Assessment Report for
Wisconsin, SPS Experiment 1

Visit date: December 14, 2004

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1 Executive Summary

A visit was made to the Wisconsin SPS-1 site on December 14, 2004 for the purpose of conducting an assessment of the WIM system located on US Route 29 at milepost 189.8, 1.25 miles east of Hilltop Road. The LTPP lane is the driving lane in the westbound direction and is identified as lane number 4 in the WIM controller.

This site is not recommended for a site validation.

The site is instrumented with PAT America bending plate weighing sensors. The WIM utilizes a PAT America DAW-100 WIM controller.

The equipment is not in working order. The following actions will be needed to make the equipment fully operational:

- Leading Plate Weighing Sensor has a broken hold-down bolt which secures the weight-pad to the frame. This bolt needs to be repaired or replaced.
- Replace the lead-in cable splice for the leading weigh-pad, or replace the weigh-pad, if required.
- Make adjustments to the equipment algorithms to correctly classify 5-axle single unit vehicles and semi-trailer trucks.

Sufficient data was collected to provide a Sheet 16 for classification verification at this site. There are 6-percent unclassified vehicles. This exceeds the percentage of 2% defined as the criteria for research data. Class 7 trucks had an error rate of 100% and Class 9 trucks had an error rate of 18%, both exceeding the threshold 2% of matches for truck classes. **The algorithm for classification should be reviewed and corrected. The classification verification process will need to be repeated at the next assessment or validation**.

The pavement condition appeared to be satisfactory for conducting a performance evaluation. There were no distresses observed that would influence truck motions significantly. A visual survey determined that there is no discernable bouncing or avoidance by trucks in the sensor area. However, the WIM index value of 0.789 m/km was exceeded for all passes. Index values ranged from 0.867 to 1.492 for Long Range Index (LRI) and 1.078 to 1.766 for the Short Range Index (SRI). Therefore, the pavement smoothness may have an effect on the operation of the WIM equipment.

As the WIM scale is located in close proximity to the upstream section 0262, it may not be possible to effect any corrective actions without taking this section out of study.

A review of the speed information collected on-site indicates that the range of truck speeds to be covered during an evaluation is 55 to 65. The posted speed limit at the site is 65 mph.

This site has 1 year of classification data and 1 year of weight data, which has been submitted. The site was last calibrated on September 17, 1997 and the only data available for this site was for 2001. **Based on available calibration information and review of the data submitted through last year, this site still needs 5 years of data to meet the need for 5 years of research quality classification and weight data.**

2 Corrective Actions Recommended

The hold-down bolt on the approach side-securing rail, of the leading weigh-pad frame is broken and the weight-pad is loose in the frame. The securing rail and the weigh-pad are vibrating as heavier vehicles traverse the weighing sensor. This bolt needs to be repaired or replaced.

A review and correction of the system classification algorithm needs to be performed to circumvent Class 7 vehicles being identified as Class 15 vehicles. This can be achieved by adding a Class 7 vehicle algorithm to the 5-axle bin.

The misidentification of Class 9 vehicles as Class 8, 10 and 15 vehicles is due to errant extra (ghost) axles or missing axles in the axle detection process. This is most likely caused by the low insulation resistance values or the vibration of the weigh-pad due to broken bolt.

No information was available on the anticipated correction date for this site.

As noted in the Executive Summary, the WIM index value of 0.789 m/km was exceeded for all profile passes. As the WIM scale is located in close proximity to the upstream section 0262, it may not be possible to effect any corrective actions without taking this section out of study. If remedial action is taken it should be done for the entire section. While grinding may sufficiently reduce the observed roughness to meet the recommended levels, it may be necessary to replace the pavement section to achieve those levels of smoothness.

3 Equipment inspection and diagnostics

The site is instrumented with PAT America weighing sensors, installed in a staggered configuration, 16 feet 2 inches apart. A 6- foot by 6-foot loop sensor is installed directly preceding each weighing sensor for vehicle presence detection and secondary speed determination. The WIM system utilizes a PAT America DAW-100 WIM Controller for signal processing, data storage, user interface and remote operation.

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

An electronic check of all WIM components was performed. The insulation resistance for the leading weigh-pad indicated a value below acceptable tolerances. All other in-road sensors and WIM controller components appear to be working properly.

A visual inspection of all system components, including in-road sensors, cabinet, pull boxes, power and telephone service equipment and conduit was conducted. All components, except as noted above, appear to be in excellent physical condition.

4 Classification Verification with test truck recommendations

The agency uses a modified FHWA 13-bin classification scheme. A class 15 is added for unknown vehicles and class 14 is defined as a 5-axle vehicle with multiple one-axle trailers.

A sample of 100 vehicles 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 zero-percent unknown vehicles and six-percent unclassified vehicles. The unclassified vehicles are typically 5-axle Class 7 single unit dump trucks and the Class 9 vehicles are typically vehicles with extra or missing axle detections or 5-axle semi-trailer trucks.

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 classification error rates by class:

Table 1 Truck Misclassification Percentages for 550100 - 14-Dec-2004

Class	Percent Error	Class	Percent Error	Class	Percent Error
4	N/A	5	17	6	N/A
7	100	8	14	9	18
10	33	11	100	12	N/A
13	0	14	0		

A correction of the system classification algorithm needs to be performed to circumvent Class 7 vehicles being identified as Class 15 vehicles. This can be achieved by adding a Class 7 vehicle algorithm to the 5-axle bin.

The misidentification of Class 9 vehicles as Class 8, 10 and 15 vehicles is due to the addition of/or missing of axles in the vehicle report.

The misclassification percentage is computed as the probability that a pair containing the class of interest does NOT include a match. Thus if there are eight pairs of observations with at least one Class 9 and only six of them are matches, the error rate is 25 percent. The percent error and the mean differences reported below do not represent the same statistic. It is possible to have error rates greater than zero with a mean difference of zero.

Table 2 Truck Classification Mean Differences for 550100 - 14-Dec-2004

Class	Mean Difference	Class	Mean Difference	Class	Mean Difference
4	N/A	5	20	6	N/A
7	-100				
8	17	9	-18	10	50
11	UNK	12	N/A	13	0

These error rates are normalized to represent how many vehicles of the class are expected to be over or under-counted for every hundred of that class observed by the equipment. Thus a value of 0 means the class is identified correctly on average. A number between –1 and –100 indicates at least that number of vehicles was either missed or not assigned to the class by the equipment. It is not possible to miss more than all or more than one hundred out of one hundred. Numbers 1 or larger indicate how many more vehicles are assigned to the class than the actual "hundred observed". Classes marked Unknown are those identified by the equipment but no vehicles of the type were seen the observer. There is no way to tell how many more are reported than actually present in the population. N/A means that neither the equipment nor the observer recorded vehicles of that particular class.

