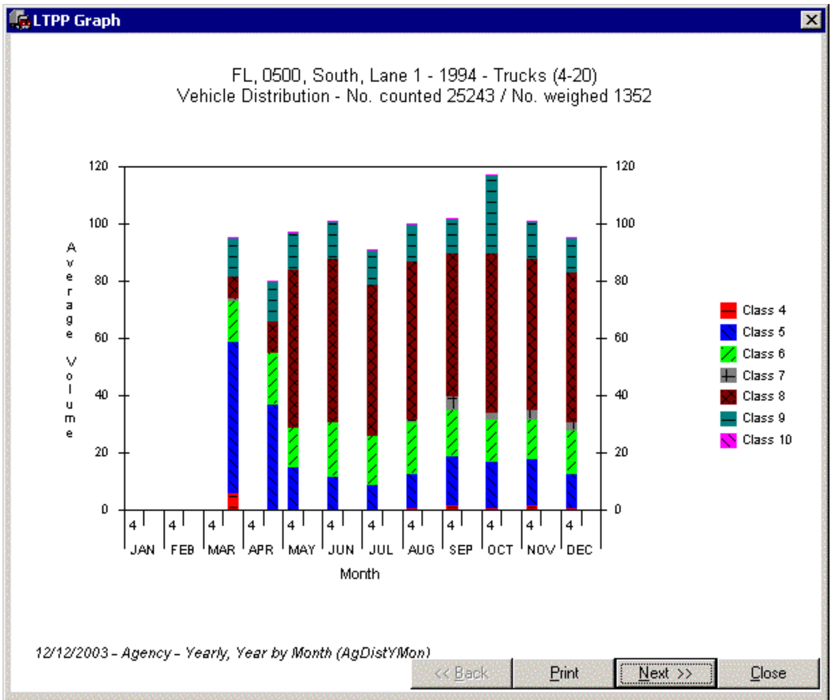


Figure 14-5 Vehicle Distribution by Month Typical of Year 1995 and Earlier at 120500

