Validation Report

Arkansas, SPS-2
Task Order 16, CLIN 2
May 15 to 16, 2007

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1 Executive Summary

A visit was made to the Arkansas 0200 on May 15 to 16, 2007 for the purposes of conducting a validation of the WIM system located on I-30, 39 miles west of Little Rock. The SPS-2 is located in the righthand, westbound lane of a four-lane divided facility. The LTPP lane is the only lane that is instrumented at this site. The validation procedures were in accordance with LTPP's SPS WIM Data Collection Guide dated August 21, 2001.

This is thought to be a relocation of the previous site from within a LTPP test section. There is no information currently available to identify the location from which earlier data was collected. This is the first successful validation visit to this location. The site was installed mid-winter 2006 by IRD. The initial visit had been scheduled for December 19, 2006, which was cancelled the Friday before due to equipment problems. The second visit was attempted on February 13, 2007, but again ended with us unable to validate the site due to on-going equipment problems.

This site meets all LTPP precision requirements except speed which is not considered sufficient to disqualify the site as having research quality data. The LTPP Mod 3 classification algorithm is not currently providing research quality classification information at this site.

The site is instrumented with bending plate and iSINC electronics. It is installed in portland cement concrete, 400 feet long.

The validation used the following trucks:

1) 5-axle tractor-trailer with a tractor having an air suspension and a trailer with a standard rear tandem and an air suspension loaded to 77,150 lbs., the "golden" truck.
2) 5-axle tractor semi-trailer with a tractor having an air suspension and a trailer with a standard rear tandem and a steel leaf suspension loaded to 63,040 lbs., the partial truck.

The validation speeds ranged from 43 to 65 miles per hour. The pavement temperatures ranged from 70 to 104 degrees Fahrenheit. The desired speed range was achieved during this validation. The desired 30 degree Fahrenheit temperature range was also achieved.

Table 1-1 Post-Validation results – 050200 – 16-May-2007

SPS-1, -2, -5, -6 and -8	95 %Confidence Limit of Error	Site Values	Pass/Fail
Steering axles	±20 percent	-2.0 ± 7.0%	Pass
Tandem axles	±15 percent	1.6 ± 5.7%	Pass
GVW	±10 percent	1.1 ± 3.6%	Pass
Speed	±1 mph [2 km/hr]	**-0.3 ± 1.6 mph**	**Fail**
Axle spacing	± 0.5 ft [150mm]	0.0 ± 0.0 ft	Pass

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. Profile data is not yet available from which to compute WIM Index values.

If this site had been evaluated using ASTM E-1318-02 it would have met the conditions for a Type I site exclusive of wheel loads. LTPP does not validate WIM performance with respect to wheel loads.

Table 1-2 Results Based on ASTM E-1318-02 Test Procedures

Characteristic	Limits for Allowable Error	Percent within Allowable Error	Pass/Fail
Single Axles	± 20%	100%	Pass
Axle Groups	± 15%	100%	Pass
GVW	± 10%	100%	Pass

This site needs 5 years of data to meet the goal of five years of research quality data.

2 Corrective Actions Recommended

There are no corrective actions required at this site at this time.

3 Post Calibration Analysis

This final analysis is based on test runs conducted May 16, 2007 from mid-morning to mid-afternoon at test site 050200 on I-30. This SPS-2 site is at milepost 101.8 on the westbound, righthand of a four-lane divided facility. No auto-calibration was used during test runs. The two trucks used for the calibration and for the subsequent validation included:

1. 5-axle tractor-trailer with a tractor having an air suspension and trailer with a standard rear tandem and an air suspension loaded to 77,150 lbs., the "golden" truck.
2. 5-axle tractor semi-trailer with a tractor having an air suspension and a trailer with a standard rear tandem and a steel leaf suspension loaded to 63,040 lbs., the "partial" truck.

Each truck made a total of 20 passes over the WIM scale at speeds ranging from approximately 43 to 65 miles per hour. The desired speed range was achieved during this validation. Pavement surface temperatures were recorded during the test runs ranging from about 70 to 104 degrees Fahrenheit. The desired 30 degree Fahrenheit temperature range was achieved. The computed values of 95% confidence limits of each statistic for the total population are in Table 3-1. The failure of the speed criterion does not preclude this site from being considered capable of producing research quality data.

Table 3-1 Post-Validation Results – 050200 – 16-May-2007

SPS-1, -2, -5, -6 and -8	95 %Confidence Limit of Error	Site Values	Pass/Fail
Steering axles	±20 percent	-2.0 ± 7.0%	Pass
Tandem axles	±15 percent	1.6 ± 5.7%	Pass
GVW	±10 percent	1.1 ± 3.6%	Pass
Speed	±1 mph [2 km/hr]	**-0.3 ± 1.6 mph**	**Fail**
Axle spacing	± 0.5 ft [150mm]	0.0 ± 0.0 ft	Pass

The test runs were conducted primarily during the morning and afternoon hours. Sunny weather conditions resulted in a range of pavement temperatures. The runs were also conducted at various speeds to determine the effects of these variables on the performance of the WIM scale. To investigate these effects, the dataset was split into three speed groups and three temperature groups. The distribution of runs by speed and temperature is illustrated in Figure 3-1. The figure indicates that the desired distribution of speed and temperature combinations was achieved for this set of validation runs.

The three speed groups were divided as follows: Low speed – 43 to 49 mph, Medium speed – 50 to 59 mph and High speed – 60 + mph. The three temperature groups were created by splitting the runs between those at 70 to 84 degrees Fahrenheit for Low

temperature, 85 to 98 degrees Fahrenheit for Medium temperature and 99 to 104 degrees Fahrenheit for High temperature.

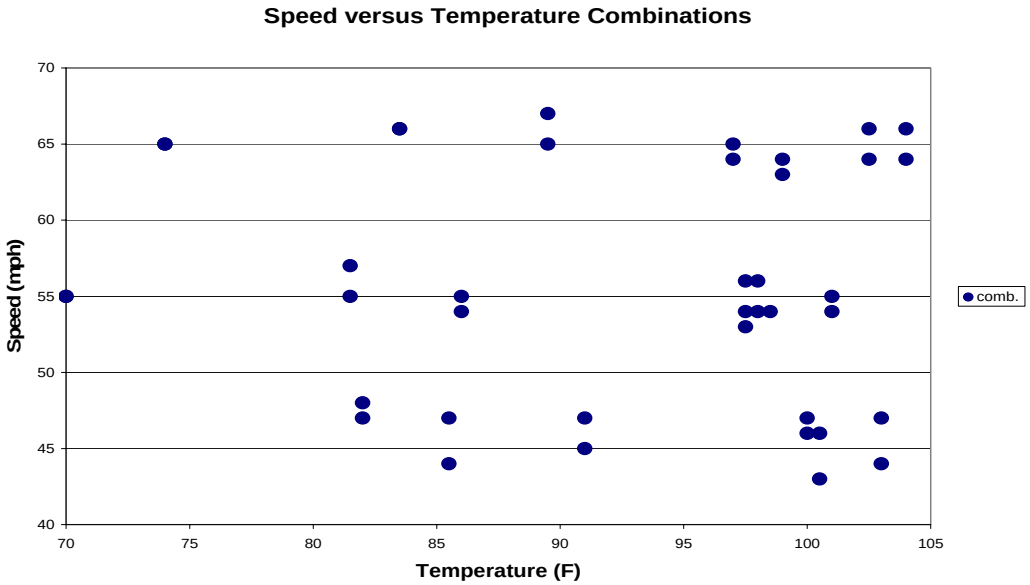


Figure 3-1 Post-Validation Speed-Temperature Distribution – 050200 – 16-May-2007

A series of graphs was developed to investigate visually any sign of a relationship between speed or temperature and the scale performance. Figure 3-2 shows the GVW Percent Error vs. Speed graph for the population as a whole.

The weights are slightly overestimated at the low and high speeds and essentially unbiased in the medium range.

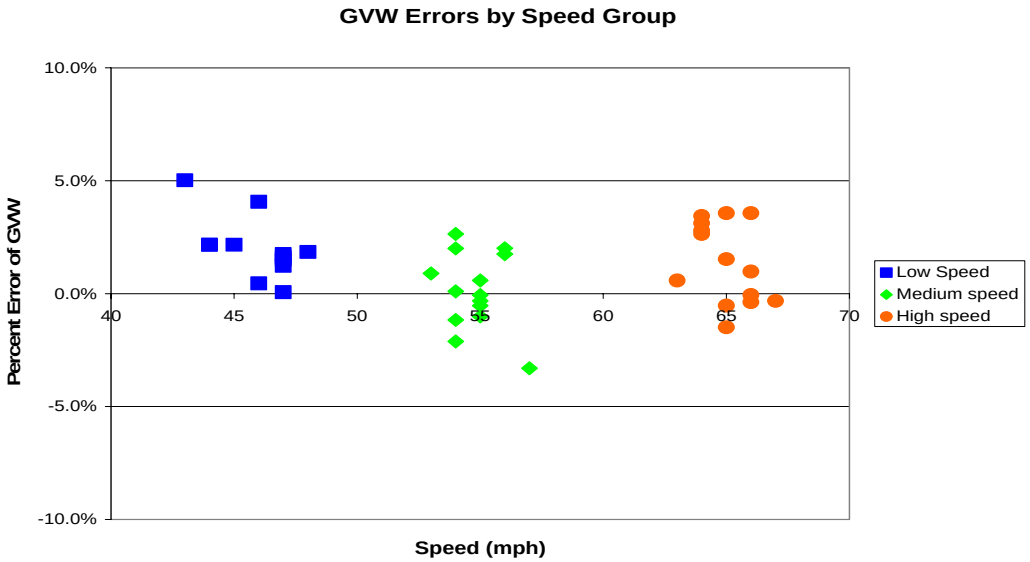


Figure 3-2 Post-validation GVW Percent Error vs. Speed – 050200 – 16-May-2007

Figure 3-3 shows the relationship between temperature and GVW percentage error. It would appear that the weights are not particularly influenced by temperature except at the higher end of the range for this visit. However, it can be seen from looking at Figure 3-3 that there is an unequal distribution of observations by temperature. The visual trend may actually be an artifact of the number of points by temperature group.

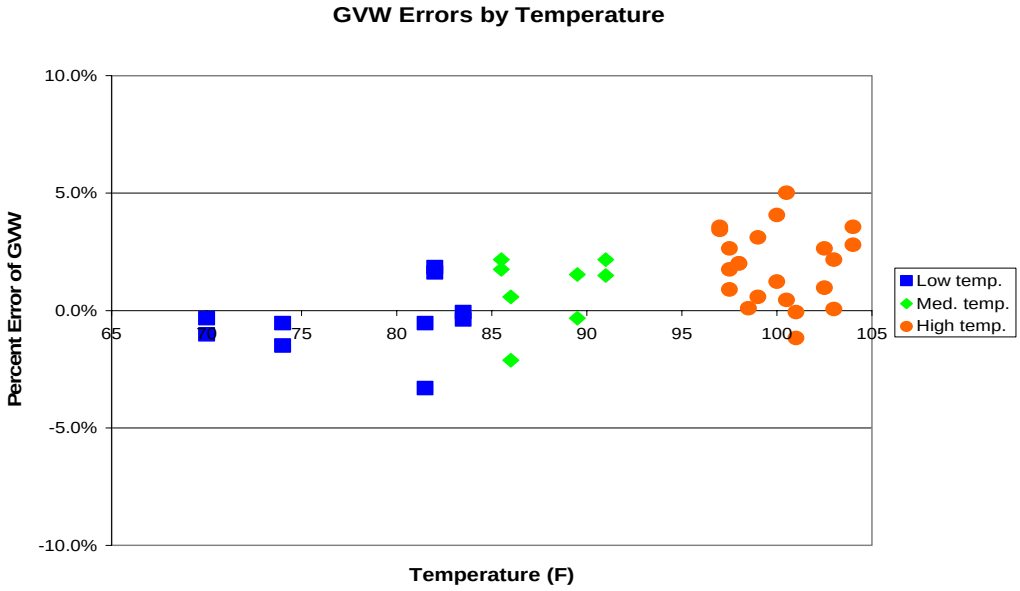


Figure 3-3 Post-Validation GVW Percent Error vs. Temperature – 050200 – 16-May-2007

Figure 3-4 shows the relationship between the drive tandem spacing errors in feet and speeds. This graph is used as a potential indicator of classification errors due to failure to correctly identify spacings on a vehicle. Since the most common reference value is the drive tandem on a Class 9 vehicle, this is the spacing evaluated and plotted for validations. As can be seen in Figure 3-4 there is no indication of spacing errors as a function of speed.

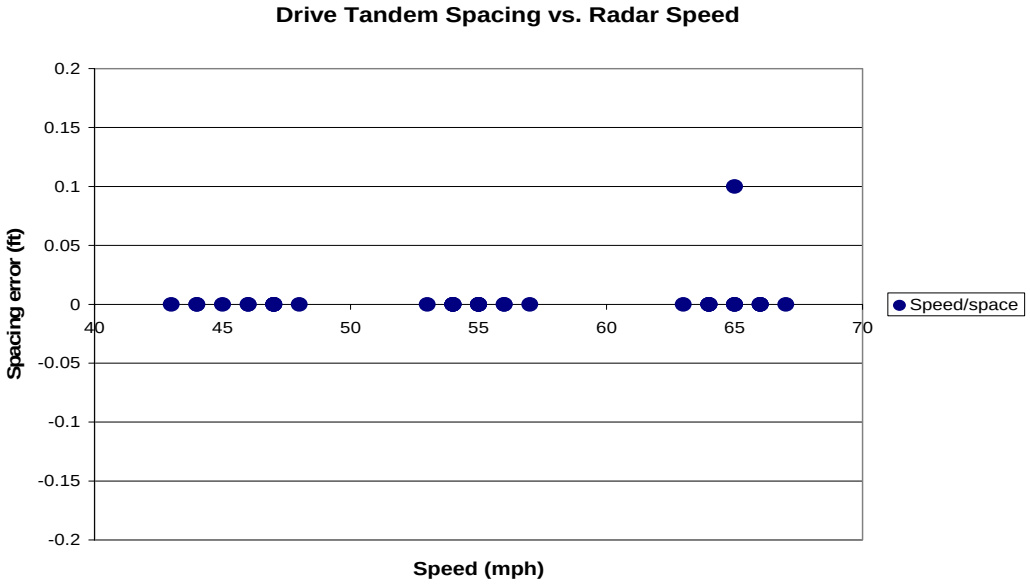


Figure 3-4 Post-Validation Spacing vs. Speed – 050200 – 16-May-2007

3.1 Temperature-based Analysis

The three temperature groups were created by splitting the runs between those at 70 to 84 degrees Fahrenheit for Low temperature, 85 to 98 degrees Fahrenheit for Medium temperature and 99 to 104 degrees Fahrenheit for High temperature.