A review of the data both collected on site and previously submitted by the agency indicated that Class 9s, Class 8s and Class 5s each constitute at least 10 percent of the truck population. Class 5s and Class 8s constitute eleven and thirteen percent of the truck population respectively. Class 9s comprise sixty-one percent. Therefore in addition to the air-suspension 3S2, the second vehicle used for a validation should also be a Class 9. Due to the length of the truck turn-around no additional vehicles are required. Due to the large percentage of Class 9 vehicles, we are recommending that the air-suspension 3S2 be fully loaded and the second Class 9 partially loaded when performing any validation.

5 Profile Evaluation

The WIM site is a section of pavement that is 305 m long with the WIM scale located at 274.5 m from the beginning of the 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 Stantec Inc on October 18, 2004 were processed through the LTPP SPS WIM Index software (Alpha version). This WIM scale is installed on an asphalt concrete pavement. The results are shown in Table 3.

A total of 11 profiler passes were conducted over the WIM site. Since the issuance of the LTPP directive on collection of longitudinal profile data for SPS WIM sections, 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 included 5 passes at the center of the lane, 3 passes shifted to the left side of the lane, and 3 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 both the left wheel path (LWP) and the right wheel path (RWP).

Table 3 shows the computed index values for all 11 profiler passes for this WIM site. The average values over each path were also calculated where three or more passes were completed, as shown in the right most column of the table. Values above the index limits are presented in italics.

Table 3 Long Range Index (LRI) and Short Range Index (SRI)

Profiler Passes			Pass 1	Pass 2	Pass 3	Pass 4	Pass 5	Ave.
Center	LWP	LRI (m/km)	*0.894*	*0.923*	*0.942*	*0.905*	*0.889*	***0.911***
		SRI (m/km)	*1.267*	*1.384*	*1.409*	*1.477*	*1.327*	***1.373***
	RWP	LRI (m/km)	*1.056*	*1.118*	*1.102*	*1.061*	*1.040*	***1.075***
		SRI (m/km)	*1.258*	*1.280*	*1.302*	*1.356*	*1.268*	***1.293***
Left Shift	LWP	LRI (m/km)	*1.002*	*0.992*	*0.989*			***0.994***
		SRI (m/km)	*1.649*	*1.687*	*1.730*			***1.689***
	RWP	LRI (m/km)	*1.025*	*0.983*	*1.058*			***1.022***
		SRI (m/km)	*1.184*	*1.264*	*1.234*			***1.227***
Right Shift	LWP	LRI (m/km)	*0.886*	*0.872*	*0.844*			***0.867***
		SRI (m/km)	*1.151*	*1.085*	*0.998*			***1.078***
	RWP	LRI (m/km)	*1.766*	*1.355*	*1.355*			***1.492***
		SRI (m/km)	*1.873*	*1.674*	*1.750*			***1.766***

All passes exceeded the WIM Index value of 0.789 m/km 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. **Based on the profile data analysis, the Wisconsin SPS-1 WIM site does not meet the smoothness requirements for a WIM location.**

If any remedial action is taken it should be done for the entire section. While grinding may sufficiently reduce the observed roughness to meet the recommended levels, it may be necessary to replace the pavement section to achieve those levels of smoothness.

6 Distress survey and any applicable photos

The pavement appears to be in good condition with little or no distress. Figure 13-1 and Figure 13-2 show the condition of the pavement in the downstream and upstream direction respectively.

7 Vehicle-pavement interaction discussion

A visual inspection of the pavement 425 feet in advance of the WIM area and 75 feet following the WIM area was conducted. No significant pavement distress that would affect the performance of the WIM scales was detected.

There is no visible vertical or horizontal motion of trucks that can be discerned, immediately approaching, traversing or leaving the sensor area. Daylight cannot be readily seen between the tires indicating that the trucks are probably touching the sensors fully. All traffic appears to travel along the center of the lane.

Due to the loose weigh-pad vibrations, it is suspected that the interaction between the truck tires and weigh-pad is causing errant axle detections and/or misses.

8 Speed data with speed range recommendations for evaluation

Based on the data provided by the LTPP database prior to the visit and the data collected on site the 15th and 85th percentile speeds for Class 9s are 55 and 65 mph respectively. This range does not vary significantly for other truck classes. As a result the recommended speeds for test trucks in an evaluation are 55 and 65 mph.

Measurements of speeds on-site indicated that the equipment is currently measuring speeds with a bias of 0.0 mph and an associated standard deviation of 0.5 mph.

The review of drive axle spacings for Class 9 vehicles indicates that this is not affecting the measurements of length and therefore vehicle classification. From on site observation supported by video recording, the site carries standard drive tandems for Class 9s indicating that the average drive axle spacing to be 4.3 feet. The data collected by the equipment shows the average drive axle spacings of Class 9s to be 4.3 feet.

9 Traffic Data review: Overall Quantity and Sufficiency

As of December 14, 2004 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 4.

Table 4 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)

A record of a calibration visit for September 17, 1997 was provided. Review of the data indicates that no information is available on the precision or bias of the weight data. Additionally, no data for that year has been provided to LTPP.

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 5. 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. While a sufficient quantity of weight data exists for 2001, this site lacks 5 years of research quality weight and classification data.

Together with the previously gathered calibration information it can be seen that at least 5 additional years of research quality data are needed to meet the goal of a minimum of 5 years of research weight and classification data.

Table 5 Amount of Traffic Data Available

Year	Class Days	Months	Coverage	Weight Days	Months	Coverage
2001	58	10	Complete Week	286	11	Complete Week

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.

Based on this review it is recommended that further investigation be done for classification and weight data for 2001. Comparison of the vehicle distributions for the two data types shows inconsistencies. The weight data over 2001 indicates increasingly heavier unloaded Class 9s while also demonstrating increasingly lighter loaded Class 9s. Heavy Truck distributions also indicate a significant shift from Class 9 classifications to Class 15.

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 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 numbers, 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 submitted. Counts derived from weight data are available for all months. Loading 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.

An LTPP Traffic Sheet 16 was provided for the site indicating that a validation was done September 17, 1997. However, the first month with sufficient data available in the LTPP traffic database is January 2001. That formed the basis for the comparison values dated January 1, 2001. According to the results shown in Table 6, in 2001, when more than 210 days of weight data was collected the percentage of Class 9 vehicles significantly decreased after no truck data was recorded in May. Loading information indicates a decrease in mean loaded weight and an increase in unloaded weight averages as the year advanced.