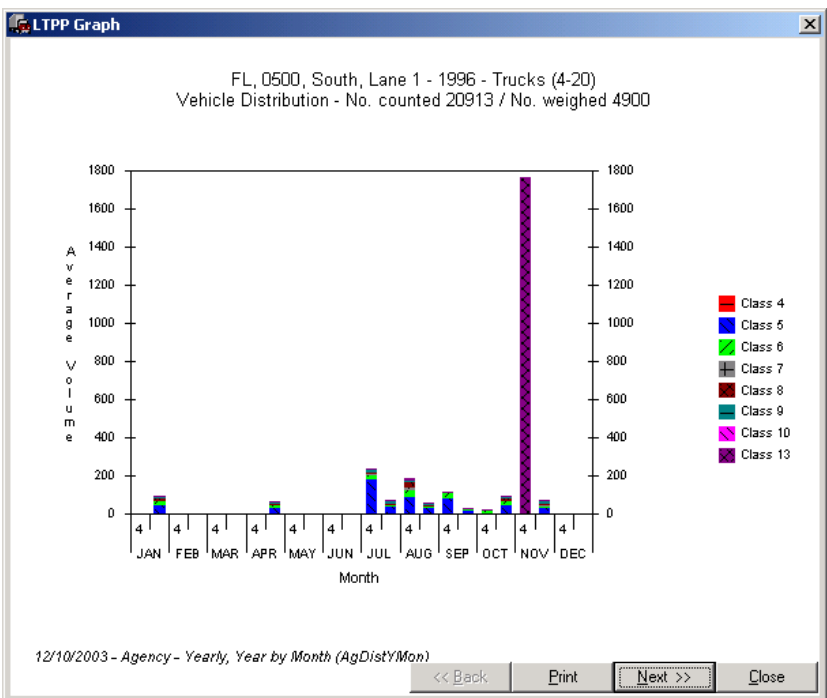


Figure 14-6 Vehicle Distribution by Month for the Year 1996 at 120500

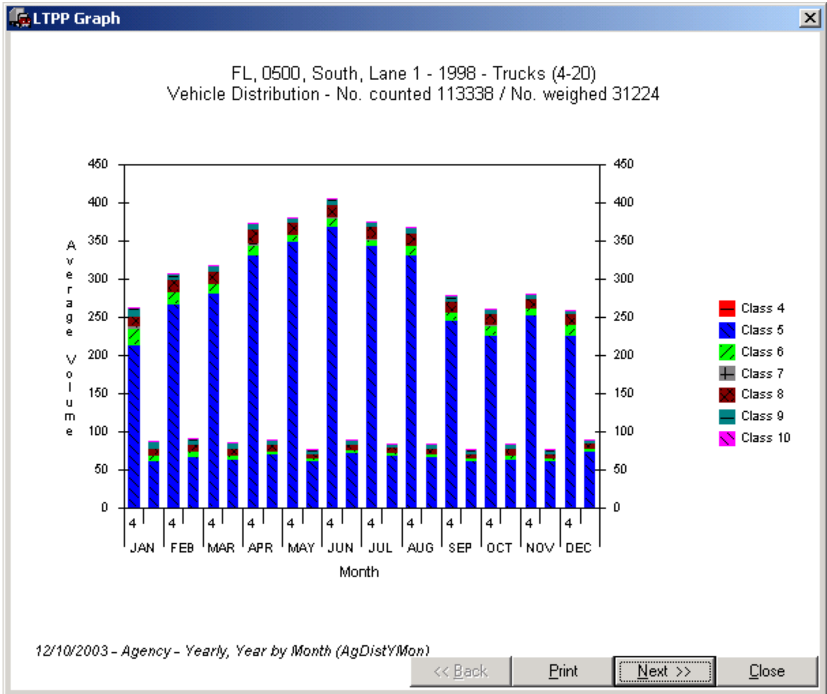


Figure 14-7 Vehicle Distribution by Month for the Year 1998 at 120500

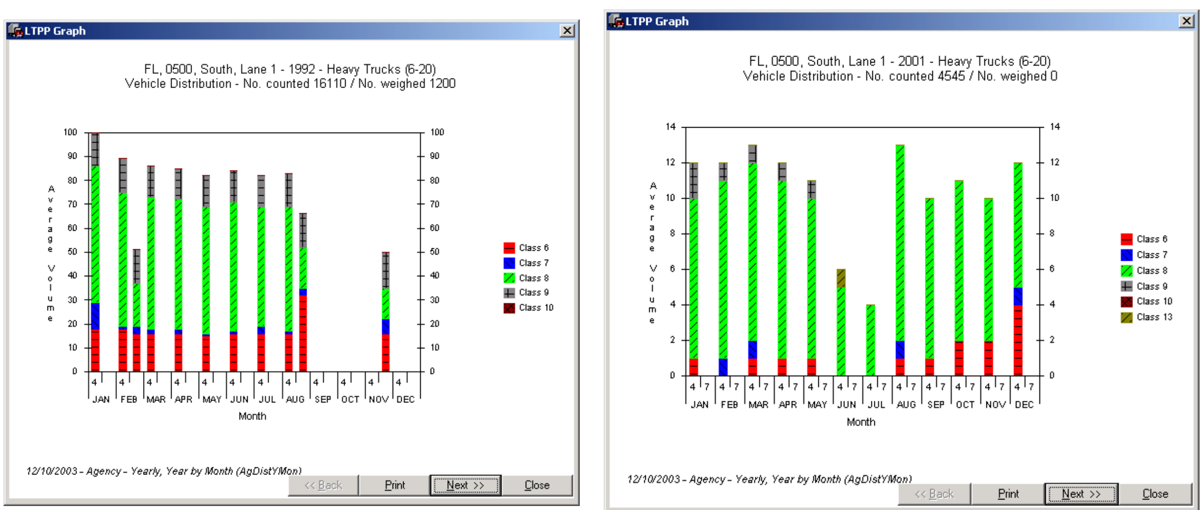


Figure 14-8 Vehicle Distribution by Month for the Year 1992 and 2001 at 120500

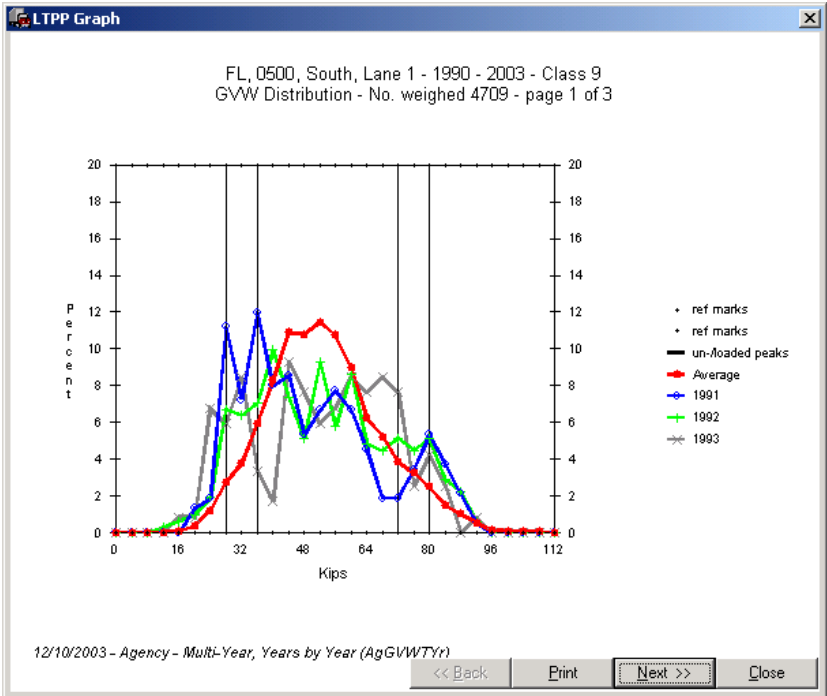


Figure 14-9 Class 9 GVW Distribution - 1991 to 1993 at 120500

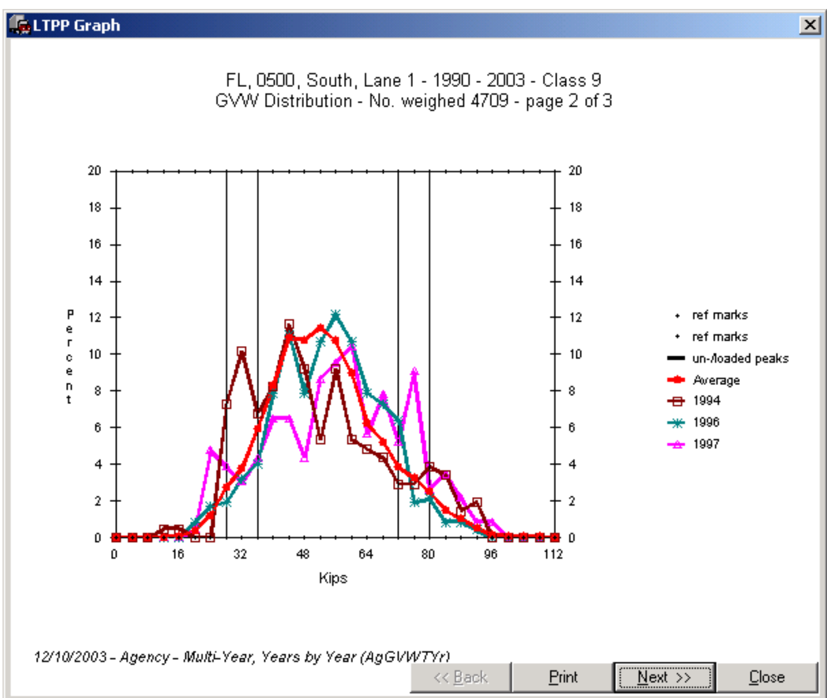


Figure 14-10 Class 9 GVW Distribution - 1994 to 1997 at 120500

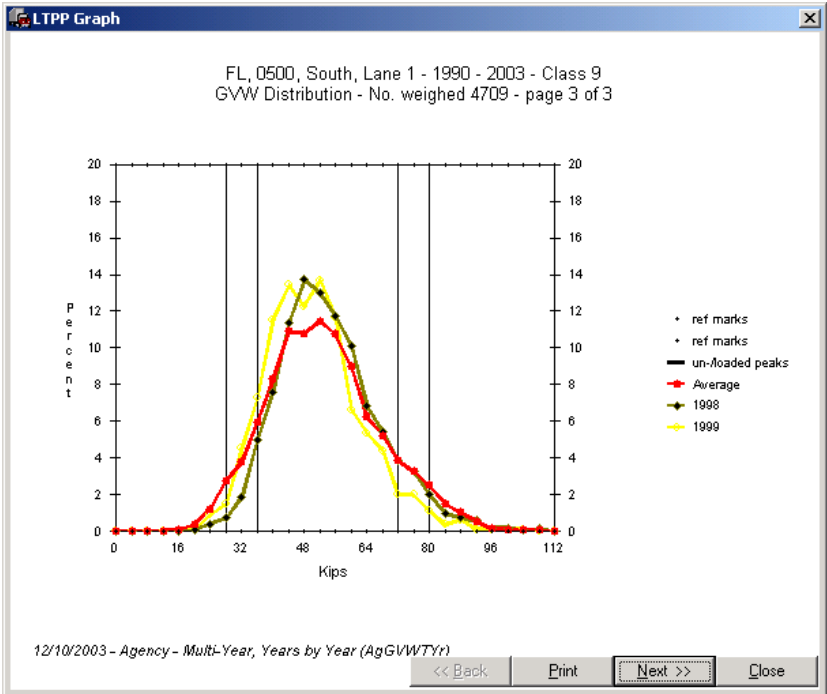


Figure 14-11 Class 9 GVW Distribution - 1998 to 2001 at 120500

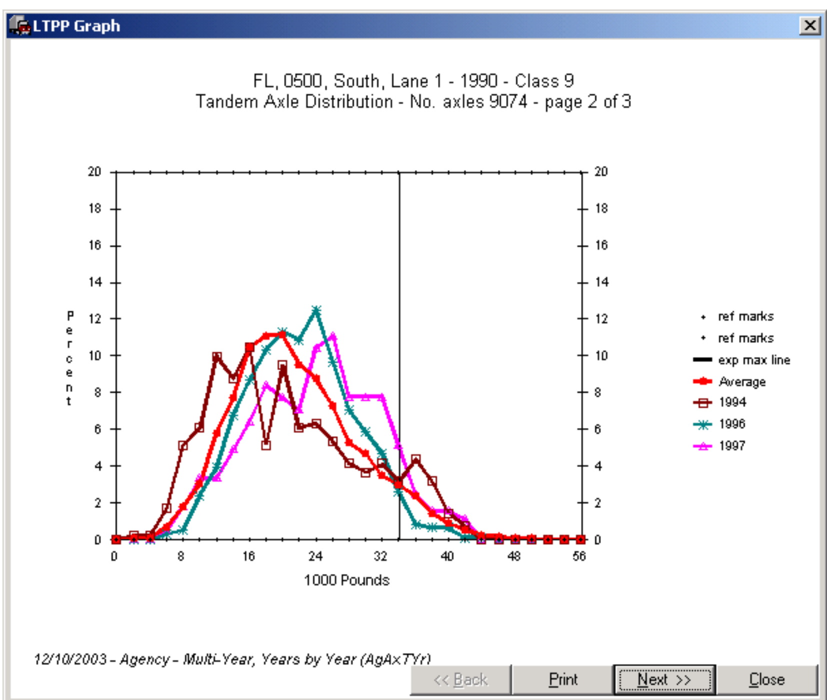


Figure 14-12 Class 9 Axle Distribution - 1994 – 1996 at 120500