Table 3-2 Post-Validation Results by Temperature Bin – 050200 – 16-May-2007

Element	95% Limit	Low Temperature 70 to 84 °F	Medium Temperature 85 to 98 °F	High Temperature 99 to 104 °F
Steering axles	±20 %	-1.8 ± 8.5%	-1.6 ± 9.3%	-2.2 ± 6.8%
Tandem axles	±15 %	-0.2 ± 5.4%	1.2 ± 5.3%	2.6 ± 5.6%
GVW	±10 %	-0.4 ± 3.3%	0.9 ± 3.5%	1.9 ± 3.3%
Speed	±1 mph	-0.8 ± 2.1 mph	-0.5 ± 1.8 mph	-0.1 ± 1.4 mph
Axle spacing	± 0.5 ft	0.0 ± 0.0 ft	0.0 ± 0.0 ft	0.0 ± 0.0 ft

The data in Table 3-2 would seem to indicate different behavior when temperature is below 85 degrees Fahrenheit. However; the sample size at low temperature is about half that at high temperature. Additionally the variability of the high temperature range is very sensitive to the decision on where to put the Medium – High temperature boundary.

Figure 3-5 is the distribution of GVW Errors versus Temperature by Truck graph. Both trucks have the same trends for weight with temperature. If there is a temperature effect it does not appear to be truck related.

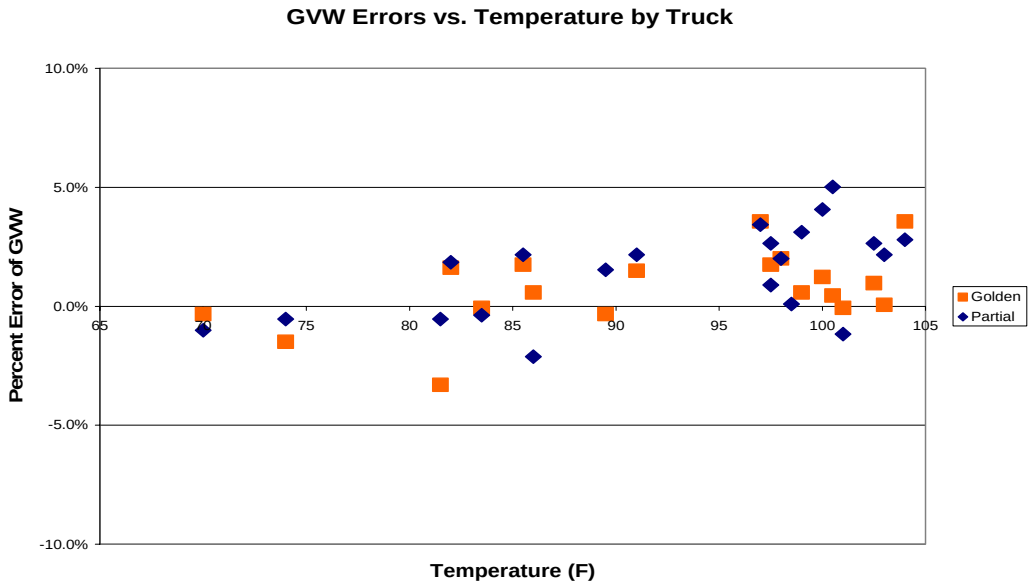


Figure 3-5 Post-Validation GVW Percent Error vs. Temperature by Truck – 050200 – 16-May-2007

Figure 3-6 shows the relation between steering axle errors and temperature. This graph is included due to the frequent use of steering axle weights of Class 9 vehicles for calibration. This site does not use auto-calibration. The steering axles in this graph are associated only with Class 9 vehicles. The steering axles appear to be consistently underestimated in all temperature groups.

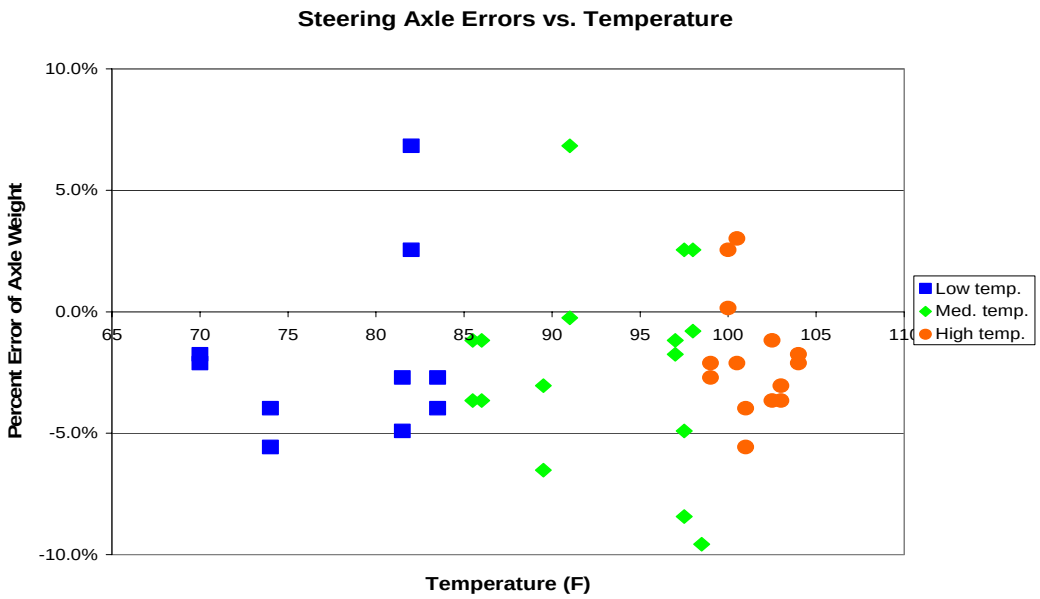


Figure 3-6 Post-Validation Steering Axle Error vs. Temperature by Group – 050200 – 16-May-2007

3.2 Speed-based Analysis

The three speed groups were divided using 43 to 49 mph for Low speed, 50 to 59 mph for Medium speed and 60+ mph for High speed.

Table 3-3 Post-Validation Results by Speed Bin – 050200 – 16-May-2007

Element	95% Limit	Low Speed 43 to 49 mph	Medium Speed 50 to 59 mph	High Speed 60+ mph
Steering axles	±20 %	0.7 ± 8.2%	-3.2 ± 7.6%	-3.0 ± 3.4%
Tandem axles	±15 %	2.2 ± 5.7%	0.6 ± 5.7%	1.2 ± 6.1%
GVW	±10 %	2.0 ± 3.0%	0.1 ± 3.7%	1.4 ± 3.8%
Speed	±1 mph	-0.8 ± 1.9 mph	-0.2 ± 1.7 mph	-0.1 ± 1.3 mph
Axle spacing	± 0.5 ft	0.0 ± 0.0 ft	0.0 ± 0.0 ft	0.0 ± 0.1 ft

Table 3-3 shows characteristics for each speed group. For the low and medium speed group the variability is about twice that of the high speed group for steering axles. For steering axles the underestimation for the medium and high speed groups is about the same. The low speed group has slightly overestimated steering axle loads. For tandem axles the overestimation and variability is very similar across speed groups. The GVW estimates are for slight across the speed groups with low variability.

Figure 3-7 shows the distribution of GVW errors by truck across the entire speed range. Except at low speed, the variability and bias are essentially the same. Since the Sheet 20 evaluation for post-validation conditions indicates that the 15th percentile speed is 60 mph this is not considered significant.

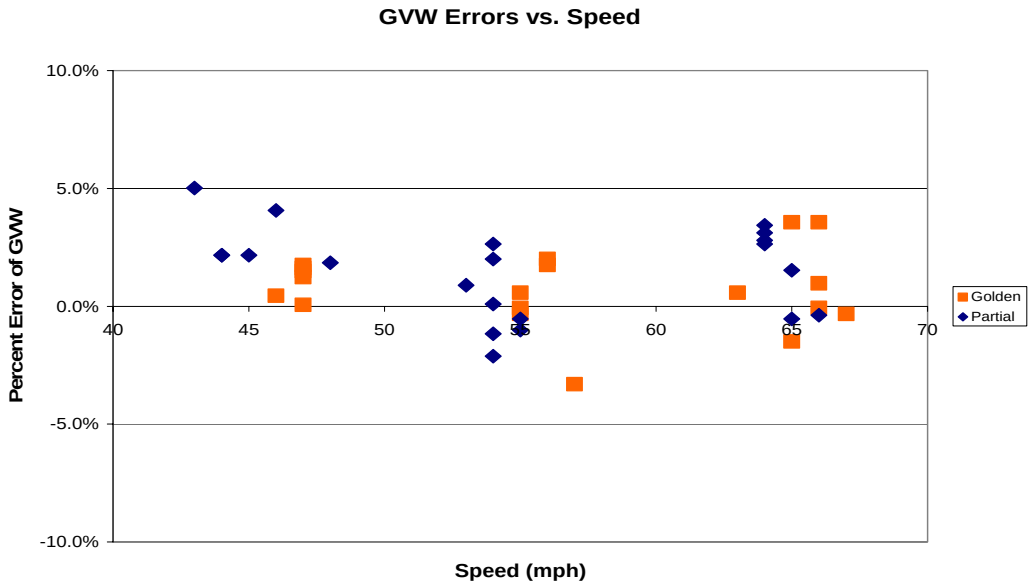


Figure 3-7 Post-Validation GVW Percent Error vs. Speed by Truck – 050200 – 16-May-2007

Figure 3-8 shows the relation between steering axle errors and speed. This graph is included due to the frequent use of steering axle weights of Class 9 vehicles for auto-calibration. This site does not use auto-calibration. The steering axles in this graph are associated only with Class 9 vehicles. There is no particular influence of speed on steering axle estimates.

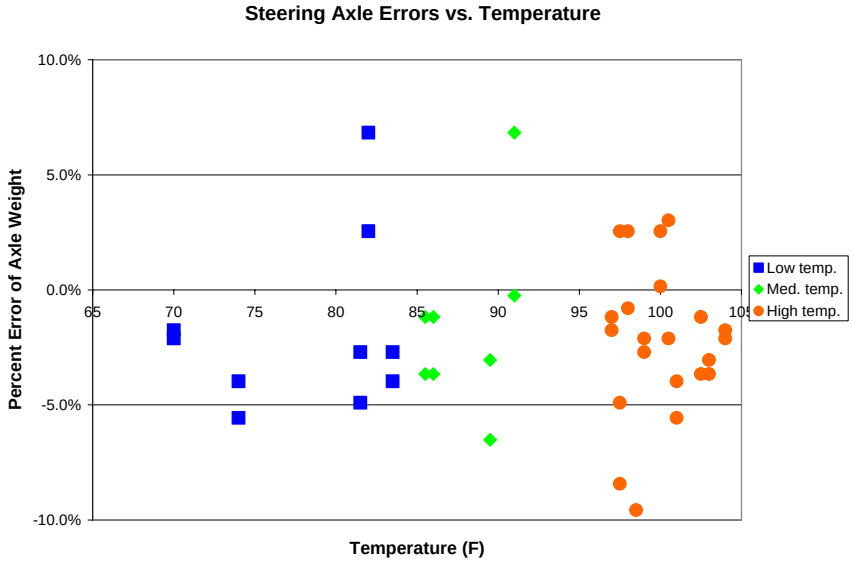


Figure 3-8 Post-Validation Steering Axle Percent Error vs. Speed by Group – 050200 – 16-May-2007

3.3 Classification Validation

This LTPP installed site uses the FHWA 13-bin classification scheme and the LTPP Mod 3 classification algorithm. Classification 15 has been added to define unclassified vehicles.

The classification validation is intended to find gross errors in vehicle classification, not to validate the installed algorithm. A sample of 100 trucks 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 0 percent unclassified vehicles.

The second check is the ability of the algorithm to correctly distinguish between truck classes with no more than 2% errors in such classifications. Table 3-4 has the classification error rates by class. The overall misclassification rate is 6. percent. The misclassification is the result of vehicles in Classes 4 and 8 being identified by the equipment as Class 5s. The high error rates for classes 4, 5 and 8 are the result of very small samples, 5 or fewer.

Table 3-4 Truck Misclassification Percentages for 050200 – 16-May-2007

Class	Percent Error	Class	Percent Error	Class	Percent Error
4	100	5	50	6	N/A
7	N/A				
8	50	9	0	10	0
11	0	12	0	13	N/A

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 0 with a mean difference of zero.

Table 3-5 Truck Classification Mean Differences for 050200 – 16-May-2007

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

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 either missed or not assigned to the class by the equipment. It is not possible to miss more than all of them or one hundred out of one hundred. Numbers 1 or larger indicate at least 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 by the observer. There is no way to tell how many vehicles of that type might actually exist. N/A means no vehicles of the class were recorded by either the equipment or the observer.

3.4 Evaluation by ASTM E-1318 Criteria

The ASTM E-1318 criteria for a successful validation of Type I sites is 95% of the observed errors within the limits for allowable errors for each of the relevant statistics. If this site had been evaluated using ASTM E-1318-02 it would have met the conditions for a Type I site exclusive of wheel loads. LTPP does not validate WIM performance with respect to wheel loads.

Table 3-6 Results of Validation Using ASTM E-1318-02 Criteria

Characteristic	Limits for Allowable Error	Percent within Allowable Error	Pass/Fail
Single Axles	± 20%	100%	Pass
Axle Groups	± 15%	98.8%	Pass
GVW	± 10%	100%	Pass

4 Pavement Discussion

The pavement condition did not appear to influence truck movement across the sensors.

4.1 Profile Analysis

As of this validation there was no post-installation profile information available for this site. It is expected that a site profiling visit will occur in the next year. When the data is received an amended report including WIMIndex information will be provided.

4.2 Distress Survey and Any Applicable Photos

During a visual survey of the pavement no distresses that would influence truck movement across the WIM scales were noted.

4.3 Vehicle-pavement Interaction Discussion

A visual observation of the trucks as they approach, traverse and leave the sensor area did not indicate any visible motion of the trucks that would affect the performance of the WIM scales. Trucks appear to track down the wheel path and daylight cannot be seen between the tires of any of the sensors for the equipment.