Table 6 SPS Summary Report

Comparison Date Weight - 01-January-2001 Classification –

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				344	1.13	10,179	65,663	34,151
JAN 2001	5	2.2	23	336	1.13	10,224	73,619	34,125
FEB 2001	2	2.5	18	274	1.41	10,514	73,819	34,231
MAR 2001	8	2.7	31	374	1.06	10,302	73,592	33,857
APR 2001	7	2.9	27	378	0.96	10,141	73,567	33,947
JUN 2001	3	2.9	16	107	1.15	10,406	65,427	
JUL 2001	3	1.4	29	155	1.15	10,267	65,528	38,489
AUG 2001	4	1.4	28	161	1.13	10,414	62,221	38,147
SEP 2001	11	1.9	29	160	1.04	10,378	62,070	37,572
OCT 2001			25	130	1.35	10,866	61,933	38,178
NOV 2001	7	1.8	29	122	1.22	10,833	61,619	38,390
DEC 2001	8	0.6	30	75	1.34	10,912	58,224	36,423

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, labeled with a 7, 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 comparison between typical by week patterns for heavy truck classification data for March and August 2001 respectively. The individual weeks for these time periods show essentially the same heavy truck mix. Every vehicle in Classes 6 through 13 that constitutes at least 10 percent of the population is expected to stay within plus or minus 5 percent of the value observed during the two weeks following validation. This range is shown by the darker band inside the lighter band to the right of the weekly data. Weeks that go outside more than plus or minus 10 percent of the expected value will fall above or below the light gray areas of the band. These are weeks that should have been subjected to additional scrutiny prior to accepting the data as reasonable. However, in the case of classification data there is insufficient data to create the expected values for comparison. In those graphs the values for weight data have been

substituted. This also illustrates the difference between the classification information and the weight information being reported.
For this site, the fleet mix for the year 2001 is comparatively stable through April. However, after no data was collected for May, and beginning in June, there is a significant decrease in Class 9s and an equivalent increase in Class 15s. This distribution continues through the remainder of 2001. Figure 14-3 and Figure 14-4 illustrate the change in distributions prior to and following the absence of data in May.

Figure 14-5 shows the pattern for vehicle distribution by month by year for the data collected from the classifier versus the data collected by the WIM equipment. On average, the 7-card volumes are 4 to 5 times larger than the 4-card volumes. This may be due to the agency's only submitting 13 classes of classification data but providing all records from the WIM system. Although the percentage of unknowns in the weight data is disturbing, the more critical difference in the data is the relative numbers of Class 9 vehicles.

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. Figure 14-6 illustrates the typical bimodal pattern for the first quarter of 2001. Figure 14-7 illustrates how the heavy trucks comprising the unloaded peak have shifted to the loaded peak. The new pattern continues throughout the remainder of the year. This type of shift may be real or may be indicative of sensor failure. In the absence of calibration data, the true cause of the shift cannot be determined.

To investigate any seasonal variations the Class 9 GVW distributions are graphed by month by year. As shown in Figure 14-8 the unloaded vehicles are now incorporated into the loaded peak. As this began in June, it is not considered to be seasonal.

9.4 Axle Distributions

GVW graphs were available for 2001 therefore; no axle distribution graphs were required for data review.

9.5 ESALs per year

Average ESALs for Class 9 vehicles are a very crude method of identifying loading shifts. Figure 14-9 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 an SN = 5 and a p_t of 2.5. Average ESALs per Class 9 are not used as an indicator of research quality data. In 2001 the ESALs appear to be reasonably stable from month to month.

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 14-10, the weight of the front axle was essentially constant in the months when data was collected before June. After the lack of data for the entire month of May, the deviation of the front axle weights increases as the year advances.

10 Updated handout guide and Sheet 17

A copy of the post-visit handout guide has been included following page 17. It includes a current Sheet 17 with all applicable maps and photographs. The following information has changed since the handout guide was prepared:

- Site location – milepost changed from 15.5 to 189.8.
- GPS coordinates have been updated.
- Truck route information has been provided.

11 Updated Sheet 18

A current Sheet 18 as provided by the State, indicating the contacts, conditions for assessments and evaluations has been attached following the updated handout guide.

12 Traffic Sheet 16 (Classification Verification only)

Sufficient classification information was collected between 10:15 a.m. and 12:15 p.m. on December 14, 2004 to complete a Sheet 16. A copy is attached following the Sheet 18 information.

13 Distress Photographs

Figure 13-1 Pavement Condition in the Downstream Direction at 550100

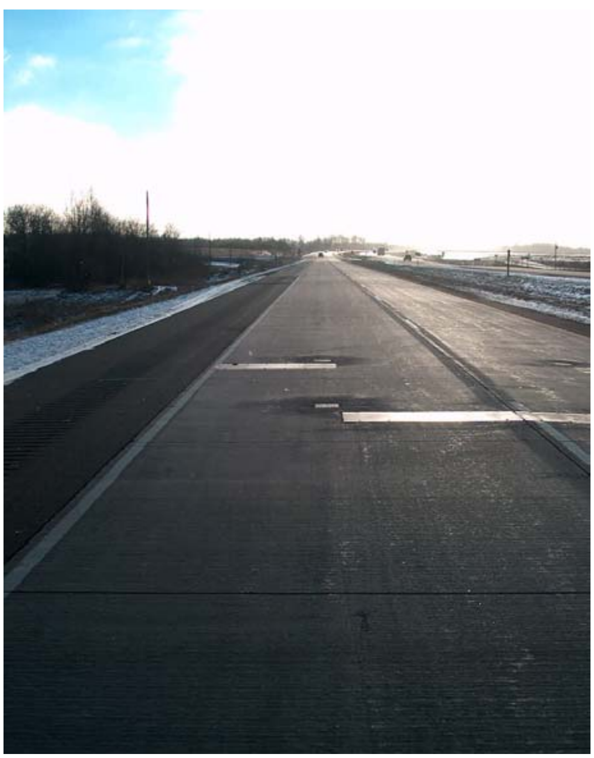


Figure 13-2 Pavement Condition in the Upstream Direction at 550100

14 Traffic Graphs

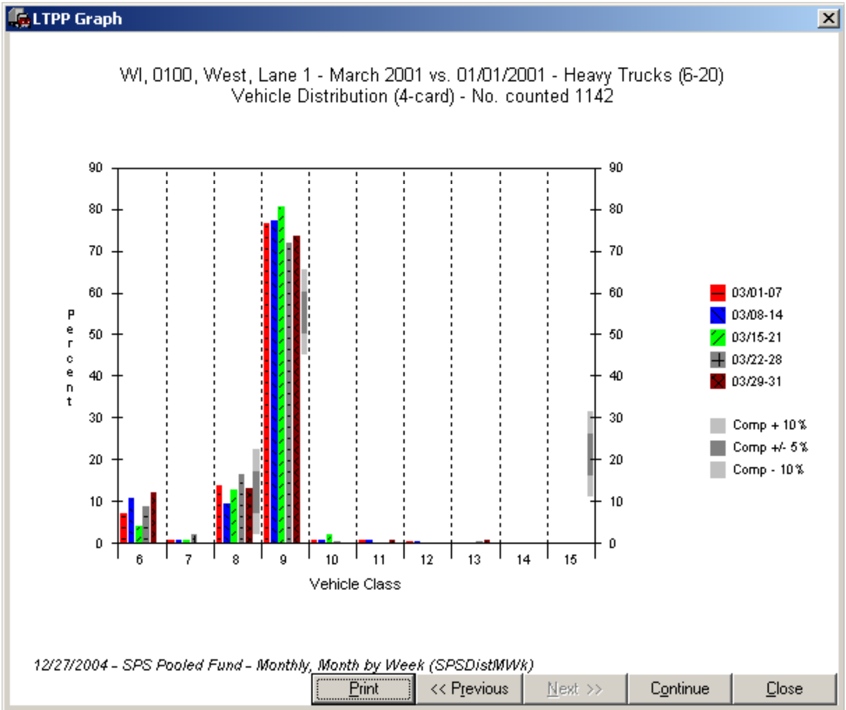


Figure 14-1 Heavy Truck Distribution Pattern for Classification Data for March 2001 for 550100