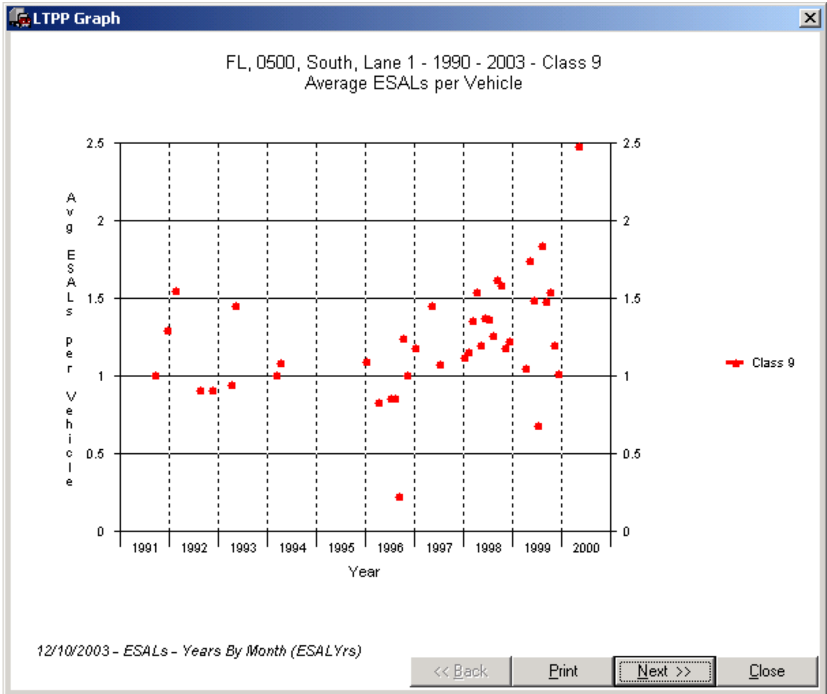


Figure 14-13 Average Class 9 ESALs for site from 1991 to 2000 at 120500

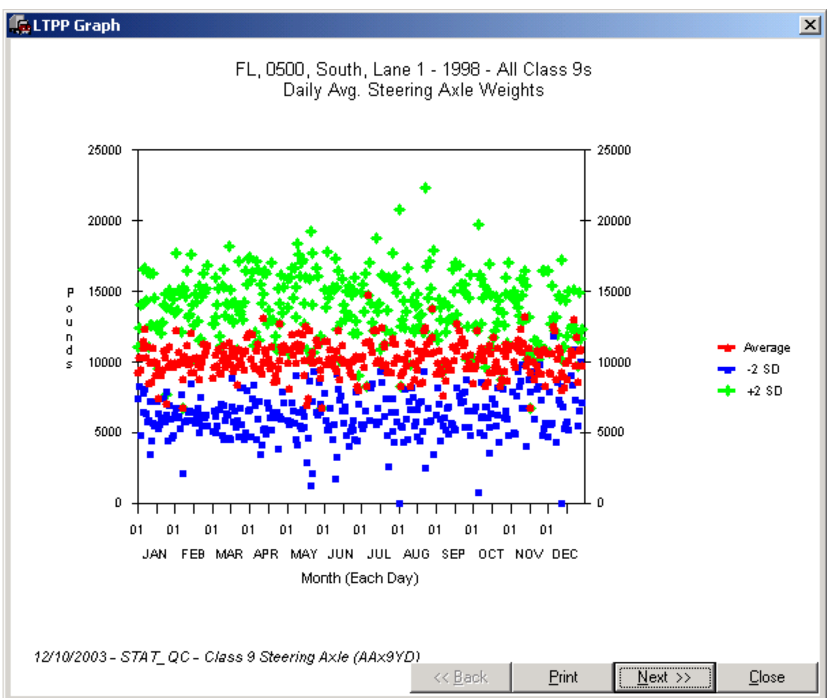


Figure 14-14 Average Daily Class 9 Steering Axle Weight – 1998 at 120500

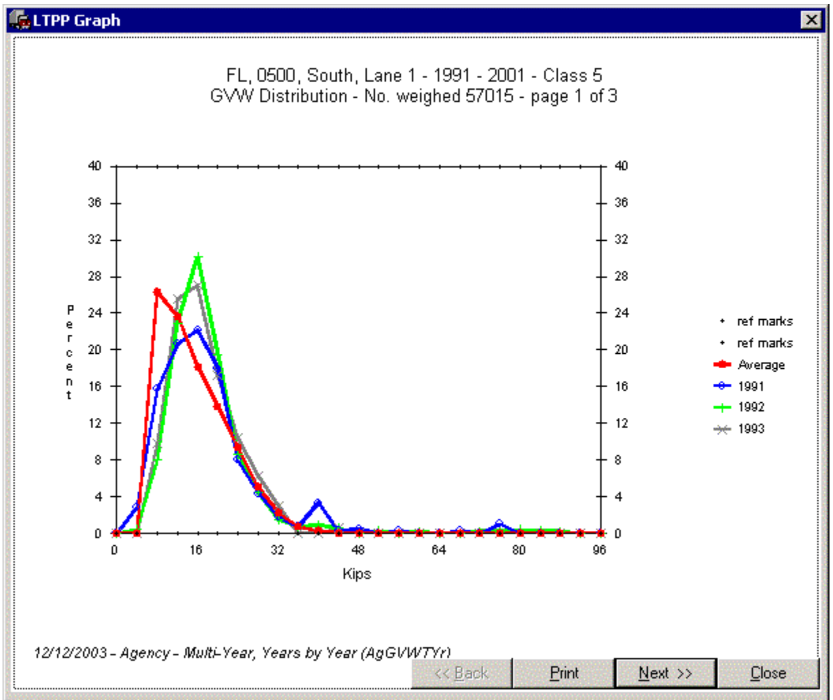


Figure 14-15 Class 5 GVW Distribution Year by Years 1991 to 1993 at 120500

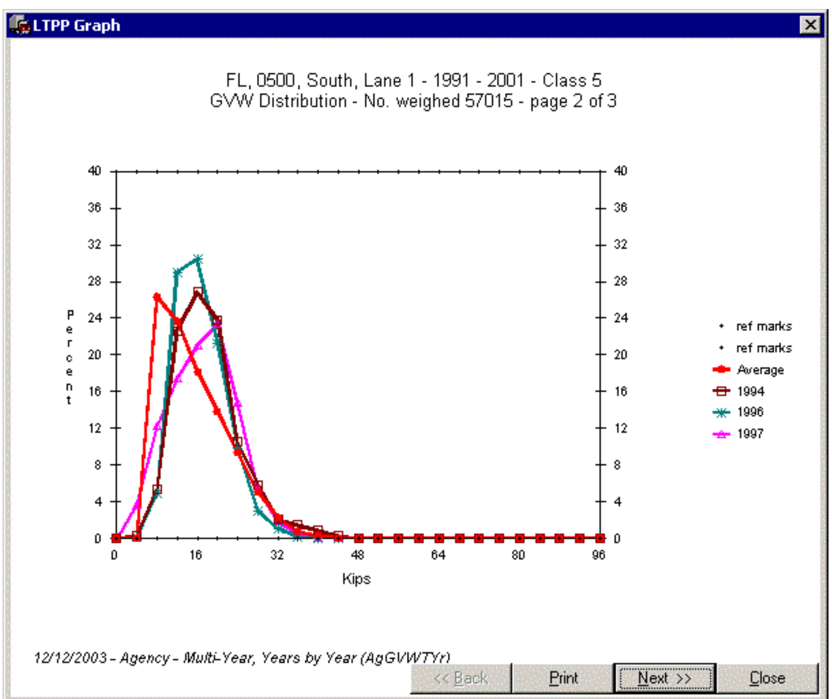


Figure 14-16 Class 5 GVW Distribution Year by Years 1994 to 1997 at 120500

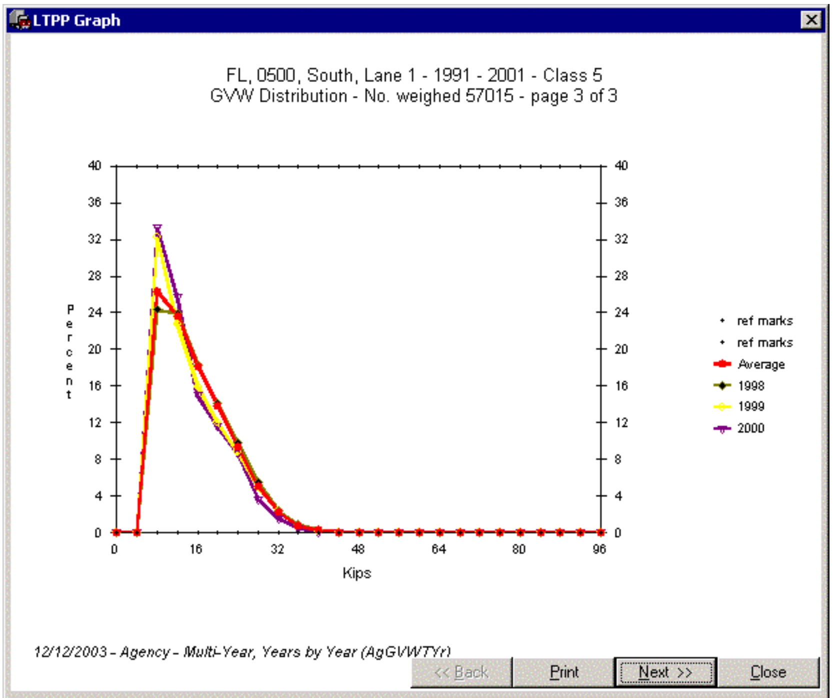


Figure 14-17 Class 5 GVW Distribution Year by Years 1998 to 2000 at 120500

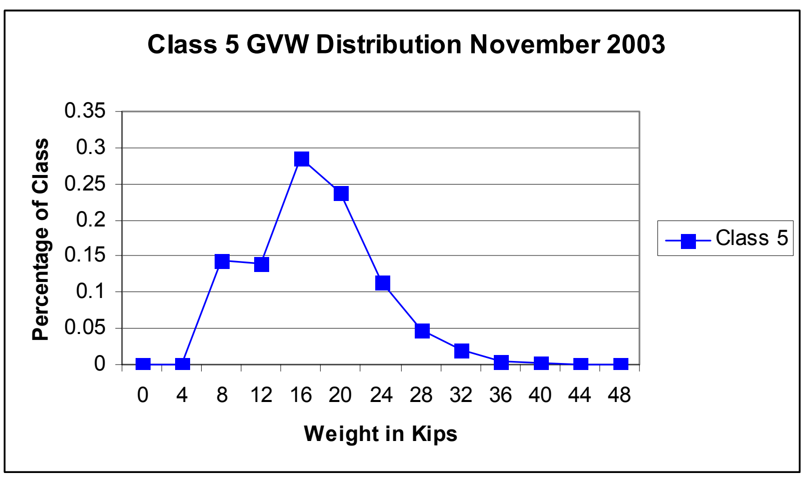


Figure 14-18 Class 5 GVW Distribution for November 2003 at 120500

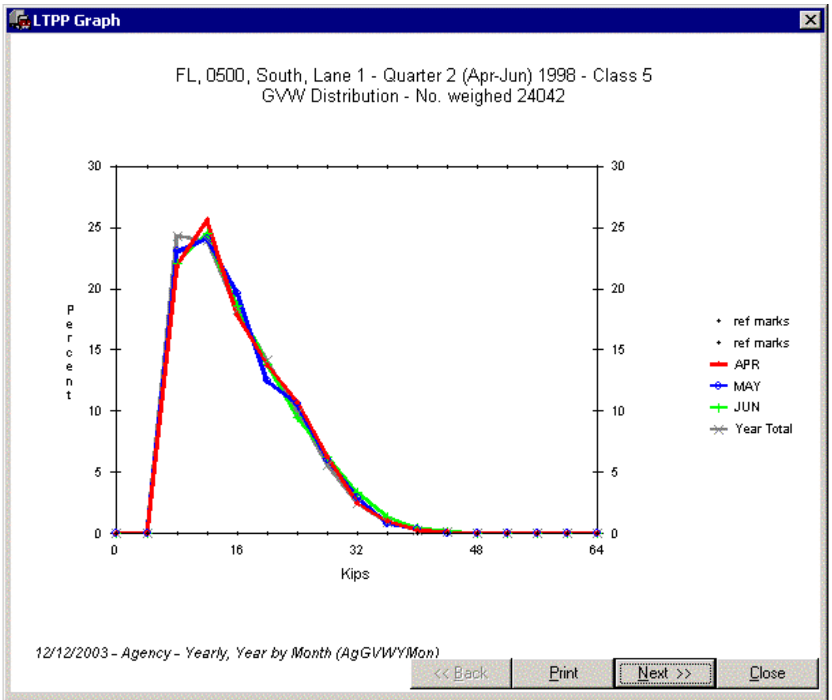