5 Equipment Discussion

The traffic monitoring equipment at this location includes bending plate and iSINC. These sensors are installed in a portland cement concrete pavement about 400 ft in length.

5.1 Pre-Evaluation Diagnostics

A complete electronic and electrical check of all system components including in-road sensors, electrical power, and telephone service were performed immediately prior to the evaluation. All sensors and system components were found to be within operating parameters.

A complete visual inspection of all WIM system and support components was also performed. All components appear to be in good physical condition.

5.2 Calibration Process

The equipment required one-iteration of the calibration process between the initial 40 runs and the final 40 runs to improve the performance of the equipment and diminish the discernable bias in weights provided by the equipment particularly for the high speed group that includes the 85th percentile speed as determined by the pre-validation Sheet 20 assessment.

5.2.1 Calibration Iteration 1

For this equipment, there are 5 speed designated weight compensation factors for each sensor that are adjusted to directly affect the weight reported by the WIM equipment. To reduce overestimation of weights these factors are reduced by the same percentage of the overestimation, and if the weights are underestimated, these factors are increased by the same percentage as the mean error.

The beginning compensation factors for this validation were:

Speed point	sensor 1	sensor 2
80 kph (50 mph)	3475	3475
88 kph (55 mph)	3530	3530
96 kph (60 mph)	3655	3655
104 kph (65 mph)	3600	3600
112 kph (70 mph)	3670	3670

Based on the results from the Pre-Validation, which produced a mean GVW error range of -5.0% to +8.0%, the compensation factors were adjusted to compensate for underestimations and overestimations of GVW. The new factors and changes made are shown below.

Speed point	sensor 1	sensor 2	change
80 kph (50 mph)	3475	3475	none
88 kph (55 mph)	3576	3576	raised 1.3%
96 kph (60 mph)	3582	3582	lowered 2.0%
104 kph (65 mph)	3420	3420	lowered 5.0%
112 kph (70 mph)	3413	3413	lowered 7.0%

Table 5-1 Calibration Iteration 1 Results – 050200 – 16-May-2007 (9:00:00 AM)

SPS-1, -2, -5, -6 and -8	95 %Confidence Limit of Error	Site Values	Pass/Fail
Steering axles	±20 percent	-3.2 ± 8.5%	Pass
Tandem axles	±15 percent	-0.3 ± 5.4%	Pass
GVW	±10 percent	-0.8 ± 3.3%	Pass
Speed	±1 mph	**-0.8 ± 2.1 mph**	**Fail**
Axle spacing	± 0.5 ft	0.0 ± 0.0 ft	Pass

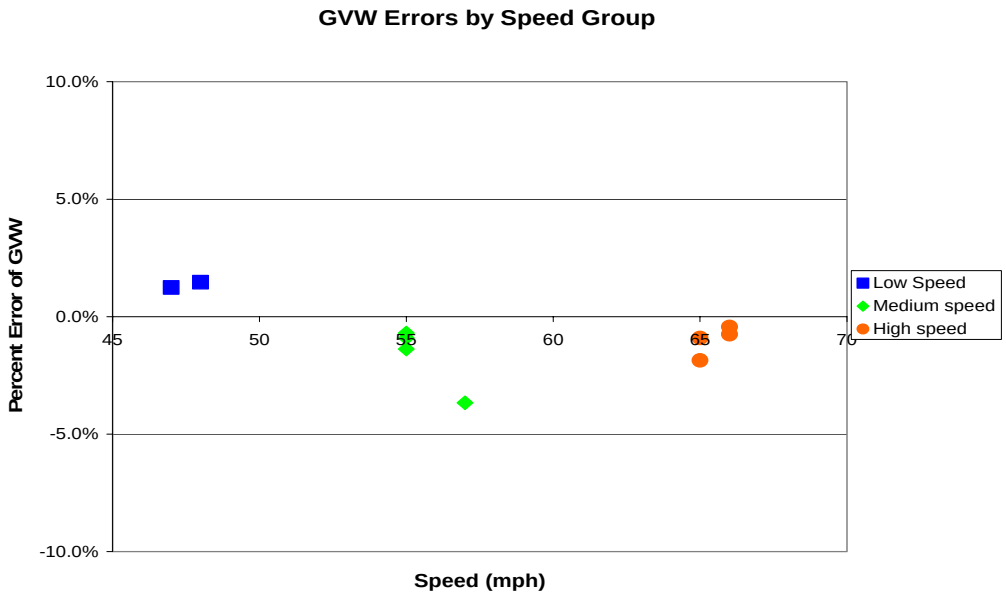


Figure 5-1 Calibration Iteration 1 GVW Percent Error vs. Speed Group – 050200 – 16-May-2007 (9:00:00 AM)

5.3 Summary of Traffic Sheet 16s

This site has validation information from the current visit only. Table 5-2 has the information to be included in TRF_CALIBRATION_AVC for Sheet 16s submitted for the current visit.

Table 5-2 Classification Validation History – 050200 – 16-May-2007

Date	Method	Mean Difference				Percent Unclassified
		Class 9	Class 8	Other 1	Other 2	
05/16/07	Manual	0	-50			0
05/15/07	Manual	0	-63			0

Table 5-3 has the information to be included in TRF_CALIBRATION_WIM for Sheet 16s submitted for the current visit.

Table 5-3 Weight Validation History – 050200 – 16-May-2007

Date	Method	Mean Error and (SD)		
		GVW	Single Axles	Tandem Axles
05/16/07	Test Trucks	1.1 (1.8)	-2.0 (3.4)	1.6 (2.9)
05/15/07	Test Trucks	2.0 (3.1)	-0.6 (3.3)	2.5 (4.2)

5.4 Projected Maintenance/Replacement Requirements

As a part of the SPS Pooled Fund contract under which this site was installed semi-annual maintenance activities will be conducted. No additional maintenance requirements have been identified as a result of this visit.

6 Pre-Validation Analysis

This pre-validation analysis is based on test runs conducted May 15, 2007 from mid-morning to early afternoon at 050200 on 39 miles west of Little Rock. This SPS-2 site is at milepost 101.8 on I-30 in the westbound, righthand of a four-lane divided facility. No auto-calibration was used during test runs. The two trucks used for initial validation included:

1. 5-axle tractor semi-trailer combination with a tractor having an air suspension and trailer with a standard rear tandem and an air suspension loaded to 77,540 lbs.
2. 5-axle tractor semi-trailer with a tractor having an air suspension and a trailer with a standard rear tandemand a steel leaf suspension loaded to 62,650 lbs. , the partial truck.

For the initial validation each truck made a total of 20 passes over the WIM scale at speeds ranging from approximately 44 to 65 miles per hour. The desired speed range was achieved during this validation. Pavement surface temperatures were recorded during the test runs ranging from about 72 to 112degrees Fahrenheit. The desired 30 degree Fahrenheit temperature range was also achieved. The computed values of 95% confidence limits of each statistic for the total population are in Table 6-1. It can be seen that the site was capable of producing research quality loading data at the pre-validation stage. However, investigation of the speed group trends led to the decision to perform a calibration to reduce bias in the estimates.

Table 6-1 Pre-Validation Results – 050200 – 15-May-2007

SPS-1, -2, -5, -6 and -8	95 %Confidence Limit of Error	Site Values	Pass/Fail
Steering axles	±20 percent	-0.6 ± 6.7%	Pass
Tandem axles	±15 percent	2.5 ± 8.3%	Pass
GVW	±10 percent	2.0 ± 6.4%	Pass
Speed	±1 mph [2 km/hr]	**-0.5 ± 2.5 mph**	**Fail**
Axle spacing	± 0.5 ft [150mm]	0.0 ± 0.1 ft	Pass

The test runs were conducted primarily during the morning and afternoon hours. Sunny weather conditions resulted in a wide range of pavement temperatures. The runs were also conducted at various speeds to determine the effects of these variables on the performance of the WIM scale. To investigate these effects, the dataset was split into three speed groups and three temperature groups. The distribution of runs within these groupings is illustrated in Figure 6-1. The figure indicates that the desired distribution of speed and temperature combinations was achieved for this set of validation runs.

The three speed groups were divided into 44 to 49 mph for Low speed, 50 to 59 mph for Medium speed and 60+ mph for High speed. The three temperature groups were created by splitting the runs between those at 72 to 84 degrees Fahrenheit for Low temperature, 85 to 101 degrees Fahrenheit for Medium temperature and 102 to 112 degrees Fahrenheit for High temperature.

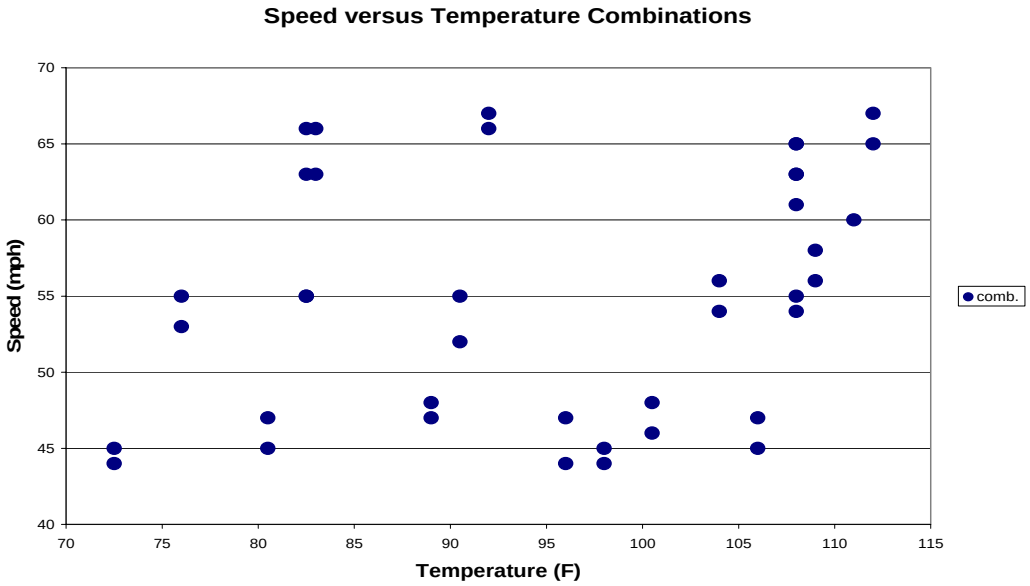


Figure 6-1 Pre-Validation Speed-Temperature Distribution – 050200 – 15-May-2007

A series of graphs was developed to investigate visually for any sign of any relationship between speed or temperature and the scale performance.

Figure 6-2 shows the GVW Percent Error vs. Speed graph for the population as a whole. In Figure 6-2 the slight overestimation for the low speed group and the some what higher overestimation for the high speed group are illustrated. In contrast the medium speed group generally has underestimates of GVW.

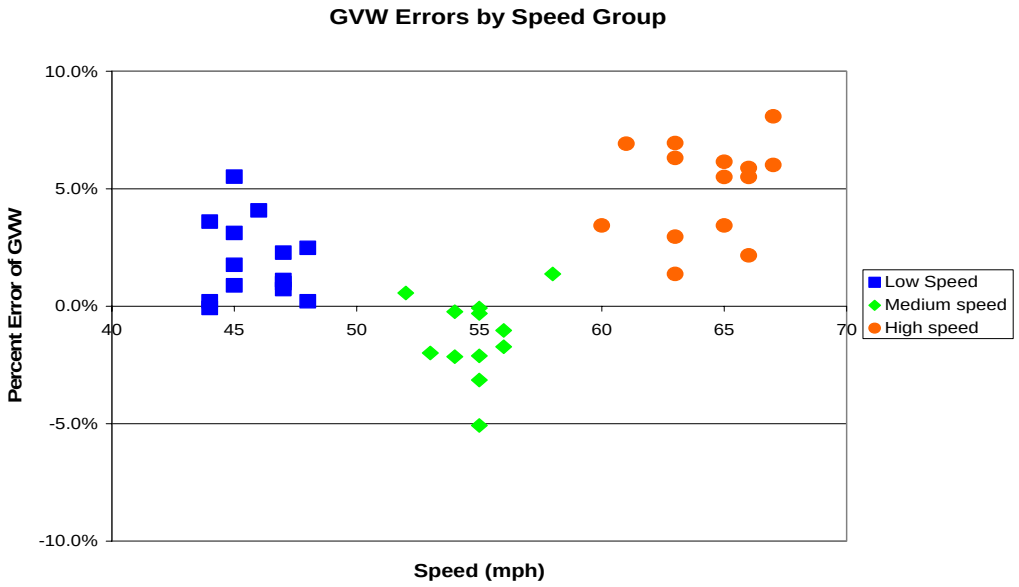


Figure 6-2 Pre-validation GVW Percent Error vs. Speed – 050200 – 15-May-2007

Figure 6-3 shows the relationship between temperature and GVW percentage error. There is no apparent temperature influence on GVW estimation.

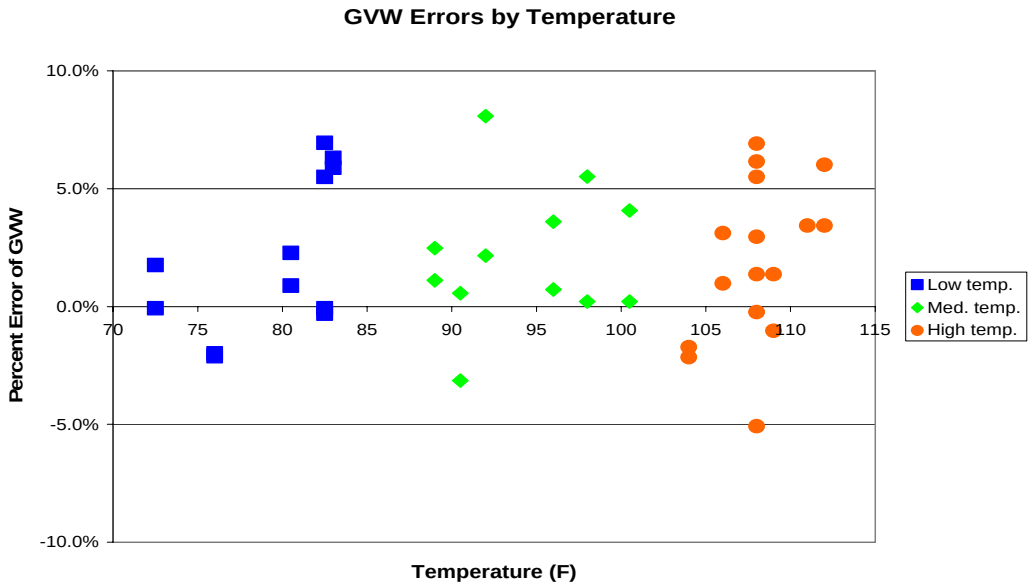


Figure 6-3 Pre-Validation GVW Percent Error vs. Temperature – 050200 – 15-May-2007

Figure 6-4 shows the relationship between the drive tandem spacing errors in feet and speeds. This graph is used as a potential indicator of classification errors due to failure to correctly identify spacings on a vehicle. Since the most common reference value is the

drive tandem on a Class 9 vehicle, this is the spacing evaluated and plotted for validations. At this site it would appear that underestimates of spacings occur at lower speeds and overestimates at higher ones. Very few spacing estimates are different from the actual drive tandem spacing.