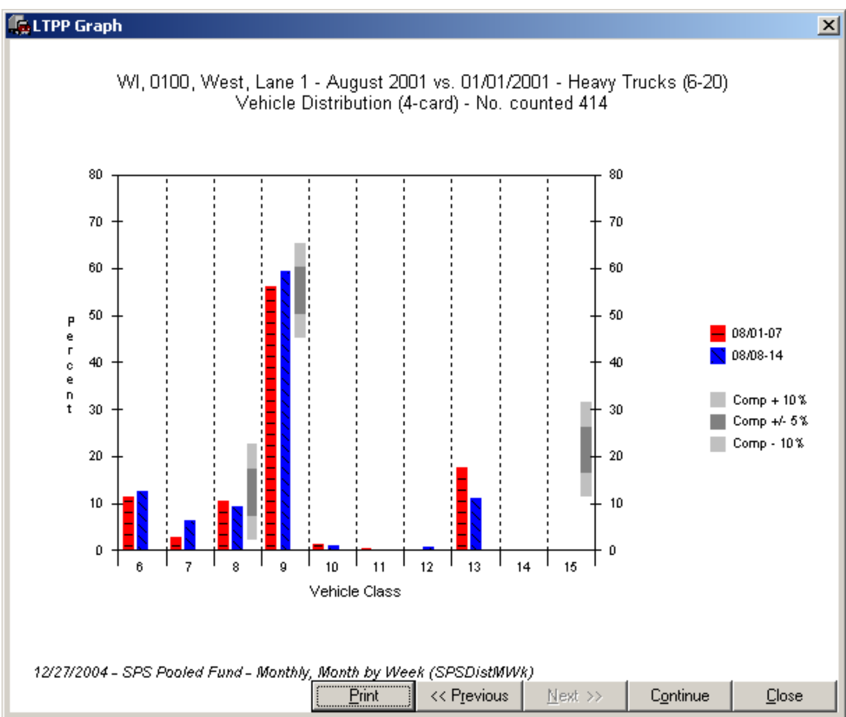


Figure 14-2 Heavy Truck Distribution Pattern for Classification Data - August 2001 for 550100

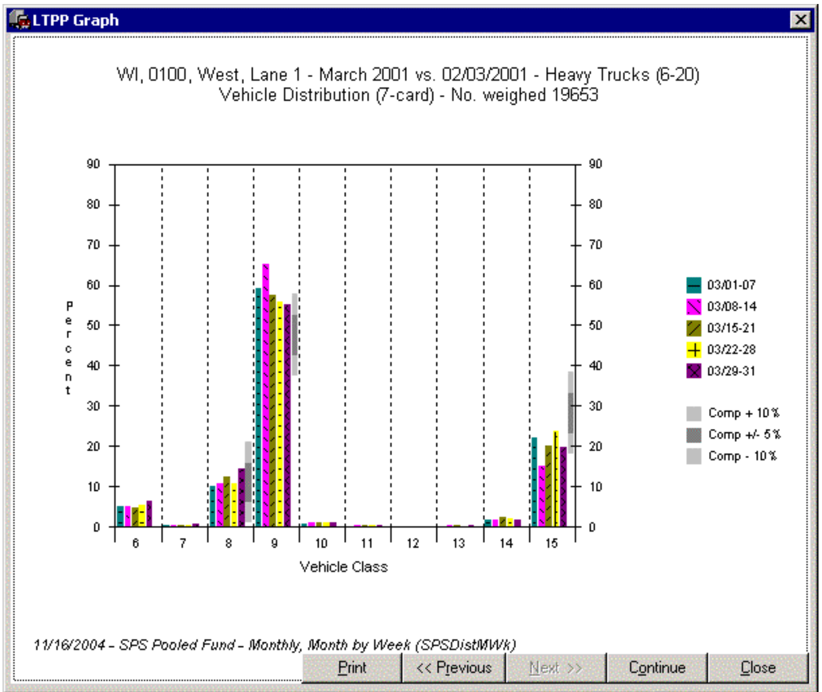


Figure 14-3 Typical Heavy Truck Distribution Pattern for Weight Data - March 2001 for 550100

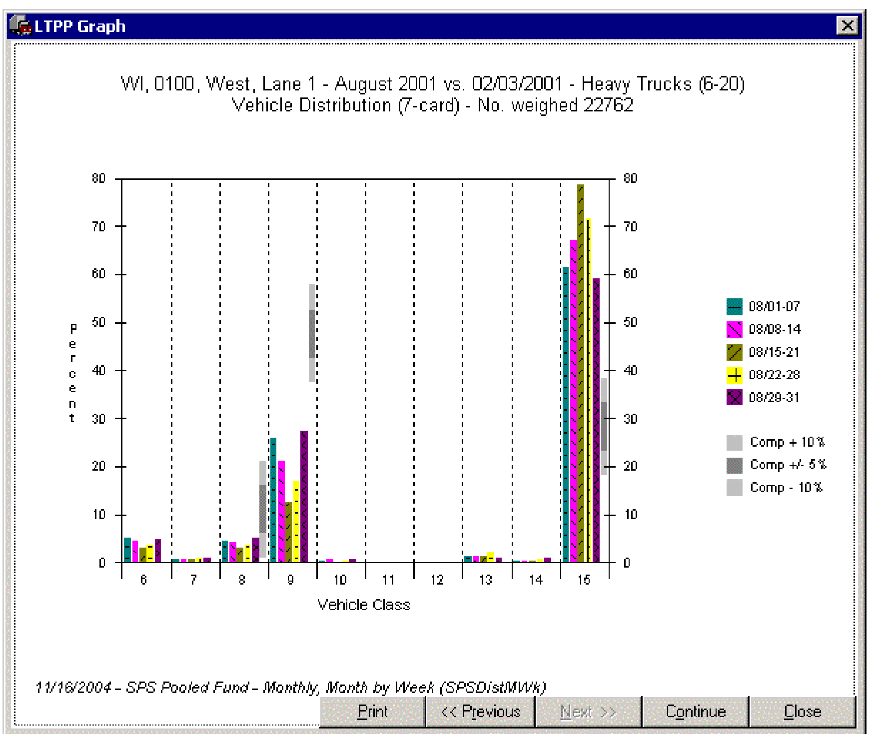


Figure 14-4 Heavy Truck Distribution Pattern for Weight Data - August 2001 for 550100