Figure 14-19 Class 5 GVW Distribution Year by Months Example at 120500

HANDOUT GUIDE FOR SPS WIM ASSESSMENT

STATE: Florida

SHRP ID: 0500

Figures

1. General Information

SITE ID: *120500*

LOCATION: *US 1 South, 4.5 miles North of SR 704*

VISIT DATE: *December 4, 2003*

VISIT TYPE: *Assessment*

2. Contact Information

POINTS OF CONTACT:

Assessment Team: *Dean J. Wolf, 301-210-5105, djwolf@mactec.com*

Highway Agency: *Walton Jones, 850-414-4726, walton.jones@dot.state.fl.us*
Mike Leggett, 850-414-4727, Michael.Leggett@dot.state.fl.us

FHWA COTR: *Debbie Walker, 202-493-3068, deborah.walker@fhwa.dot.gov*

FHWA Division Office Liaison: *Greg Schiess, 850-942-9650, Ext. 3023, greg.scheiss@fhwa.dot.gov*

LTPP SPS WIM WEB PAGE: *http://www.tfhrc.gov/pavement/ltpp/spstraffic/index.htm*

3. Agenda

BRIEFING DATE: ***8:00am, December 3rd, 2003*** *at the FDOT District 4 Office, 3400 West Commercial Boulevard, Fort Lauderdale, Florida 33309, (954) 486-1400.*

ONSITE PERIOD: *December 4, 2003*

TRUCK ROUTE CHECK: *Done (See Truck Route).*

4. Site Location/ Directions

NEAREST AIRPORT: *Palm Beach International Airport, West Palm Beach, Florida or Fort Lauderdale/Hollywood International Airport, Fort Lauderdale, Florida.*

DIRECTIONS TO THE SITE: *4.5 miles north of SR 706, near Tequesta.*

MEETING LOCATION: *On Site – 8:00 a.m., December 4th, 2003*

WIM SITE LOCATION: *US 1 (Latitude: 26.99734; Longitude: 80.09726)*

WIM SITE LOCATION MAP: *See Figure 4.1*

Figure 4.1: Site 120500 in Florida and Briefing Location

5. Truck Route Information

ROUTE RESTRICTIONS: None.