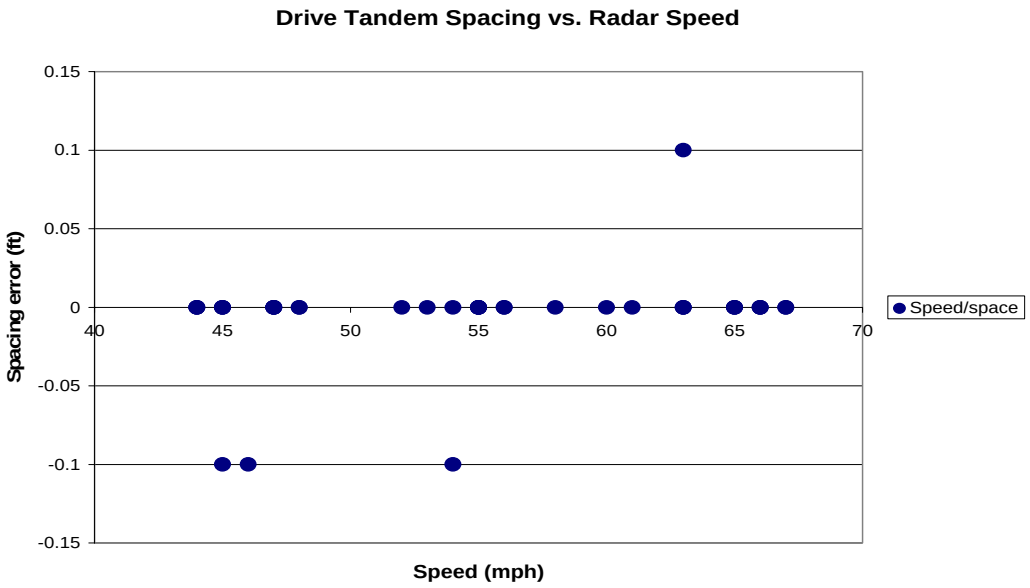


Figure 6-4 Pre-Validation Spacing vs. Speed - 050200 – 15-May-2007

6.1 Temperature-based Analysis

The three temperature groups were created by splitting the runs between those at 72 to 84 degrees Fahrenheit for Low temperature, 85 to 101 degrees Fahrenheit for Medium temperature and 102 to 112 degrees Fahrenheit for High temperature.

Table 6-2 Pre-Validation Results by Temperature Bin – 050200 – 15-May-2007

Element	95% Limit	Low Temperature 72 to 84 °F	Medium Temperature 85 to 101 °F	High Temperature 102 to 112 °F
Steering axles	±20 %	-1.1 ± 7.9%	0.5 ± 3.7%	-1.1 ± 8.5%
Tandem axles	±15 %	2.5 ± 8.8%	2.5 ± 8.6%	2.4 ± 8.6%
GVW	±10 %	2.1 ± 7.2%	2.1 ± 6.4%	1.9 ± 7.2%
Speed	±1 mph	-0.5 ± 1.8 mph	-0.6 ± 4.0 mph	-0.4 ± 2.3 mph
Axle spacing	± 0.5 ft	0.0 ± 0.1 ft	0.0 ± 0.1 ft	0.0 ± 0.1 ft

Table 6-2 shows very little difference is the bias or variability of the various loading estimates by temperature group.

Figure 6-5 also shows that the estimates by truck are apparently not affected by temperature.

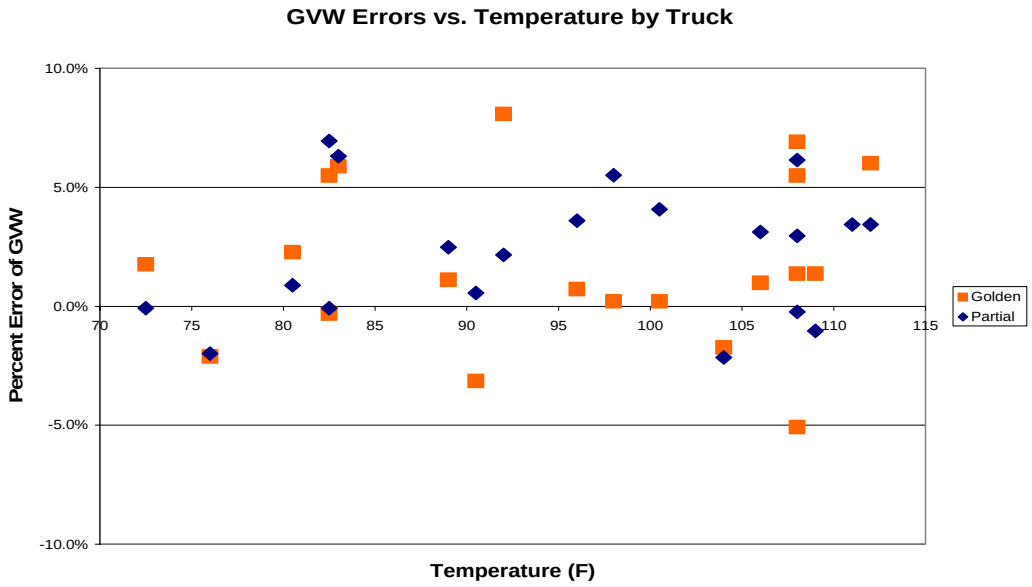


Figure 6-5 Pre-Validation GVW Percent Error vs. Temperature by Truck – 050200 – 15-May-2007

Figure 6-6 shows the relation between steering axle errors and temperature. This graph is included due to the frequent use of steering axle weights of Class 9 vehicles for auto-calibration. This site does not use auto-calibration. The steering axles in this graph are associated only with Class 9 vehicles.

Figure 6-6 shows that the estimation of steering axle weights is not particularly affected by temperature although somewhat greater variability exists for the low and high temperature groups.

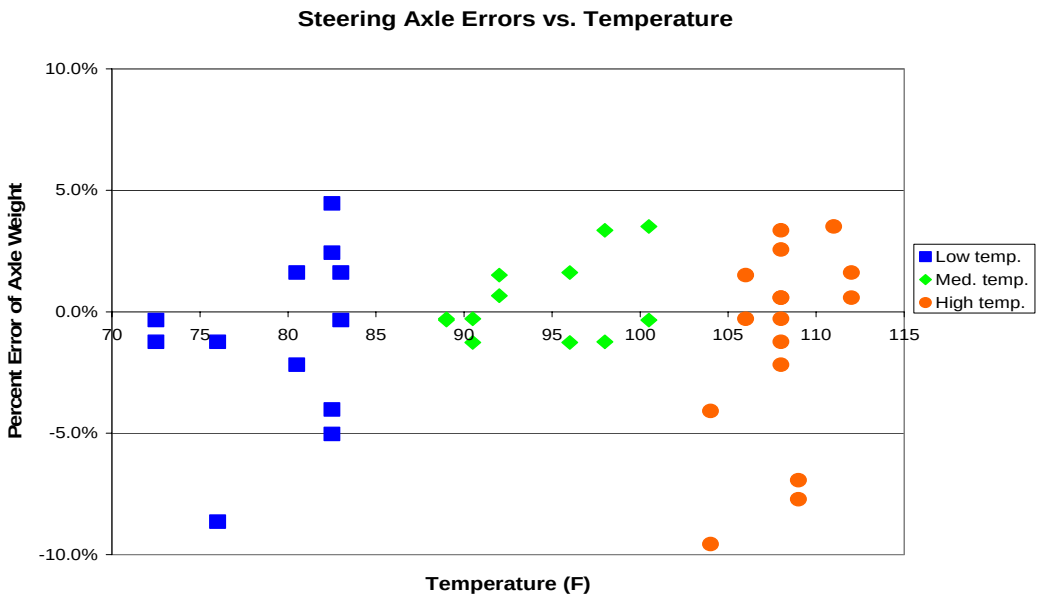


Figure 6-6 Pre-Validation Steering Axle Error vs. Temperature by Group – 050200 – 15-May-2007

6.2 Speed-based Analysis

The speed groups were divided as follows: Low speed – 44 to 49 mph, Medium speed – 50 to 59 mph and High speed – 60+ mph.

Table 6-3 Pre-Validation Results by Speed Bin – 050200 – 15-May-2007

Element	95% Limit	Low Speed 44 to 49 mph	Medium Speed 50 to 59 mph	High Speed 60+ mph
Steering axles	±20 %	0.3 ± 3.8%	-4.3 ± 7.3%	1.6 ± 3.4%
Tandem axles	±15 %	2.2 ± 6.7%	-0.8 ± 7.4%	5.6 ± 6.3%
GVW	±10 %	1.9 ± 3.6%	-1.3 ± 3.9%	5.0 ± 4.3%
Speed	±1 mph	-0.5 ± 3.5 mph	-0.5 ± 1.8 mph	-0.4 ± 2.8 mph
Axle spacing	± 0.5 ft	0.0 ± 0.1 ft	0.0 ± 0.1 ft	0.0 ± 0.1 ft

Table 6-3 illustrates why the decision was made to complete a calibration iteration. The GVW is slightly overestimated at low speed and overestimated by nearly twice that at high speed with essentially the same variability for both speed groups. At the same time the GVW is underestimated for the medium speed group. Similar trends hold for the steering axle and tandem axle loading estimates.

Figure 6-7 illustrates that the two trucks used for the validation follow the same trend for each speed group. While the Golden truck (squares) tends to have lower estimation errors at low speed than the partial truck (diamonds) the error patterns are similar for the high speed group.

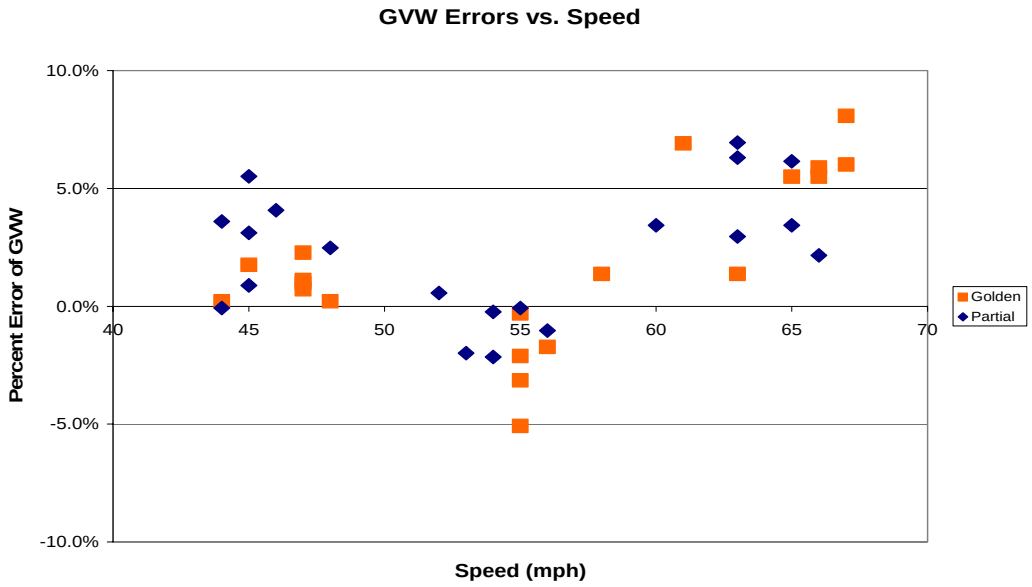


Figure 6-7 Pre-Validation GVW Percent Error vs. Speed Group - 050200 –15-May-2007

Figure 6-8 shows the relation between steering axle errors and speed. This graph is included due to the frequent use of steering axle weights of Class 9 vehicles for calibration. This site does not use auto-calibration. The steering axles in this graph are associated only with Class 9 vehicles.

Figure 6-8 shows a distinctly different pattern for steering axles as a function of speed group. The steering axles in the medium speed group are clearly being underestimated. There is a slight overestimation of those axles in the other two speed groups.

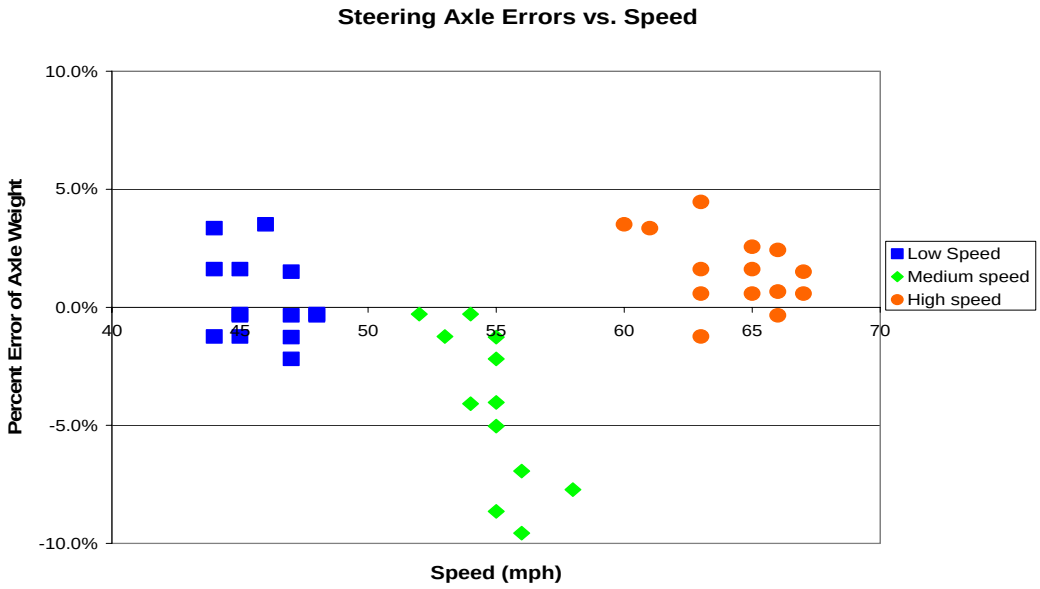


Figure 6-8 Pre-Validation Steering Axle Percent Error vs. Speed Group - 050200 – 15-May-2007

6.3 Classification Validation

This LTPP installed site uses the FHWA 13-bin classification scheme and the LTPP Mod 3 classification algorithm. Classification 15 has been added to define unclassified vehicles.