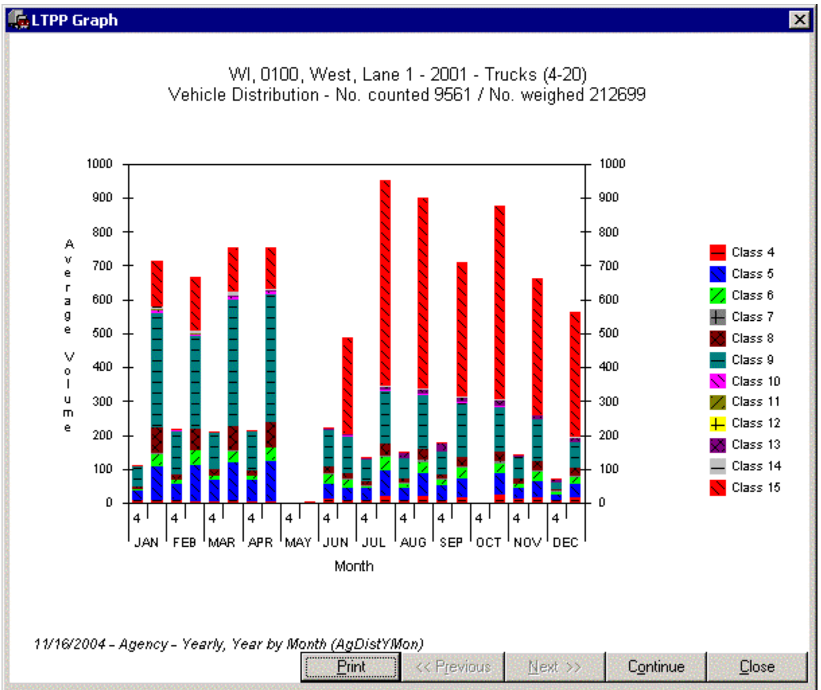


Figure 14-5 Truck Distribution by Month for the Year 2001 for 550100

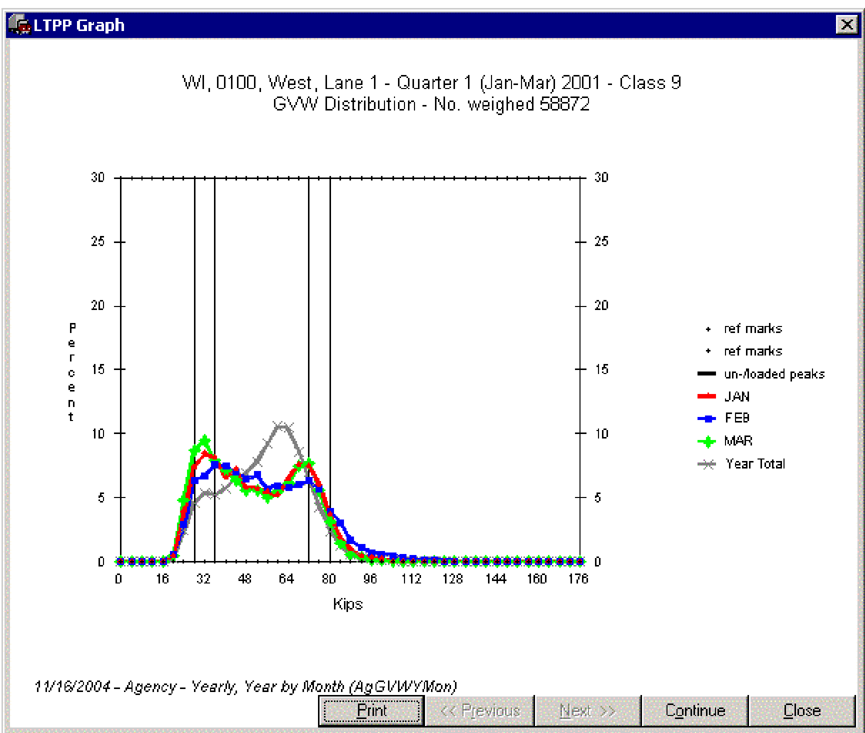


Figure 14-6 Class 9 GVW Distribution for the January 2001 to March 2001 for 550100