SCALE LOCATION: *Brown Mayflower Moving and Storage, 1900 Old Okeechobee Rd., West Palm Beach, FL. $10.00 per run, open M-F, 8:00am to 4:45pm. Contact – Henry Wilkinson, 561-686-1400. Located off of Okeechobee Blvd.*

TRUCK ROUTE:

- *Northbound Turnaround: 1.779 miles from the site (27^0 00.783' North and 80^0 06.246' West).*
- *Southbound Turnaround: 0.52 miles from site (26^0 59.399' North and 80^0 05.659' West).*

6. Sheet 17 – Florida (120500)

1.* ROUTE ___US 1____ MILEPOST ________LTPP DIRECTION - N <u>S</u> E W

2.* WIM SITE DESCRIPTION - Grade ___< 1_____ % Sag vertical Y / N
Nearest SPS section upstream of the site _0__ _5__ _5__ _4__
Distance from sensor to nearest upstream SPS Section ___ _1__ _8__ _2__ ft

3.* LANE CONFIGURATION
Lanes in LTPP direction __2__ Lane width _1_ _2_ ft

Median -
1 – painted
2 – physical barrier
<u>3 – grass</u>
4 – none

Shoulder -
1 – curb and gutter
<u>2 – paved AC</u>
3 – paved PCC
4 – unpaved
5 – none

Shoulder width ___ _4__ ft

4.* PAVEMENT TYPE ______Asphalt Concrete_____ ______________

5.* PAVEMENT SURFACE CONDITION – Distress Survey
Date __12-04-03___ Distress Map ~~Filename~~
Photo_Downstream_TO_2_12_13A_0500_12_04_03.JPG_
Date ______12-04-03________________________ Distress Map ~~Filename~~
Photo_Upstream_TO_2_12_13A_0500_12_04_03.JPG _________________
Date ______________________________ Distress Map ~~Filename~~ _________________

6. * SENSOR SEQUENCE ____left wheel patj_Quartz Sensor – Loop – right wheel path Quartz - Sensor___

7. * REPLACEMENT AND/OR GRINDING __ __ __ / __ __ / __ __ __ __
REPLACEMENT AND/OR GRINDING __ __ __ / __ __ / __ __ __ __
REPLACEMENT AND/OR GRINDING __ __ __ / __ __ / __ __ __ __

8. RAMPS OR INTERSECTIONS
Intersection/driveway within 300 m upstream of sensor location Y / <u>N</u>
distance __________
Intersection/driveway within 300 m downstream of sensor location Y / <u>N</u>
distance __________
Is shoulder routinely used for turns or passing? Y / <u>N</u>

9. DRAINAGE (*Bending plate and load cell systems only)*
1 – Open to ground
2 – Pipe to culvert
3 – None

Clearance under plate ___ ___ . ___ in

Clearance/access to flush fines from under system Y / N

10. * CABINET LOCATION
Same side of road as LTPP lane Y / N Median Y/ N Behind barrier Y / N
Distance from edge of traveled lane _3_ _2_ ft
Distance from system __ __ _0_ ft
TYPE _______334 B___________________

CABINET ACCESS controlled by LTPP / STATE / JOINT ?
Contact - name and phone number _____Kip Jones (850) 414-4726__
Alternate - name and phone number __Michael Leggett (850) 414-4726__

11. * POWER
Distance to cabinet from drop ___ ___ _5__ ft Overhead / underground / solar / AC in cabinet?
Service provider _____________________ Phone number
____

12. * TELEPHONE
Distance to cabinet from drop ___ _2__ _0__ ft Overhead / under ground / cell?
Service provider _____________________ Phone Number
____

13.* SYSTEM (software & version no.)- _________PAT DAW 190 Ver. 3.18 4/2/03__
Computer connection – RS232 / Parallel port / USB / Other
____

14. * TEST TRUCK TURNAROUND time ___6____ minutes DISTANCE _3.4__ mi.

15. PHOTOS FILENAME

Power source	_ Solar_Panels_TO_2_12_13A_0500_12_04_03.JPG __
Phone source	_ Telephone_Drop_TO_2_12_13A_0500_12_04_03.JPG _
Cabinet exterior	____
Cabinet interior	_ Cabinet_Interior_1_TO_2_12_13A_0500_12_04_03.JPG _
Weight sensors	__Leading_Quartz_Sensor_TO_2_12_13A_0500_12_04_03.JPG
Classification sensors	__ Loop_Sensor_TO_2_12_13A_0500_12_04_03.JPG __
Other sensors	_______________________

Description ______________________________
Downstream direction at sensors on LTPP lane _
Downstream_TO_2_12_13A_0500_12_04_03.JPG ___________________
Upstream direction at sensors on LTPP lane _
Upstream_TO_2_12_13A_0500_12_04_03.JPG ___________________

COMMENTS ____________GPS Coordinates: Latitude: 26.99734; Longitude: 80.09726

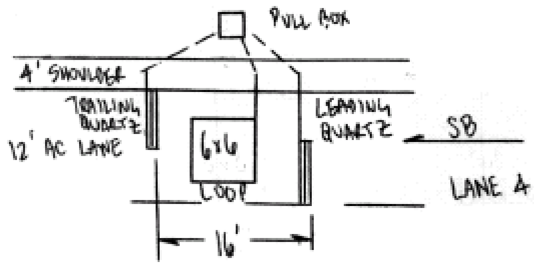
______________Amenities:____

Various Hotels, Restaurants, Gas Stations located 5 miles South of site in Jupiter.____________________