The classification validation is intended to find gross errors in vehicle classification, not to validate the installed algorithm. A sample of 100 trucks was collected at the site. The classification identification is to identify gross errors in classification, not validate the classification algorithm. 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 0 percent unclassified vehicles.

The second check is the ability of the algorithm to correctly distinguish between truck classes with no more than 2% errors in such classifications. Table 6-4 has the classification error rates by class. The overall misclassification rate is 14.8 percent. The misclassification rate is based on observed Class 4 and Class 8 vehicles being counted by the WIM equipment as Class 5s. There are very small numbers of Class 4, 5 and 8 vehicles in the sample leading to very large numbers for misclassification percentages and mean differences.

Table 6-4 Truck Misclassification Percentages for 050200 – 15-May-2007

Class	Percent Error	Class	Percent Error	Class	Percent Error
4	100	5	50	6	0
7	N/A				
8	63	9	0	10	N/A
11	0	12	0	13	N/A

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 0 with a mean difference of zero.

Table 6-5 Truck Classification Mean Differences for 050200 – 15-May-2007

Class	Mean Difference	Class	Mean Difference	Class	Mean Difference
4	-50	5	67	6	0
7	N/A				
8	-63	9	0	10	N/A
11	0	12	0	13	N/A

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 either missed or not assigned to the class by the equipment. It is not possible to miss more than all of them or one hundred out of one hundred. Numbers 1 or larger indicate at least 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 vehicles of that type might actually exist. N/A means no vehicles of the class were recorded by either the equipment or the observer.

6.4 Evaluation by ASTM E-1318 Criteria

The ASTM E-1318 criteria for a successful validation of Type I sites is 95% of the observed errors within the limits for allowable errors for each of the relevant statistics. If this site had been evaluated using ASTM E-1318-02 it would have met the conditions for a Type I site exclusive of wheel loads. LTPP does not validate WIM performance with respect to wheel loads.

Table 6-6 Results of Validation Using ASTM E-1318-02 Criteria

Characteristic	Limits for Allowable Error	Percent within Allowable Error	Pass/Fail
Single Axles	± 20%	100%	Pass
Axle Groups	± 15%	100%	Pass
GVW	± 10%	100%	Pass

7 Data Availability and Quality

As of May 15, 2007 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.

Data that has validation information available has been 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 7-1. 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 2000 has a sufficient quantity to be considered a complete year of data. In the absence of previously gathered validation information it can be seen that at least five additional years of research quality data are needed to meet the goal of a minimum of 5 years of research weight data.

Table 7-1 Amount of Traffic Data Available 050200 – 15-May-2007

Year	Classification Days	Months	Coverage	Weight Days	Months	Coverage
1996	81	8	Full week	65	5	Full week
1997	76	5	Full week	28	2	Full week
1998	59	4	Full week	26	2	Full week
1999	83	6	Full week	65	4	Full week
2000	317	11	Full week	343	12	Full week
2001	139	5	Full week	53	2	Full week
2002	169	8	Full week	150	7	Full week
2003	150	5	Full week	55	2	Full week
2004	179	7	Full week	4	1	Weekday(s) and Weekend day(s)

There was no data available as of May 23rd to prepare information on site GVW, vehicle distribution or speed distribution for comparison when evaluating incoming data.

8 Data Sheets

The following is a listing of data sheets incorporated in Appendix A.

Sheet 19 – Truck 1 – 3S2 loaded air suspension (4 pages)
Sheet 19 – Truck 2 – 3S2 loaded air suspension tractor, steel spring suspension trailer (4 pages)

Sheet 20 – Speed and Classification verification Pre-Validation (2 pages)
Sheet 20 – Speed and Classification verification – Post-Validation (2 pages)

Sheet 21 – Pre-Validation (3 pages)
Sheet 21 – Calibration Iteration 1 (1 page)
Sheet 21 – Post-Validation (2 pages)

Calibration Iteration 1 Worksheets (2 pages)

Test Truck Photographs (7 pages)

LTPP Mod 3 Classification Scheme (1 page)

Final System Parameters (1 page)

9 Updated Handout Guide and Sheet 17

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

10 Updated Sheet 18

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

11 Traffic Sheet 16(s)

Sheet 16s for the Pre-Validation and Post-Validation conditions are attached following the current Sheet 18 information at the very end of the report.

POST-VISIT HANDOUT GUIDE FOR SPS WIM FIELD VALIDATION

STATE: Arkansas

SHRP ID: 050200

Figures

1. General Information

SITE ID: *050200*

LOCATION: *I-30, Milepost 101.8*

VISIT DATE: *May 15, 2007*

VISIT TYPE: *Validation*

2. Contact Information

POINTS OF CONTACT:

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

Highway Agency: *Mark Greenwood, 501-569-2552,*
mark.greenwood@arkansashighways.com

Jerry Westerman, 501-569-2185,
jerry.westerman@arkansashighways.com

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

FHWA Division Office Liaison: *Lester Frank, 501-324-6428,*
lester.frank@fhwa.dot.gov

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

3. Agenda

BRIEFING DATE: *No briefing requested for this visit.*

ON SITE PERIOD: *May 15 and 16, 2007*

TRUCK ROUTE CHECK: *Completed May 15, 2007.*

4. Site Location/ Directions

NEAREST AIRPORT: *Little Rock National Airport*

DIRECTIONS TO THE SITE: 39 miles south of Little Rock, AAR

MEETING LOCATION: *On site beginning at 9:00 a.m.*

WIM SITE LOCATION: *Just south of the SR 70 junction.*

WIM SITE LOCATION MAP: *See Figure 4.1*

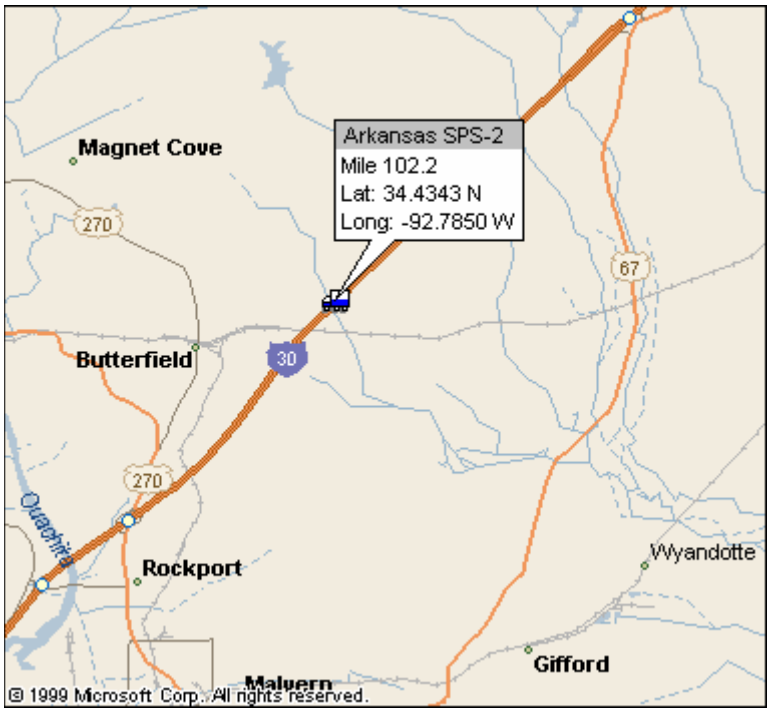


Figure 4-1 – Site 050200 in Arkansas

5. Truck Route Information

ROUTE RESTRICTIONS: *None*

SCALE LOCATION: *JJs Truck Stop (501)-778-229; I-30 and Exit 106,1106 Miltary Road, Benton, AR 72015; open 24 hrs; $8.50 per weight, $1.00 per reweigh (501)-778-2295..*

Latitude:34.573434 Longitude: -92.580486

Figure 5-1 – Truck Scale Location for 050200 in Arkansas

TRUCK ROUTE:

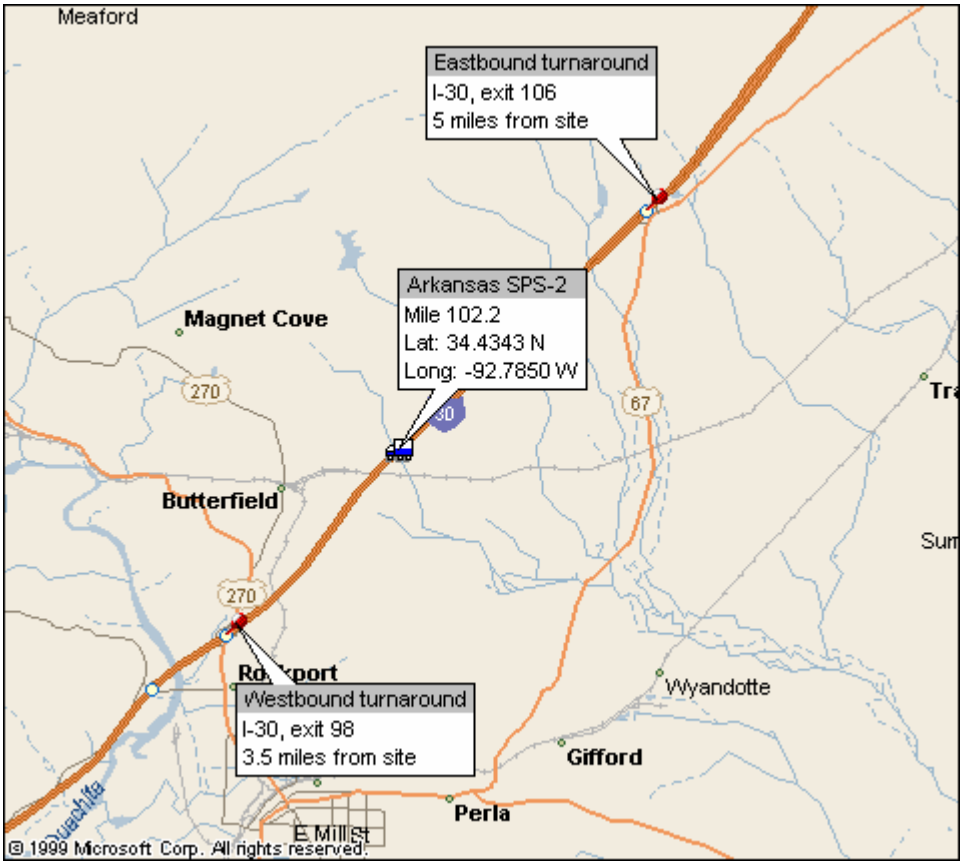


Figure 5-2 – Truck Route for 050200 in Arkansas

WB distance =3.5 miles
NB distance =5.0 miles

Total distance = 17.0 miles (15 minutes)

6. Sheet 17 – Arkansas (050200)

1.* ROUTE __I-30_____ MILEPOST ___101.8__ LTPP DIRECTION - N S E W

2.* WIM SITE DESCRIPTION - Grade __<1_____ % Sag vertical Y / N
Nearest SPS section upstream of the site _050221_
Distance from sensor to nearest upstream SPS Section ___ _6.0 miles

3.* LANE CONFIGURATION
Lanes in LTPP direction _2_ Lane width 12_ 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 __10_ ft

4.* PAVEMENT TYPE ___PCC_____

5.* PAVEMENT SURFACE CONDITION – Distress Survey
Date _5/15/2007_
Photo: 6420060018_SPSWIM_TO_16_05_2.76_0200_Upstream.JPG _
Date _5/15/2007_
Photo: 6420060018_SPSWIM_TO_16_05_2.76_0200_Downstream.JPG
Date _____ Photo Filename: _____

6. * SENSOR SEQUENCE _____loop – bending plate – bending plate - loop_____

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 ___ __4 . _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 _44__ ft
Distance from system __125_ ft
TYPE ____3R_____

CABINET ACCESS controlled by LTPP / STATE / JOINT ?
Contact - name and phone number _Roy Czzinku__306-653-6627
Alternate - name and phone number _Mark Greenwood__501-569-2552

11. * POWER

Distance to cabinet from drop __555__ ft Overhead / underground / solar /
AC in cabinet?
Service provider _____ Phone number _____

12. * TELEPHONE

Distance to cabinet from drop __555__ ft Overhead / under ground / cell?
Service provider _____ Phone Number _____

13.* SYSTEM (software & version no.)- _____
Computer connection – RS232 / Parallel port / USB / Other _____

14. * TEST TRUCK TURNAROUND time _15_minutes_____Distance _17.0_ mi.