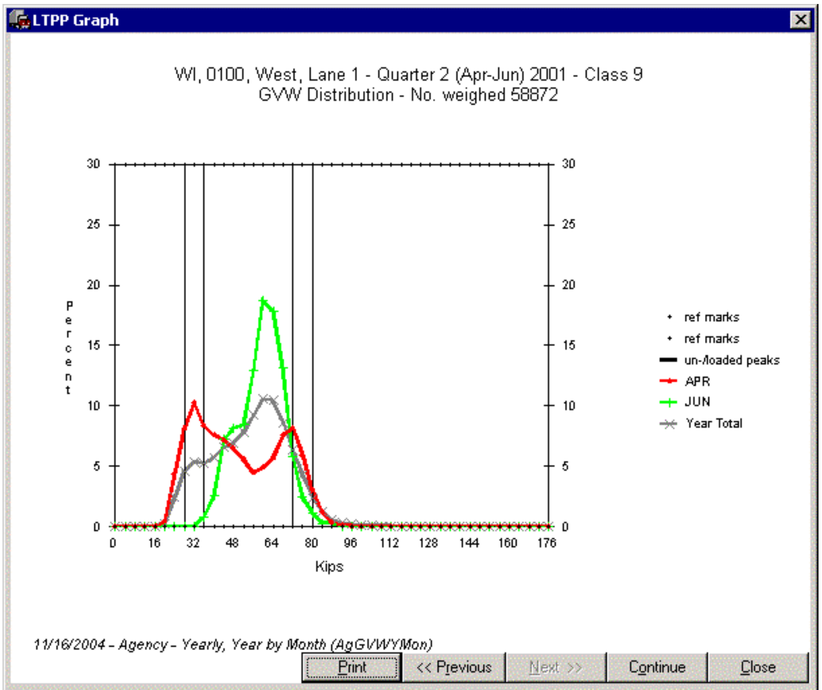


Figure 14-7 Class 9 GVW Distribution - April 2001 to June 2001 for 550100

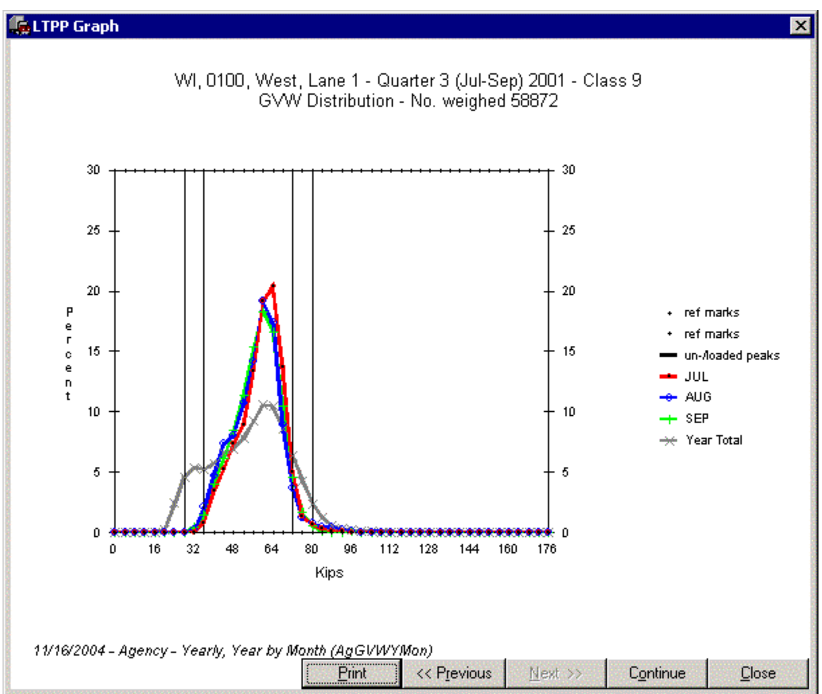


Figure 14-8 Class 9 GVW Distribution - July 2001 to September 2001 for 550100

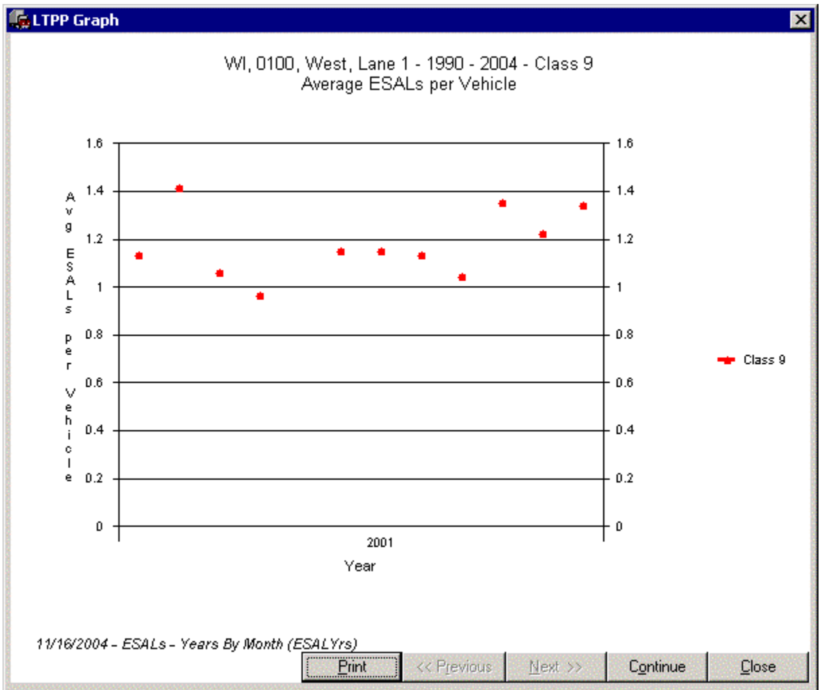


Figure 14-9 Average Class 9 ESALs for site for 2001 for 550100

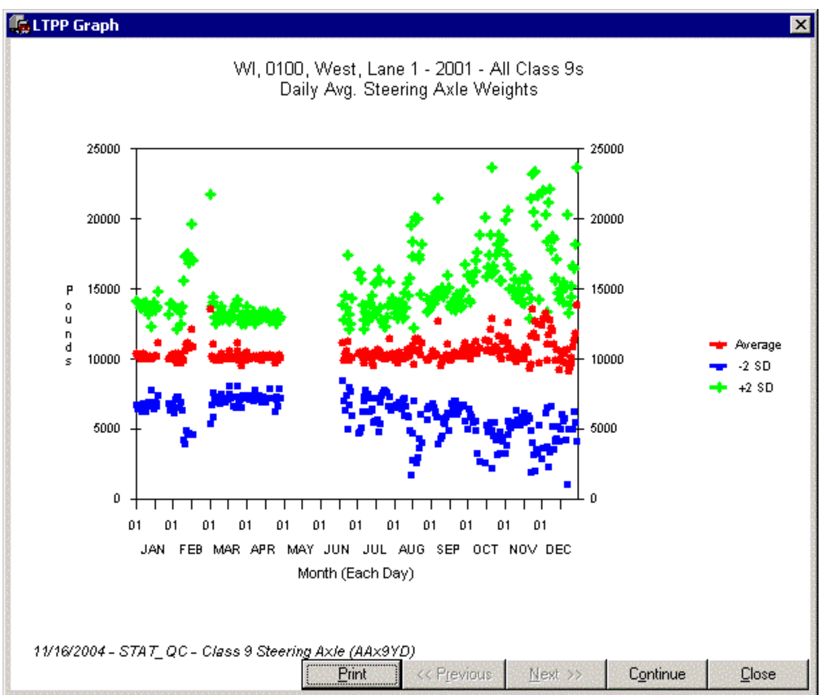


Figure 14-10 Average Daily Class 9 Steering Axle Weight - 2001 for 550100

POST-VISIT HANDOUT GUIDE FOR SPS WIM FIELD ASSESSMENT

STATE: Wisconsin

SHRP ID: 550100

Figures

1. General Information

SITE ID: *550100*

LOCATION: *US Route 29 west (M.P. 189.8)*

VISIT DATE: *December 14, 2004*

VISIT TYPE: *Assessment*

2. Contact Information

POINTS OF CONTACT:

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

Highway Agency: *Laura Fenley, 608-246-5455, laura.fenley@dot.state.wi.us*

Bill Duckert, 608-246-5440, william.duckert@dot.state.wi.us

Steven Krebs, 608-246-5399, steven.krebs@dot.state.wi.us

John Williamson, 608-267-2939, john.williamson@dot.state.wi.us

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

FHWA Division Office Liaison: *Wesley Shemwell, 608-829-7521, Wesley.shemwell@fhwa.dot.gov*

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

3. Agenda

BRIEFING DATE: *Briefing not requested for this visit*

ON SITE PERIOD: *December 14, 2004*

TRUCK ROUTE CHECK: *Completed*

4. Site Location/ Directions

NEAREST AIRPORT: *Dane County Regional Airport, Madison, Wisconsin.*

DIRECTIONS TO THE SITE: *US Route 29, 1.25miles east of Hilltop Road.*

MEETING LOCATION: S*ite beginning at 8:00 a.m.*

WIM SITE LOCATION: *US Route 29, milepost 189.8 (Latitude: 44.8508 ^{0} and Longitude: -89.2671^{0})*

WIM SITE LOCATION MAP:

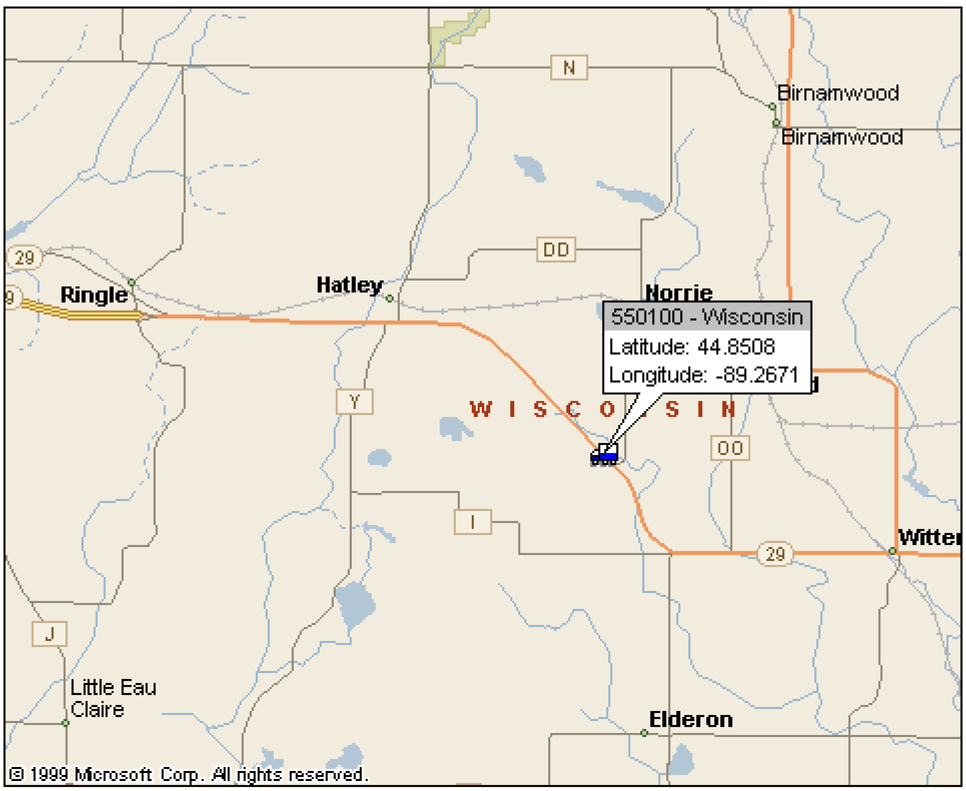


Figure 4.1: Site 550100 in Wisconsin

5. Truck Route Information

ROUTE RESTRICTIONS: *None.*

SCALE LOCATION: *Rib Mountain Truck Centers, US 51-29 Exit 188 Wausau, WI; 15.0 miles; Phone: 7153555600, Fax: 7153598728, Proprietor: Sharon Klatt; Latitude: 44.91512, Long: -89.64942; Open 24/7; $8.00 per weigh.*

TRUCK ROUTE:

- *Eastbound: 1.94 miles to Willow Drive*
- *Westbound: 1.25 miles to Hilltop Road*

6. Sheet 17 – Wisconsin (550100)

1.* ROUTE ___US-29_____MILEPOST _189.8__LTPP DIRECTION - N S E W

2.* WIM SITE DESCRIPTION - Grade __<_1___ % Sag vertical Y / N

Nearest SPS section upstream of the site __0__2__6 _2 ___

Distance from sensor to nearest upstream SPS Section ___2__7__1____ ft

3.* LANE CONFIGURATION

Lanes in LTPP direction _2___ Lane width _1_2__ ft

Median -
1 – painted
2 – physical barrier
3 – grass
4 – none

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

Shoulder width ___8 ___ ft

4.* PAVEMENT TYPE ____Asphalt Concrete________

5.* PAVEMENT SURFACE CONDITION – Distress Survey

Date ___12-14-04_Photo Downstream_TO_7_55_144_0100_12_14_04.JPG____

Date ___12-14-04_Photo Upstream_TO_7_55_144_0100_12_14_04.JPG ____

Date ______________________Distress Photo Filename _________________

6. * SENSOR SEQUENCE ____loop – right wheelpath bending plate – loop – left wheelpath bending plate________

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 / N

distance __________

Intersection/driveway within 300 m downstream of sensor location Y / N

distance __________

Is shoulder routinely used for turns or passing? Y / N

9. DRAINAGE (*Bending plate and load cell systems only)*

1 – Open to ground
2 – Pipe to culvert
3 – None

Clearance under plate ___ _6_. _0_ 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_6__ ft
Distance from system __1_5_3_ ft
TYPE _____M____________________

CABINET ACCESS controlled by LTPP / STATE / JOINT?
Contact - name and phone number ___John Williamson (608) 267-2939__
Alternate - name and phone number ___Jane Oldenburg (608) 245-2679__

11. * POWER
Distance to cabinet from drop _1_ ___ ft Overhead / underground / solar / AC in cabinet?
Service provider ____________________ Phone number ______________

12. * TELEPHONE
Distance to cabinet from drop ___ _1_ ___ ft Overhead / under ground / cell?
Service provider ____________________ Phone Number ______________

13.* SYSTEM (software & version no.)- ___DAW-100 Ver. 8.65 V3-T3____________
Computer connection – RS232 / Parallel port / USB / Other _______________

14. * TEST TRUCK TURNAROUND time __1_0__ minutes DISTANCE _6.38_ mi

15. PHOTOS FILENAME
Power source _ Power_Source_TO_7_55_144_0100_12_14_04.JPG _________
Phone source _ Phone_Source_TO_7_55_144_0100_12_14_04.JPG _________
Cabinet exterior _ Cabinet_Exterior_TO_7_55_144_0100_12_14_04.JPG _______
Cabinet interior _ Cabinet_Interior_TO_7_55_144_0100_12_14_04.JPG _______
Weight sensors _ Lead_Weigh_Sensor_TO_7_55_144_0100_12_14_04.JPG ____
Classification sensors _ Trail_Weigh_Sensor_TO_7_55_144_0100_12_14_04.JPG ____
Other sensors ______________________
Description ________________
Downstream direction at sensors on LTPP lane _
Downstream_TO_7_55_144_0100_12_14_04.JPG ___________________
Upstream direction at sensors on LTPP lane _
Upstream_TO_7_55_144_0100_12_14_04.JPG __________________

COMMENTS

GPS Coordinates: Latitude: 44.8508^0 and Longitude: -89.2671^0

Amenities:

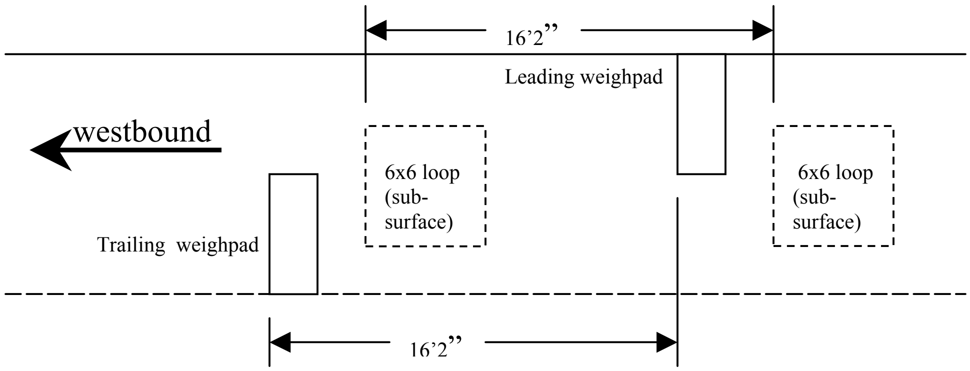
Hatley – 3 miles west of site: BP gas, Subway restaurant

Wausau – 20 miles west of site: Various gas stations, hotels, restaurants, Home Depot