COMPLETED BY _____Dean J. Wolf_____________________________

PHONE __301-210-5105___ DATE COMPLETED _1_ _2_ /_0_ _4_ / _2_ _0_ _0_ _3_

Sketch of equipment layout



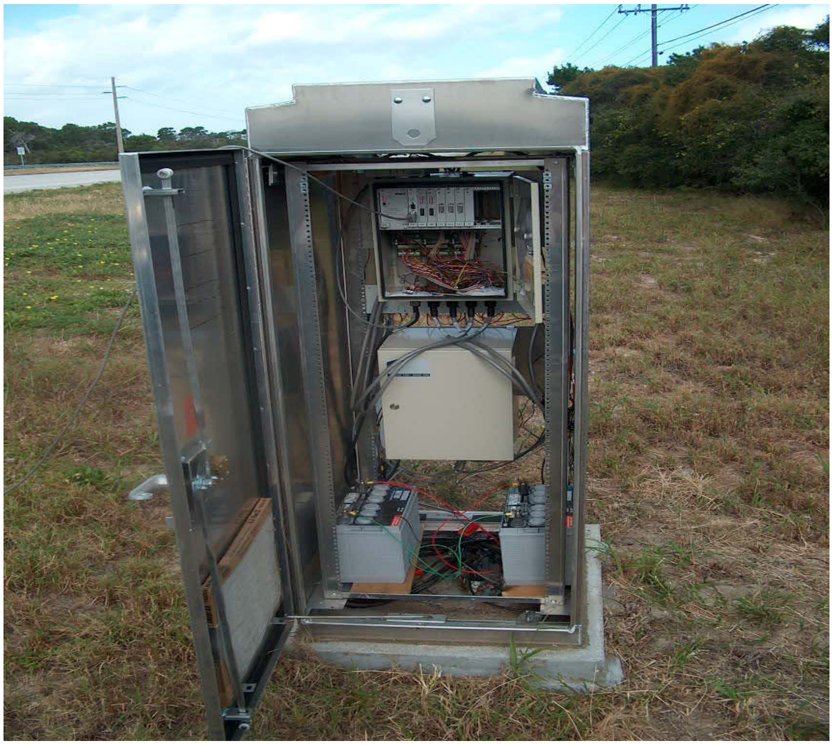
Site Map

Downstream_TO_2_12_13A_0500_12_04_03.JPG (Distress Photo 1)

Upstream_TO_2_12_13A_0500_12_04_03.JPG (Distress Photo 2)

Solar_Panels_TO_2_12_13A_0500_12_04_03.JPG

Telephone_Drop_TO_2_12_13A_0500_12_04_03.JPG



Cabinet_Interior_1_TO_2_12_13A_0500_12_04_03.JPG

Leading_Quartz_Sensor_TO_2_12_13A_0500_12_04_03.JPG

Loop_Sensor_TO_2_12_13A_0500_12_04_03.JPG

Downstream_TO_2_12_13A_0500_12_04_03.JPG

Upstream_TO_2_12_13A_0500_12_04_03.JPG

WIM SITE COORDINATION SPS Project_ID _0 _5 _0 _0

1. Equipment –
   - Maintenance – contract with purchase / separate contract LTPP / <u>separate contract State</u> / state personnel
     Contact ________Kip Jones (850) 414-4726___________________

   - Purchase by LTPP / <u>State</u>
     Constraints on specifications (sensor, electronics, warranties, maintenance, installation)

   - Installation – <u>Included with purchase</u> / separate contract by State / state personnel / LTPP contract

   - Calibration – <u>Vendor</u> / State / LTPP

   - Manuals and software – <u>State</u> / LTPP

   - Pavement PCC/<u>AC</u> – always new / <u>replacement as needed</u> / grinding and maintenance as needed / maintenance only / no remediation

   - Power - overhead / underground / <u>solar</u> billed to State / LTPP / N/A

   - Communication - <u>Landline</u> / Cellular / Other <u>billed to State</u> / LTPP / N/A

2. Site visits – Evaluation

   - WIM Validation Check - advance notice required _14__ <u>days</u> / weeks

   - Trucks – air suspension 3S2 State / <u>LTPP</u>
     2nd common State / <u>LTPP</u>
     3rd common State / LTPP
     4th common State / LTPP
     Loads State / LTPP
     Contact ____

     Drivers State / <u>LTPP</u>
     Contact ____

     Contractors with prior successful experience in WIM calibration in state:
     ____FTE, DTS____
     Nearest static scale (commercial or enforcement)
     __ *Brown Mayflower Moving and Storage, 1900 Old Okeechobee Rd., West Palm Beach, FL. open M-F, 8:00am to 4:45pm. Contact – Henry Wilkinson, 561-686-1400. Located off of Okeechobee Blvd.*____

   - Profiling – short wave -- permanent / <u>temporary site marking</u>

WIM SITE COORDINATION SPS Project_ID _0 _5 _0 _0

-- long wave – permanent / temporary site marking

- Pre-visit data
  – Classification and speed: Contact Richard Reel___(850) 414-4709__
  --Typical operating conditions (congestion, high truck volumes)
  Contact ______Michael Leggett (850) 414-4727______
  -- Equipment operational status: Contact ___Michael Leggett (850) 414-4727__

- Access to cabinet
  State only / Joint / LTPP Key / Combination

- State personnel required on site Y / N
  Contact information _______Kip Jones (850) 414-4726____________________

- Enforcement Coordination required Y / N
  Contact information ____

- Traffic Control Required Y/ N
  Contact information ____

- Maximum number of personnel on site _5_;
  Invitees ___________________________

- Authorization to calibrate site -- State only / LTPP

- Special conditions ____

3. Data Processing
- Down load State only / LTPP read only / LTPP download / LTPP download and copy to state
- Data Review State per LTPP guidelines / State weekly / LTPP
- Data submission for QC State - weekly; twice a month; monthly / LTPP

4. Site visits – Validation

- WIM Validation Check - advance notice required __14_ days / weeks
  LTPP Semi-annually / Sate per LTPP protocol semi-annually / State other

- Trucks – air suspension 3S2 State / LTPP
  2nd common State / LTPP
  3rd common State / LTPP
  4th common State / LTPP
  Loads State / LTPP
  Contact ______________________________________

Drivers State / LTPP
Contact ____

Contractors with prior successful experience in WIM calibration in state:
___________DTS, FTE______________________________________

- Profiling – short wave -- permanent / temporary site marking
  -- long wave – permanent / temporary site marking

- Pre-visit data
  – – Classification and speed: Contact __Richard Reel__(850) 414-4709__
  -- Equipment operational status: Contact __Michael Leggett (850) 414-4727__