15. PHOTOS FILENAME

Power source
6420060018_SPSWIM_TO_16_05_2.76_0200_Power_Service_Box.JPG
6420060018_SPSWIM_TO_16_05_2.76_0200_Power_CB_Box.JPG
Phone source
6420060018_SPSWIM_TO_16_05_2.76_0200_Telephone_Drop.JPG
6420060018_SPSWIM_TO_16_05_2.76_0200_Telephone_Service_Pedestal.JPG
Cabinet exterior
6420060018_SPSWIM_TO_16_05_2.76_0200_Cabinet_Exterior.JPG
Cabinet interior
6420060018_SPSWIM_TO_16_05_2.76_0200_Cabinet_Interior_Front.JPG
6420060018_SPSWIM_TO_16_05_2.76_0200_Cabinet_Interior_Back.JPG
Weight sensors
6420060018_SPSWIM_TO_16_05_2.76_0200_Leading_Weighpad.JPG
6420060018_SPSWIM_TO_16_05_2.76_0200_Trailing_Weighpad.JPG
Classification sensors _____
Other sensors Loops_____
Description
6420060018_SPSWIM_TO_16_05_2.76_0200_Leading_Loop.JPG
6420060018_SPSWIM_TO_16_05_2.76_0200_Trailing_Loop.JPG

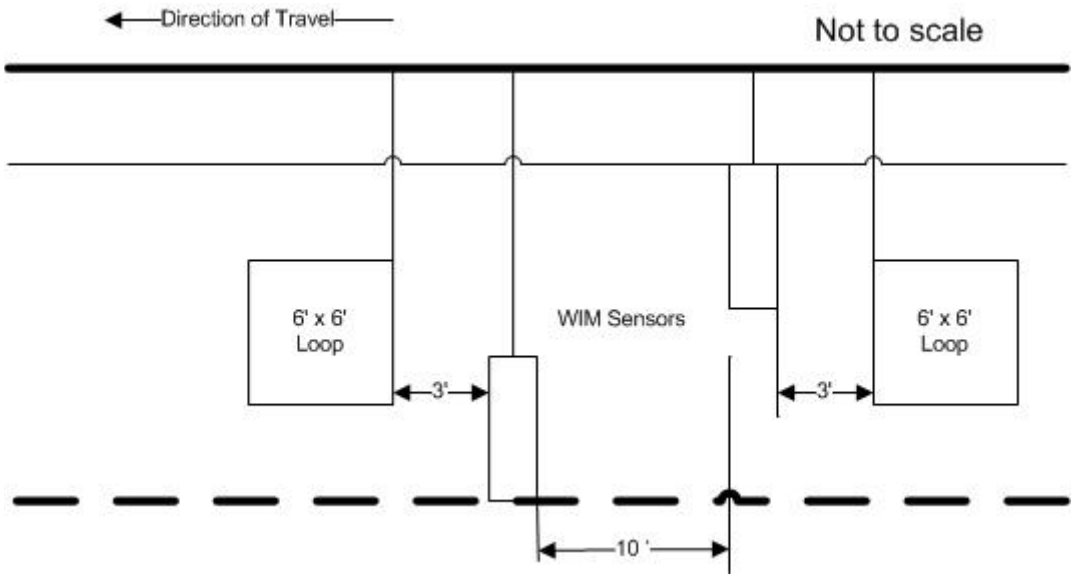
Downstream direction at sensors on LTPP lane
6420060018_SPSWIM_TO_16_05_2.76_0200_Downstream.JPG
Upstream direction at sensors on LTPP lane
_6420060018_SPSWIM_TO_16_05_2.76_0200_Upstream.JPG

COMMENTS __Cabinet is difficult to get to with a generic vehicle; recommend an SUV as area is muddy when wet or be prepared to call a tow vehicle.
__Have a 100' connection cable available.
____Power/phone drops located 340' west then 115' north

COMPLETED BY ____Dean J. Wolf_____

PHONE _301-210-5105_____ DATE COMPLETED _0_5_ /_1 5__ / _2_0_0_7__

Sketch of equipment layout



Site Map

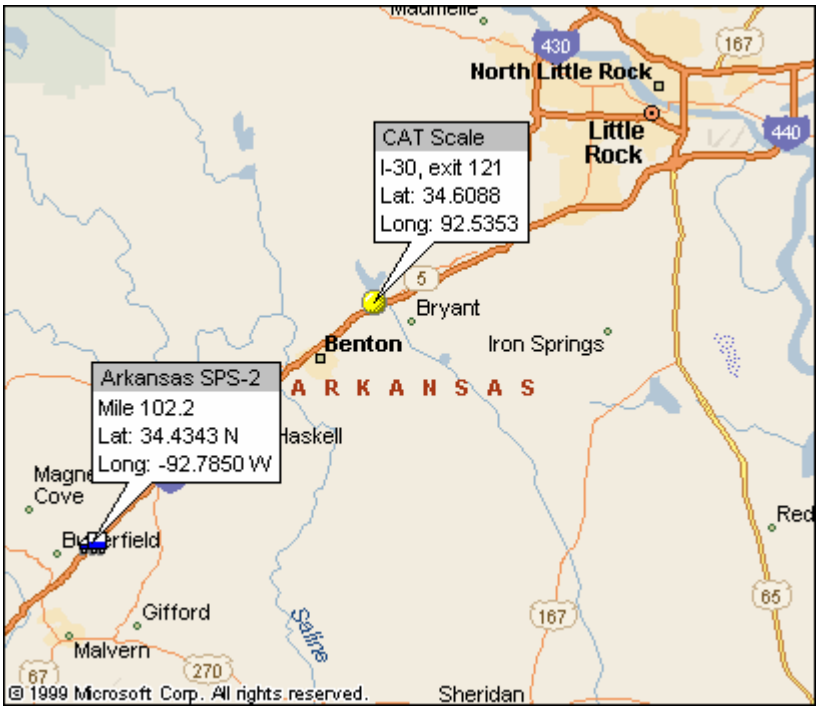


Figure 6-1 - Site Map for 050200 in Arkansas

Photo 1 - 6420060018_SPSWIM_TO_16_05_2.76_0200_Upstream.JPG – 5/15/2007

Photo 2 - 6420060018_SPSWIM_TO_16_05_2.76_0200_Downstream.JPG – 5/15/2007

Photo 3 - 6420060018_SPSWIM_TO_16_05_2.76_0200_Power_Service_Box.JPG

Photo 4 - 6420060018_SPSWIM_TO_16_05_2.76_0200_Power_CB_Box.JPG

Photo 5 - 6420060018_SPSWIM_TO_16_05_2.76_0200_Telephone_Drop.JPG

Photo 6 - 6420060018_SPSWIM_TO_16_05_2.76_0200_Telephone_Service_Pedestal.JPG

Photo 7 - 6420060018_SPSWIM_TO_16_05_2.76_0200_Cabinet_Exterior.JPG

Photo 8 - 6420060018_SPSWIM_TO_16_05_2.76_0200_Cabinet_Interior_Front.JPG

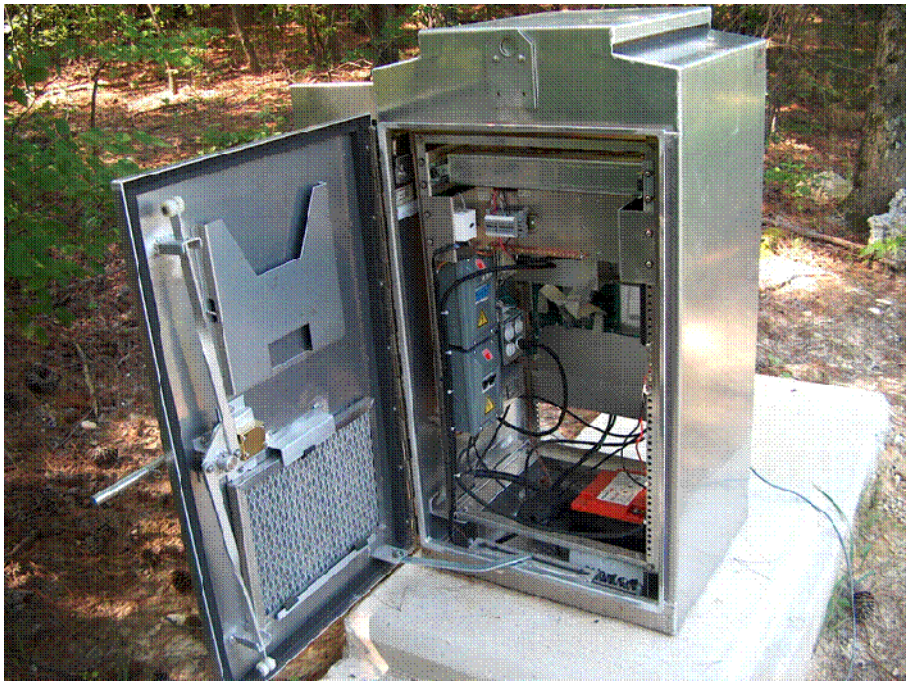


Photo 9 - 6420060018_SPSWIM_TO_16_05_2.76_0200_Cabinet_Interior_Back.JPG

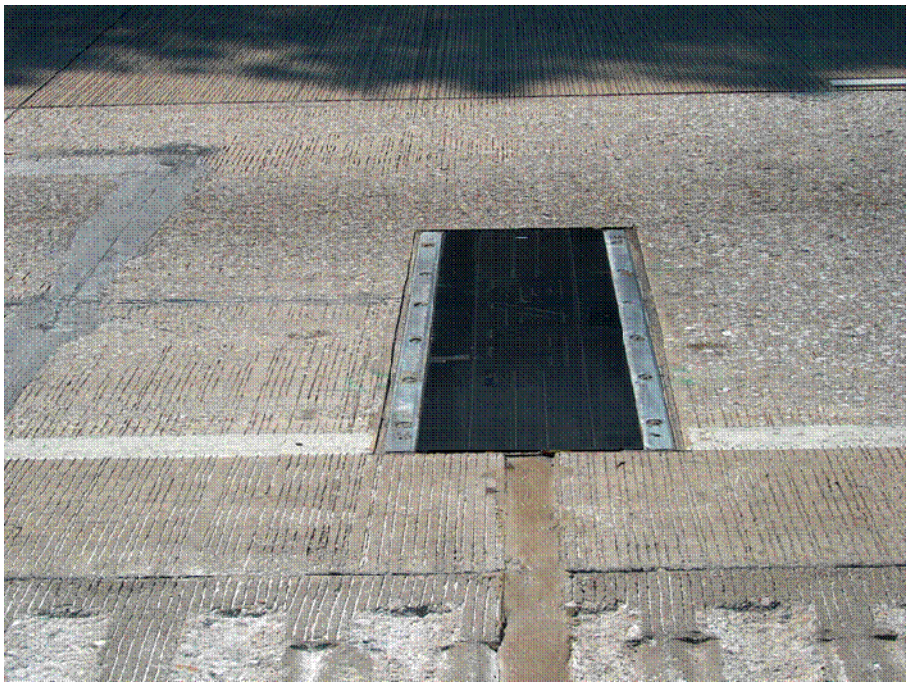


Photo 10 - 6420060018_SPSWIM_TO_16_05_2.76_0200_Leading_Weighpad.JPG

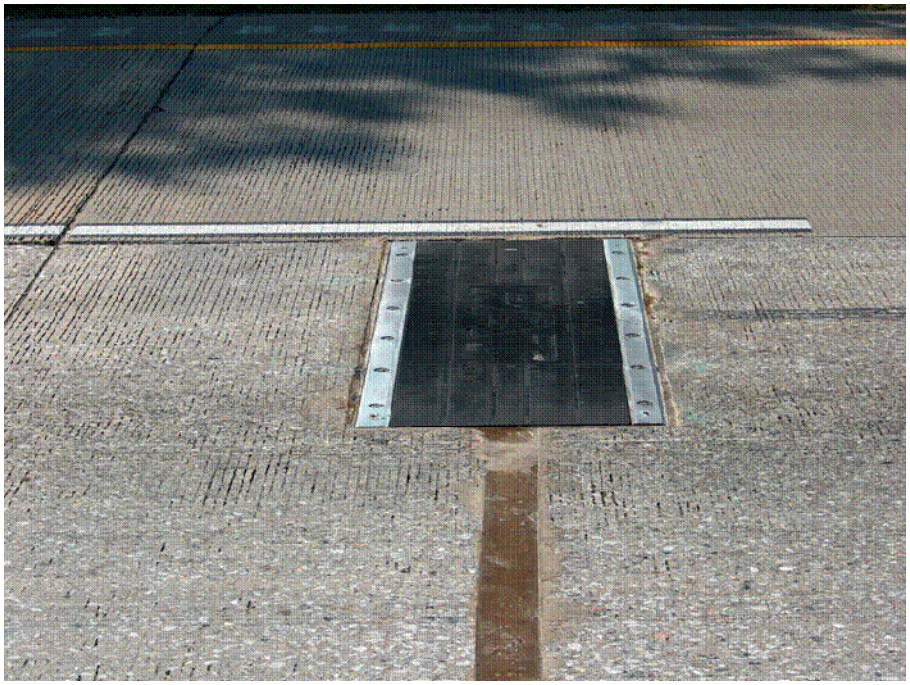


Photo 11 - 6420060018_SPSWIM_TO_16_05_2.76_0200_Trailing_Weighpad.JPG

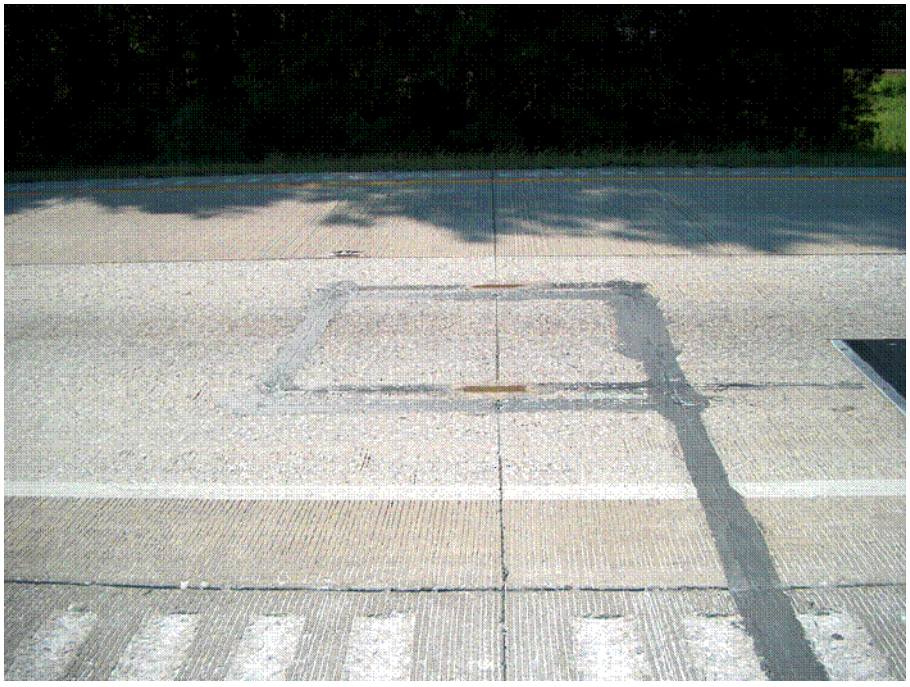


Photo 12 - 6420060018_SPSWIM_TO_16_05_2.76_0200_Leading_Loop.JPG

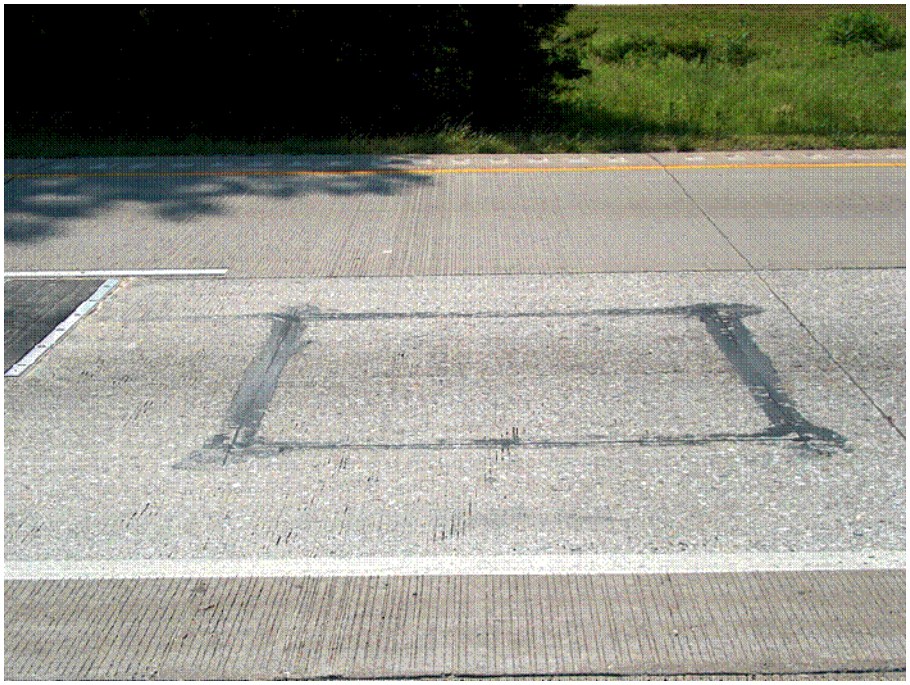


Photo 13 - 6420060018_SPSWIM_TO_16_05_2.76_0200_Trailing_Loop.JPG

SHEET 18	STATE CODE [5]
LTPP MONITORED TRAFFIC DATA	SPS PROJECT ID [0200]
WIM SITE COORDINATION	DATE: (mm/dd/yyyy) 5/15/2007