COMPLETED BY Dean J. Wolf

PHONE (301) 210-5105 DATE COMPLETED _1_2_ /_1_4_ / _2_0_0_4_

Sketch of equipment layout



Site Map

Figure 6.1: Site Map of 550100 in Wisconsin

Cabinet_Exterior_TO_7_144_0100_12_14_04.JPG

Cabinet_Interior_TO_7_144_0100_12_14_04.JPG

Lead_Weigh_Sensor_TO_7_55_144_0100_12_14_04.JPG

Trail_Weigh_Sensor_TO_7_55_144_0100_12_14_04.JPG

Phone_Source_TO_7_144_0100_12_14_04.JPG

Power_Source_TO_7_144_0100_12_14_04.JPG

WIM_Site_TO_7_144_0100_12_14_04.JPG

WIM_to_Cabinet_TO_7_144_0100_12_14_04.JPG

SHEET 18	STATE CODE [_55_]
LTPP MONITORED TRAFFIC DATA	SPS PROJECT ID [_0100 _]
WIM SITE COORDINATION	DATE: (mm/dd/yyyy) 12 / 14 / 2004

Rev. 05/18/04

1. DATA PROCESSING –
   a. Down load –
      X State only
      □ LTPP read only
      □ LTPP download
      □ LTPP download and copy to state

   b. Data Review –
      X State per LTPP guidelines
      □ State – □ Weekly □ Twice a Month □ Monthly □ Quarterly
      □ LTPP

   c. Data submission –
      X State – □ Weekly □ Twice a month □ Monthly □ Quarterly
      □ LTPP

2. EQUIPMENT –
   a. Purchase –
      □ LTPP
      X State

   b. Installation –
      □ Included with purchase
      □ Separate contract by State
      X State personnel
      □ LTPP contract

   c. Maintenance –
      □ Contract with purchase
      □ Separate contract LTPP
      □ Separate contract State
      X State personnel

   d. Calibration –
      □ Vendor
      X State
      □ LTPP

   e. Manuals and software control –
      X State
      □ LTPP

   f. Power –
      i. Type –
         □ Overhead
         X Underground
         □ Solar

ii. Payment –
X State
□ LTPP
□ N/A

g. Communication –
i. Type –
X Landline
□ Cellular
□ Other

ii. Payment –
X State
□ LTPP
□ N/A

3. PAVEMENT –
a. Type –
□ Portland Concrete Cement
□ Asphalt Concrete

b. Condition –
□ Always new
□ Replacement as needed
□ Grinding and maintenance as needed
□ Maintenance only
□ No remediation

c. Profiling Site Markings –
i. Short wave –
□ Permanent
□ Temporary

ii. Long wave –
□ Permanent
□ Temporary

4. ON SITE ACTIVITIES –
a. WIM Validation Check - advance notice required __3___ weeks MINIMUM (to arrange traffic control)

b. Notice for straightedge and grinding check - _______ days / weeks
i. On site lead –
□ State
□ LTPP

ii. Accept grinding –
☐ State
☐ LTPP

c. Calibration Routine –
☐ LTPP – ☐ Semi-annually ☐ Annually
☐ State per LTPP protocol – ☐ Semi-annually ☐ Annually
X State other – _system auto-calibration__________

d. Test Vehicles
i. Trucks –
1st – Air suspension 3S2 ☐ State ☐ LTPP
2nd – ________________ ☐ State ☐ LTPP
3rd – ________________ ☐ State ☐ LTPP
4th – ________________ ☐ State ☐ LTPP

ii. Loads – ☐ State ☐ LTPP

iii. Drivers – ☐ State ☐ LTPP

e. Contractor(s) with prior successful experience in WIM calibration in state:

____unknown____

f. Access to cabinet
i. Personnel Access –
X State only
☐ Joint
☐ LTPP

ii. Physical Access –
XKey
☐ Combination

g. State personnel required on site – XYes ☐No

h. Traffic Control Required – ☐Yes ☐No Depends on what

i. Enforcement Coordination Required – ☐Yes ☐No is to be done

j. Authorization to calibrate site –
X State only
☐ LTPP

5. SITE SPECIFIC CONDITIONS –
a. Funds and accountability – ______________________________________

b. Reports – ____

c. Other – ____

6. CONTACTS –

a. Equipment (operational status, access, etc.) –

Name: _John Williamson________ Phone: 608-267-2939_____

Agency: Wisconsin Department of Transportation___

b. Data Processing and Pre-Visit Data –

Name: ____ John Williamson _____ Phone: __608-267-2939___

Agency: ____

c. Construction schedule and verification –

Name: ________________________ Phone: __________________

Agency: ____

d. Test Vehicles (trucks, loads, drivers) –

Name: ________________________ Phone: __________________

Agency: ____

e. Traffic Control –

Name: __ John Williamson ___ Phone: _608-267-2939____

Agency: ____

f. Enforcement Coordination –

Name: ___ John Williamson ____ Phone: __608-267-2939___

Agency: ____

SHEET 16 LTPP MONITORED TRAFFIC DATA SITE CALIBRATION SUMMARY	*STATE ASSIGNED ID [__ 0__ _0_ _1_] *STATE CODE [_5_ _5_] *SHRP SECTION ID [_0_ _1_ _0_ _0_]

SITE CALIBRATION INFORMATION

1. * DATE OF CALIBRATION (MONTH/DAY/YEAR) [_1_2 __ / _1_ _4_ / _2_ _0_ _0_ _4_]

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

3. * REASON FOR CALIBRATION
____ REGULARLY SCHEDULED SITE VISIT ____ RESEARCH
____ EQUIPMENT REPLACEMENT ____ TRAINING
____ DATA TRIGGERED SYSTEM REVISION ____ NEW EQUIPMENT INSTALLATION
__X__ OTHER (SPECIFY) _______Site Assessment Visit____

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

5. EQUIPMENT MANUFACTURER ____PAT America____

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

	TRUCK	TYPE	SUSPENSION
TYPE PER FHWA 13 BIN SYSTEM	1	________	________________
SUSPENSION: 1 - AIR; 2 - LEAF SPRING	2	________	________________
3 - OTHER (DESCRIBE)	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) _N____
IF YES, LIST AND DEFINE AUTO-CALIBRATION VALUE: ______________________________

CLASSIFIER TEST SPECIFICS***

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

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

14. MEAN DIFFERENCE IN VOLUMES BY VEHICLES CLASSIFICATION:
*** FHWA CLASS 9 ____ _18___ ____ FHWA CLASS ____ ____ ____ ____ ____
*** FHWA CLASS 8 ____ _17___ ____ FHWA CLASS ____ ____ ____ ____ ____
FHWA CLASS ____ ____ ____ ____ ____
FHWA CLASS ____ ____ ____ ____ ____
*** PERCENT “UNCLASSIFIED” VEHICLES: ____ __6__ . ____

PERSON LEADING CALIBRATION EFFORT: ______Dean J. Wolf________________________________
CONTACT INFORMATION: _____301-210-5105______________________________ rev. November 9, 1999