- Access to cabinet
  State only / Joint / LTPP Key / Combination

- State personnel required on site Y / N
Contact information __________Kip Jones (850) 414-4726____________

- Enforcement Coordination required Y / N
Contact information ____

- Traffic Control Required Y/ N
Contact information ____

- Authorization to calibrate site -- State only / LTPP

- Special conditions ____

5. Site visit – Construction

- Construction schedule and verification – Contact ______Kip Jones (850) 414-4726_

- Notice for straightedge and grinding check - __4___ days / weeks
On site lead to direct / accept grinding – State / LTPP

- WIM Calibration - advance notice required __14_ days / weeks
  Number of lanes -- ___1__
  LTPP / State per LTPP protocol / State Other ________________

- Trucks – air suspension 3S2 State / LTPP
  2nd common State / LTPP
  Loads State / LTPP
  Drivers State / LTPP

Contractors with prior successful experience in WIM calibration in state:
_________FTE, DTS____

- Profiling – straight edge -- permanent / temporary site marking
  -- long wave – permanent / temporary site marking

- Pre-visit data
  – – Classification and speed: Contact ____Richard Reel__(850) 414 4709_____________
  -- Equipment operational status: Contact ___Michael Leggett (850) 414-4727___

- Access to cabinet
  State only / Joint / LTPP Key / Combination

- State personnel required on site Y / N
Contact information __________Kip Jones (850) 414-4726__________________

- Enforcement Coordination required Y / N
Contact information ____

- Traffic Control Required Y/ N
Contact information ____

- Authorization to calibrate site -- State only / LTPP

- Special conditions ____

6. Special conditions
   - Funds and accountability
   - Reports
   - Other

SHEET 16 LTPP MONITORED TRAFFIC DATA SITE CALIBRATION SUMMARY	*STATE ASSIGNED ID [_9 _9 _2 _1] *STATE CODE [_1 _2] *SHRP SECTION ID [0_5 _0 _0]

SITE CALIBRATION INFORMATION

1. * DATE OF CALIBRATION (MONTH/DAY/YEAR) [_12__ / _04__ / _2 _0 _0 _3]

2. * TYPE OF EQUIPMENT CALIBRATED __ WIM XX CLASSIFIER ___ BOTH

3. * REASON FOR CALIBRATION
____ REGULARLY SCHEDULED SITE VISIT ____ RESEARCH
____ EQUIPMENT REPLACEMENT ____ TRAINING
____ DATA TRIGGERED SYSTEM REVISION ____ NEW EQUIPMENT INSTALLATION
_XX_ OTHER (SPECIFY) _________SITE ASSESSMENT___________________________

4. * SENSORS INSTALLED IN LTPP LANE AT THIS SITE (CHECK ALL THAT APPLY):
____ BARE ROUND PIEZO CERAMIC ____ BARE FLAT PIEZO ____ BENDING PLATES
____ CHANNELIZED ROUND PIEZO ____ LOAD CELLS ____ QUARTZ PIEZO
____ CHANNELIZED FLAT PIEZO ____ INDUCTANCE LOOPS ____ CAPACITANCE PADS
_XX_ OTHER (SPECIFY) __________Quartz Sensor – Loop – Quartz Sensor_____________________

5. EQUIPMENT MANUFACTURER ___________PAT DAW 190_____________________________________

WIM SYSTEM CALIBRATION SPECIFICS**

6.**CALIBRATION TECHNIQUE USED:
____ TRAFFIC STREAM -- ____STATIC SCALE (Y/N) ____ TEST TRUCKS

__ __ __ NUMBER OF TRUCKS COMPARED __ __ __ NUMBER OF TEST TRUCKS USED

__ __ __ PASSES PER TRUCK

TYPE PER FHWA 13 BIN SYSTEM
SUSPENSION: 1 - AIR; 2 - LEAF SPRING
3 - OTHER (DESCRIBE)

TRUCK	TYPE	SUSPENSION
1	________	___________________
2	________	___________________
3	________	___________________

7. SUMMARY CALIBRATION RESULTS (EXPRESSED AS A PERCENT)
MEAN DIFFERENCE BETWEEN ---
DYNAMIC AND STATIC GVW ___ ___ ___ . __ STANDARD DEVIATION __ __ . __
DYNAMIC AND STATIC SINGLE AXLES ___ ___ ___ . __ STANDARD DEVIATION __ __ . __
DYNAMIC AND STATIC DOUBLE AXLES ___ ___ ___ . __ STANDARD DEVIATION __ __ . __

8. ___ ____ NUMBER OF SPEEDS AT WHICH CALIBRATION WAS PERFORMED

9. DEFINE THE SPEED RANGES USED (MPH) ______ ______ ______ ______ ______ ______ ______ ______
______ ______ ______ ______ ______ ______ ______ ______ ______ ______

10. CALIBRATION FACTOR (AT EXPECTED FREE FLOW SPEED) ___ ___ ___ . ___ ___

11.** IS AUTO-CALIBRATION USED AT THIS SITE? (Y/N) _____
IF YES, LIST AND DEFINE AUTO-CALIBRATION VALUE: ________________________________
____
____

CLASSIFIER TEST SPECIFICS***

12.*** METHOD FOR COLLECTING INDEPENDENT VOLUME MEASUREMENT BY VEHICLE CLASS:
___ VIDEO _XX MANUAL ___ PARALLEL CLASSIFIERS

13. METHOD TO DETERMINE LENGTH OF COUNT _XX_ TIME ____ NUMBER OF TRUCKS

14. MEAN DIFFERENCE IN VOLUMES BY VEHICLES CLASSIFICATION:
*** FHWA CLASS 9 ____ __0_ ____ FHWA CLASS __5_ ____ __36____ ____
*** FHWA CLASS 8 ____ __0_ ____ FHWA CLASS ____ ____ ____ ____ ____
FHWA CLASS ____ ____ ____ ____ ____
FHWA CLASS ____ ____ ____ ____ ____
*** PERCENT "UNCLASSIFIED" VEHICLES: ____ _2__ ____

PERSON LEADING CALIBRATION EFFORT: _______Dean J. Wolf_____________________________________
CONTACT INFORMATION: _______301-210-5105_______________________________ rev. November 9, 1999