Rev. 05/15/07

1. DATA PROCESSING –
   a. Down load –
      - ☐ State only
      - ☐ LTPP read only
      - ☒ LTPP download
      - ☐ LTPP download and copy to state

   b. Data Review –
      - ☐ State per LTPP guidelines
      - ☐ State – ☐ Weekly ☐ Twice a Month ☐ Monthly ☐ Quarterly
      - ☒ LTPP

   c. Data submission –
      - ☐ State – ☐ Weekly ☐ Twice a month ☐ Monthly ☐ Quarterly
      - ☒ LTPP

2. EQUIPMENT –
   a. Purchase –
      - ☐ State
      - ☒ LTPP

   b. Installation –
      - ☐ Included with purchase
      - ☐ Separate contract by State
      - ☐ State personnel
      - ☒ LTPP contract

   c. Maintenance –
      - ☐ Contract with purchase – Expiration Date _____
      - ☒ Separate contract LTPP – Expiration Date _2011_
      - ☐ Separate contract State – Expiration Date _____
      - ☐ State personnel

   d. Calibration –
      - ☐ Vendor
      - ☐ State
      - ☒ LTPP

   e. Manuals and software control –
      - ☐ State
      - ☒ LTPP

   f. Power –
      i. Type –
         - ☐ Overhead
         - ☒ Underground
         - ☐ Solar

      ii. Payment –
         - ☒ State
         - ☐ LTPP
         - ☐ N/A

g. Communication –

i. Type –
- ☒ Landline
- ☐ Cellular
- ☐ Other

ii. Payment –
- ☒ State
- ☐ LTPP
- ☐ N/A

3. PAVEMENT –

a. Type –
- ☒ Portland Concrete Cement
- ☐ Asphalt Concrete

b. Allowable rehabilitation activities –
- ☐ Always new
- ☐ Replacement as needed
- ☐ Grinding and maintenance as needed
- ☒ Maintenance only
- ☐ No remediation

c. Profiling Site Markings –
- ☐ Permanent
- ☒ Temporary

4. ON SITE ACTIVITIES –

a. WIM Validation Check - advance notice required _3__ ☒ days ☐ weeks

b. Notice for straightedge and grinding check - __2_ ☐ days ☒ weeks

i. On site lead –
- ☐ State
- ☒ LTPP

ii. Accept grinding –
- ☐ State
- ☒ LTPP

c. Authorization to calibrate site –
- ☐ State only
- ☒ LTPP

d. Calibration Routine –
- ☒ LTPP – ☒ Semi-annually ☐ Annually
- ☐ State per LTPP protocol – ☐ Semi-annually ☐ Annually
- ☐ State other – _____

e. Test Vehicles
   i. Trucks –
      1st – Air suspension 3S2 ☐ State ☒ LTPP
      2nd – 3S2 different weight/suspension ☐ State ☒ LTPP
      3rd – _____ ☐ State ☐ LTPP
      4th – _____ ☐ State ☐ LTPP
   ii. Loads – ☐ State ☒ LTPP
   iii. Drivers – ☐ State ☒ LTPP

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

   IRD/Pat Traffic

g. Access to cabinet
   i. Personnel Access –
      ☐ State only
      ☒ Joint
      ☐ LTPP
   ii. Physical Access –
      ☒ Key
      ☐ Combination

h. State personnel required on site – ☐ Yes ☒ No

i. Traffic Control Required – ☐ Yes ☒ No

j. Enforcement Coordination Required – ☐ Yes ☒ No

5. SITE SPECIFIC CONDITIONS –
   a. Funds and accountability – FHWA
   b. Reports – IRD
   c. Other – _____
   d. Special Conditions – _____

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

      Name: Roy Czinku Phone:(306) 653-6627

      Agency: IRD, Inc.

b. Maintenance (equipment) –

Name: Roy Czinku Phone:(306) 653-6627

Agency: IRD, Inc.

c. Data Processing and Pre-Visit Data –

Name: Roy Czinku Phone:(306) 653-6627

Agency: IRD, Inc.

d. Construction schedule and verification –

Name: Roy Czinku Phone:(306) 653-6627

Agency: IRD, Inc.

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

Name: _____ Phone:_____

Agency: _____

f. Traffic Control –

Name: Mark Greenwood Phone:(501) 569-2552

Agency: Arkansas Highway and Transportation Dept.

g. Enforcement Coordination –

Name: _____ Phone:_____

Agency: _____

h. Nearest Static Scale

Name: J J's Truck Stop Location:6106 Military Road off I-30 at exit 106, Benton AR 72015

Phone: (501) 778-2295

SHEET 16 **LTPP MONITORED TRAFFIC DATA** **SITE CALIBRATION SUMMARY**	*STATE ASSIGNED ID [__ __ __ __] *STATE CODE [05] *SHRP SECTION ID [0200]

SITE CALIBRATION INFORMATION

1. * DATE OF CALIBRATION (MONTH/DAY/YEAR) [5/15/2007]

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

3. * REASON FOR CALIBRATION
   ___ REGULARLY SCHEDULED SITE VISIT ___ RESEARCH
   ___ EQUIPMENT REPLACEMENT ___ TRAINING
   ___ DATA TRIGGERED SYSTEM REVISION ___ NEW EQUIPMENT INSTALLATION
   _X_ OTHER (SPECIFY) ___LTPP Validation_____

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 ___IRD/ PAT Traffic_____

WIM SYSTEM CALIBRATION SPECIFICS**

6.**CALIBRATION TECHNIQUE USED:
   ___ TRAFFIC STREAM -- ___STATIC SCALE (Y/N) _X_ TEST TRUCKS

   ___ NUMBER OF TRUCKS COMPARED __ 2__ NUMBER OF TEST TRUCKS USED

   __ 20__ PASSES PER TRUCK

TYPE PER FHWA 13 BIN SYSTEM SUSPENSION: 1 - AIR; 2 - LEAF SPRING 3 - OTHER (DESCRIBE)	TRUCK	TYPE	SUSPENSION
	1	9	1
	2	9	2
	3		

7. SUMMARY CALIBRATION RESULTS (EXPRESSED AS A PERCENT)
   MEAN DIFFERENCE BETWEEN ---
   DYNAMIC AND STATIC GVW ___2.0 STANDARD DEVIATION ___3.1
   DYNAMIC AND STATIC SINGLE AXLES ___-0.6 STANDARD DEVIATION ___3.3
   DYNAMIC AND STATIC DOUBLE AXLES ___2.5 STANDARD DEVIATION ___4.2

8. 3 ____ NUMBER OF SPEEDS AT WHICH CALIBRATION WAS PERFORMED

9. DEFINE THE SPEED RANGES USED (MPH) _____ _45_ __55__ __65_ _____ __ __ _____ _____
   _____ _____ _____ _____ _____ _____ _____ _____ _____ _____

10. CALIBRATION FACTOR (AT EXPECTED FREE FLOW SPEED) ___3670___

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 ___ TIME _X_ NUMBER OF TRUCKS

14. MEAN DIFFERENCE IN VOLUMES BY VEHICLES CLASSIFICATION:
   *** FHWA CLASS 9 ____ 0.0 FHWA CLASS ___ ____ ____ ____
   *** FHWA CLASS 8 ____-63.0 FHWA CLASS ___ ____ ____ ____
   FHWA CLASS ___ ____ ____ ____
   FHWA CLASS ___ ____ ____ ____
   *** PERCENT "UNCLASSIFIED" VEHICLES: ____ 0.0

PERSON LEADING CALIBRATION EFFORT: __Dean J. Wolf, MACTEC_____
CONTACT INFORMATION: _____301-210-5105_____ rev. November 9, 1999

SHEET 16 **LTPP MONITORED TRAFFIC DATA** **SITE CALIBRATION SUMMARY**	*STATE ASSIGNED ID [__ __ __ __] *STATE CODE [0 5] *SHRP SECTION ID [0200]

SITE CALIBRATION INFORMATION

1. * DATE OF CALIBRATION (MONTH/DAY/YEAR) [5/16/2007]

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

3. * REASON FOR CALIBRATION
   ___ REGULARLY SCHEDULED SITE VISIT ___ RESEARCH
   ___ EQUIPMENT REPLACEMENT ___ TRAINING
   ___ DATA TRIGGERED SYSTEM REVISION ___ NEW EQUIPMENT INSTALLATION
   _X_ OTHER (SPECIFY) ___LTPP Validation_____

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 ___IRD/ PAT Traffic_____

WIM SYSTEM CALIBRATION SPECIFICS**

6.**CALIBRATION TECHNIQUE USED:
   ___ TRAFFIC STREAM -- ___STATIC SCALE (Y/N) _X_ TEST TRUCKS

   ___ NUMBER OF TRUCKS COMPARED __ 2__ NUMBER OF TEST TRUCKS USED

   __ 20__ PASSES PER TRUCK

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

TRUCK	TYPE	SUSPENSION
1	9	1
2	9	2
3		

7. SUMMARY CALIBRATION RESULTS (EXPRESSED AS A PERCENT)
   MEAN DIFFERENCE BETWEEN ---
   DYNAMIC AND STATIC GVW 1.1 STANDARD DEVIATION 1.8
   DYNAMIC AND STATIC SINGLE AXLES -2.0 STANDARD DEVIATION 3.4
   DYNAMIC AND STATIC DOUBLE AXLES 1.6 STANDARD DEVIATION 2.9

8. 3 ____ NUMBER OF SPEEDS AT WHICH CALIBRATION WAS PERFORMED

9. DEFINE THE SPEED RANGES USED (MPH) _____ 45 55 65 _____ __ __ _____ _____
   _____ _____ _____ _____ _____ _____ _____ _____ _____ _____

10. CALIBRATION FACTOR (AT EXPECTED FREE FLOW SPEED) 3413

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 ___ TIME _X_ NUMBER OF TRUCKS

14. MEAN DIFFERENCE IN VOLUMES BY VEHICLES CLASSIFICATION:
   *** FHWA CLASS 9 ____ 0.0 FHWA CLASS ___ ____ ____ ____
   *** FHWA CLASS 8 ____ -50.0 FHWA CLASS ___ ____ ____ ____
   FHWA CLASS ___ ____ ____ ____
   FHWA CLASS ___ ____ ____ ____
   *** PERCENT "UNCLASSIFIED" VEHICLES: ____ 0.0

PERSON LEADING CALIBRATION EFFORT: Dean J. Wolf, MACTEC
CONTACT INFORMATION: 301-210-5105 rev. November 9, 1999

APPENDIX A

Sheet 19	* STATE_CODE	0 5
LTPP Traffic Data	* SPS PROJECT ID	0 2 0 0
*CALIBRATION TEST TRUCK # 1	* DATE	~~1 2 / 1 8 / 2 0 0 6~~

Rev. 08/31/01

5/15/2007

PART I.

1.* FHWA Class 9 2.* Number of Axles 5

AXLES - units - lbs / 100s lbs / kg

	3. Empty Truck Axle Weight	4.* Pre-Test Average Loaded Axle Weight	5.* Post-Test Average Loaded Axle Weight	6.* Measured D)irectly or C)alculated?
A		10953		(D) / C
B		17363		D / (C)
C		17363		D / (C)
D		16027		D / (C)
E		16027		D / (C)
F				D / C

GVW (same units as axles)

7. a) Empty GVW _____

*b) Average Pre-Test Loaded weight 77237

*c) Post Test Loaded Weight _____

*d) Difference Post Test – Pre-test _____

GEOMETRY

8 a) * Tractor Cab Style - Cab Over Engine / Conventional b) * Sleeper Cab? Y / (N)

9. a) * Make: KENWORTH b) * Model: W900

TRUCK # 374
TRAILER # 291

10.* Trailer Load Distribution Description:

CONCRETE BARRIERS EVEN ALONG LENGTH OF TRAILER (LOW BED)

11. a) Tractor Tare Weight (units): _____

b). Trailer Tare Weight (units): _____

Sheet 19	* STATE_CODE	0 5
LTPP Traffic Data	* SPS PROJECT ID	0 2 0 0
*CALIBRATION TEST TRUCK # 1	* DATE	1 2 / 1 8 / 2 0 0 6

Rev. 08/31/01

5/15/2007

12.* Axle Spacing – units m / feet and inches / feet and tenths

A to B 17' B to C [redacted] 4.9' C to D [redacted] 35.9'

D to E [redacted] 4.5' E to F _____

Wheelbased (measured A to last) _____ Computed _____

13. *Kingpin Offset From Axle B (units) 1.9' (_____)
(+ is to the rear)

SUSPENSION

Axle	14. Tire Size	15.* Suspension Description (leaf, air, no. of leaves, taper or flat leaf, etc.)
A	11R24.5	4 LEAF
B	"	AIR
C	"	AIR
D	255/70R22.5	AIR
E	"	AIR
F		

16. Cold Tire Pressures (psi) – from right to left

Steering Axle	Axle B	Axle C	Axle D	Axle E

Sheet 19	* STATE_CODE	0 5
LTPP Traffic Data	* SPS PROJECT ID	0 2 0 0
*CALIBRATION TEST TRUCK # 1	* DATE	~~1 2 / 1 8 / 2 0 0 6~~

Rev. 08/31/01

5/15/2007

PART II

Table 1. Axle and GVW computations - pre-test

Axle A		Axle B		Axle C		Axle D		Axle E		GVW	
I		II -I		III -II		IV -III		V -IV		V	
V -VI		VI- VII		VII- VIII		VIII- IX		IX`		X	
										XI	
Avg.											

Table 2. Raw Axle and GVW measurements

Axles	Meas.	Pre-test Weight			Post-test Weight
A	I				
A + B	II				
A + B + C	III				
A + B + C + D	IV				
A + B + C + D + E (1)	V				
B + C + D + E	VI				
C + D + E	VII				
D + E	VIII				
E	IX				
A + B + C + D + E (2)	X				
A + B + C + D + E (3)	XI				

Table 3. Axle and GVW computations - post -test

Axle A		Axle B		Axle C		Axle D		Axle E		GVW	
I		II -I		III -II		IV -III		V -IV		V	
V -VI		VI- VII		VII- VIII		VIII- IX		IX`		X	
										XI	
Avg.											

Sheet 19	* STATE_CODE	0 5
LTPP Traffic Data	* SPS PROJECT ID	0 2 0 0
*CALIBRATION TEST TRUCK # 1	* DATE	~~12/18/2006~~ 5/15/2007

Rev. 08/31/01

Table 4 . Axle and GVW computations -

Axle A		Axle B		Axle C		Axle D		Axle E		GVW	
I		II -I		III -II		IV -III		V -IV		V	
V -VI		VI- VII		VII- VIII		VIII- IX		IX`		X	
										XI	
Avg.											

Table 5. Raw data – Axle scales – pre-test - day 1 pre

Pass	Axle A	Axle B	Axle C	Axle D	Axle E	Axle F	GVW
1	10960	17360	17360	16030	16030		77740
2	10960	17360	17360	16020	16020		77720
3	10940	17370	17370	16030	16030		77740
Average	10953	17363	17363	16027	16027		77737
day 1 post	10720	17280	17280	16030	16030		77340

Table 6. Raw data – Axle scales – day 2 pre

Pass	Axle A	Axle B	Axle C	Axle D	Axle E	Axle F	GVW
1	10620	17330	17370	16070	16070		77420
2	10640	17340	17340	16070	16070		77460
3	10620	17340	17340	16070	16070		77440
Average	10630	17340	17340	16070	16070		77440

Table 7. Raw data – Axle scales – post-test - day 2 post

Pass	Axle A	Axle B	Axle C	Axle D	Axle E	Axle F	GVW
1	10340	17220	17220	16040	16040		76860
2							
3							
Average							

Measured By _____ Verified By _____

Sheet 19	* STATE_CODE	0 5
LTPP Traffic Data	* SPS PROJECT ID	0 2 0 0
*CALIBRATION TEST TRUCK # 2	* DATE	~~1 2 / 1 8 / 2 0 0 6~~ 5/15/2007

Rev. 08/31/01

PART I.

1.* FHWA Class 9 2.* Number of Axles 5

AXLES - units - lbs / 100s lbs / kg

	3. Empty Truck Axle Weight	4.* Pre-Test Average Loaded Axle Weight	5.* Post-Test Average Loaded Axle Weight	6.* Measured D)irectly or C)alculated?
A		10640		(D) / C
B		13803		D / (C)
C		13803		D / (C)
D		12293		D / (C)
E		12293		D / (C)
F				D / C

GVW (same units as axles)

7. a) Empty GVW _____

*b) Average Pre-Test Loaded weight 62830

*c) Post Test Loaded Weight _____

*d) Difference Post Test – Pre-test _____

GEOMETRY

8 a) * Tractor Cab Style - Cab Over Engine / Conventional b) * Sleeper Cab? Y (N)

9. a) * Make: KENWORTH b) * Model: W900

TRACTOR # 1015
TRAILER # 292

10.* Trailer Load Distribution Description:

CONCRETE BARRIERS EVENLY LOADED ON FLAT DECK TRAILER

11. a) Tractor Tare Weight (units): _____

b). Trailer Tare Weight (units): _____

Sheet 19	* STATE_CODE	0 5
LTPP Traffic Data	* SPS PROJECT ID	0 2 0 0
*CALIBRATION TEST TRUCK # 2	* DATE	~~1 2 / 1 8 / 2 0 0 6~~

Rev. 08/31/01

5/15/2007

12.* Axle Spacing – units m / feet and inches / feet and tenths

A to B 17.4 B to C 4.3 C to D 31.8

D to E 4.0 E to F _____

Wheelbased (measured A to last) _____ Computed _____

13. *Kingpin Offset From Axle B (units) 2.1 (_____)
(+ is to the rear)

SUSPENSION

Axle	14. Tire Size	15.* Suspension Description (leaf, air, no. of leaves, taper or flat leaf, etc.)
A	11R22.5	4 LEAF
B	"	AIR
C	"	AIR
D	11R24.5	STEEL LEAF
E	"	STEEL LEAF
F		

16. Cold Tire Pressures (psi) – from right to left

Steering Axle	Axle B	Axle C	Axle D	Axle E

Sheet 19	* STATE_CODE	0 5
LTPP Traffic Data	* SPS PROJECT ID	0 2 0 0
*CALIBRATION TEST TRUCK # 2	* DATE	~~1 2 7 1 8 7 2 0 0 6~~

Rev. 08/31/01

5/15/2007

PART II

Table 1. Axle and GVW computations - pre-test

Axle A		Axle B		Axle C		Axle D		Axle E		GVW	
I		II -I		III -II		IV -III		V -IV		V	
V -VI		VI- VII		VII- VIII		VIII- IX		IX`		X	
										XI	
Avg.											

Table 2. Raw Axle and GVW measurements

Axles	Meas.	Pre-test Weight			Post-test Weight
A	I				
A + B	II				
A + B + C	III				
A + B + C + D	IV				
A + B + C + D + E (1)	V				
B + C + D + E	VI				
C + D + E	VII				
D + E	VIII				
E	IX				
A + B + C + D + E (2)	X				
A + B + C + D + E (3)	XI				

Table 3. Axle and GVW computations - post -test

Axle A		Axle B		Axle C		Axle D		Axle E		GVW	
I		II -I		III -II		IV -III		V -IV		V	
V -VI		VI- VII		VII- VIII		VIII- IX		IX`		X	
										XI	
Avg.											

Sheet 19	* STATE CODE	0 5
LTPP Traffic Data	* SPS PROJECT ID	0 2 0 0
*CALIBRATION TEST TRUCK # 2	* DATE	~~1 2 / 1 8 / 2 0 0 6~~

Rev. 08/31/01

5/15/2007

Table 4 . Axle and GVW computations -

Axle A		Axle B		Axle C		Axle D		Axle E		GVW	
I		II -I		III -II		IV -III		V -IV		V	
V -VI		VI- VII		VII- VIII		VIII- IX		IX`		X	
										XI	
Avg.											

Table 5. Raw data – Axle scales – pre-test - day 1 pre

Pass	Axle A	Axle B	Axle C	Axle D	Axle E	Axle F	GVW
1	10640	13810	13810	12280	12280		62820
2	10660	13780	13780	12290	12290		62800
3	10620	13820	13820	12310	12310		62880
Average	10640	13803	13803	12293	12293		62830
day 1 post	10420	13740	13740	12280	12280		62460

Table 6. Raw data – Axle scales – day 2 pre

Pass	Axle A	Axle B	Axle C	Axle D	Axle E	Axle F	GVW
1	10880	13880	13880	12320	12320		63280
2	10900	13840	13840	12340	12340		63260
3	10900	13860	13860	12330	12330		63280
Average	10890	13840	13840	12330	12330		63270

Table 7. Raw data – Axle scales – post-test - day 2 post

Pass	Axle A	Axle B	Axle C	Axle D	Axle E	Axle F	GVW
1	10560	13840	13940	12280	12280		62800
2							
3							
Average							

Measured By AWP Verified By

Sheet 20	* STATE_CODE	0 5
LTPP Traffic Data	*SPS PROJECT_ID	0 2 0 0
Speed and Classification Checks * 1 of* 2	* DATE	~~12/19/2006~~ 5 15 2007

Rev. 08/31/2001

WIM speed	WIM class	WIM Record	Obs. Speed	Obs Class	WIM speed	WIM class	WIM Record	Obs. Speed	Obs Class
66	9	25816	66	9	67	9	26086	68	9
67	9	25822	68	9	59	11	26089	62	11
68	9	25825	67	9	62	9	26092	64	9
75	5	25829	73	5	70	5	26099	69	5
63	9	25832	63	9	60	8	26102	58	8
67	9	25839	66	9	63	9	26107	62	9
65	9	25843	66	9	69	9	26177	69	9
68	9	25850	68	9	70	9	26179	71	9
66	9	25854	66	9	66	11	26180	66	11
~~65~~	~~9~~		~~64~~	~~9~~	65	11	26182	65	11
59	5	25862	59	8	68	9	26187	67	9
64	9	25867	62	9	64	9	26192	62	9
68	9	25871	66	9	66	9	26195	66	9
73	9	25877	74	9	72	12	26198	70	12
62	8	25879	61	8	65	9	26200	64	9
65	9	25886	63	9	68	9	26207	66	9
64	6	25887	63	6	72	9	26209	71	9
65	9	26014	65	9	66	9	26215	66	9
63	11	26016	62	11	62	9	26223	65	9
64	12	26048	63	12	62	9	26233	62	9
72	5	26064	71	5	63	6	26243	70	6
65	9	26068	64	9	66	9	26249	65	9
65	9	26072	63	9	65	9	26253	69	9
69	9	26079	67	9	64	9	26256	61	9
64	11	26080	63	11	67	5	26258	65	5

Sheet 20	* STATE_CODE	0 5
LTPP Traffic Data	*SPS PROJECT_ID	0 2 0 0
Speed and Classification Checks * 2 of* 2	* DATE	~~12/20/2006~~ 5 15 2007

Rev. 08/31/2001

WIM speed	WIM class	WIM Record	Obs. Speed	Obs Class	WIM speed	WIM class	WIM Record	Obs. Speed	Obs Class	
64	9	27003	62	9	65	9	27247	65	9	
64	9	27010	64	9	64	9	27257	64	9	
61	9	27022	61	9	64	9	27260	66	9	
61	9	27099	60	9	63	12	27261	62	12	
62	11	27101	63	11	64	9	27266	63	9	
64	11	27105	64	11	64	12	27271	64	12	
64	11	27107	64	11	60	6	27277	61	6	
70	9	27114	70	9	72	5	27282	71	5	
67	5	27116	66	5	64	9	27286	65	9	
68	9	27119	67	9	60	5	27290	59	5	
64	9	27124	63	9	65	9	27292	63	9	
64	9	27128	64	9	62	5	27349	60	8	Dually Pickup
64	9	27130	63	9	69	9	27362	69	9	
69	4	27133	69	5	65	5	27366	64	8	uhaul w. car on t
63	9	27143	63	9	67	9	27372	67	9	
64	9	27201	64	9	63	9	27378	62	9	
65	9	27203	65	9	65	9	27382	65	9	
68	6	27205	70	6	65	9	27386	65	9	
62	9	27208	64	9	64	9	27393	64	9	
64	5	27212	65	4	60	5	27398	60	5	
64	5	27213	64	4	66	9	27401	67	9	
63	9	27227	63	9	70	9	27407	68	9	
60	5	27234	59	8	61	8	27418	62	8	
68	9	27243	68	9	55	5	27425	53	8	uhaul w car on trailer
67	9	27244	68	9	64	9	27437	64	9	
					66	9	27439	65	9	

Sheet 20	* STATE_CODE	0 5
LTPP Traffic Data	*SPS PROJECT_ID	0 2 0 0
Speed and Classification Checks * 1 of* 2	* DATE	~~1 2 / 2 0 / 2 0 0 6~~ 05 / 14 / 2007

Rev. 08/31/2001

WIM speed	WIM class	WIM Record	Obs. Speed	Obs Class	WIM speed	WIM class	WIM Record	Obs. Speed	Obs Class
61	9	37326	61	9	66	9	37472	64	9
67	9	37334	67	9	68	9	37476	68	9
64	9	37342	63	9	63	9	37479	62	9
66	9	37348	65	9	67	9	37482	67	9
62	9	37350	62	9	67	5	37486	65	5
67	12	37353	69	12	67	9	37495	68	9
62	9	37359	64	9	67	9	37497	66	9
59	9	37362	59	9	70	9	37542	72	9
66	9	37415	67	9	67	9	37548	69	9
63	9	37419	63	9	68	9	37563	66	9
60	11	37422	62	11	65	9	37569	64	9
69	9	37425	70	9	62	9	37572	65	9
64	9	37427	62	9	64	11	37579	62	11
68	9	37430	66	9	68	9	37588	68	9
65	9	37433	67	9	66	9	37589	65	9
60	9	37437	59	9	63	9	37597	61	9
65	9	37439	66	9	62	9	37600	60	9
67	9	37444	66	9	67	9	37609	67	9
60	9	37446	60	9	69	9	37619	68	9
64	9	37449	66	9	61	9	37622	59	9
64	9	37455	62	9	65	9	37625	65	9
63	9	37460	62	9	60	11	37633	62	11
70	9	37462	69	9	64	8	37635	62	8
68	9	37464	67	9	61	9	37637	60	9
63	9	37468	64	9	63	5	37641	61	8

plus camper

start 1:00 stop 1:31

Sheet 20	* STATE_CODE 0 5
LTPP Traffic Data	*SPS PROJECT_ID 0 2 0 0
Speed and Classification Checks * 2 of* 2	* DATE ~~1 2 / 2 0 / 2 0 0 6~~ 05 / 16 / 2007

Rev. 08/31/2001

WIM speed	WIM class	WIM Record	Obs. Speed	Obs Class	WIM speed	WIM class	WIM Record	Obs. Speed	Obs Class
64	9	37648	62	9	65	9	37901	~~9~~64	~~6~~9
55	5	37734	56	5	64	9	37910	62	9
70	9	37737	66	9	59	8	37916	60	8
66	9	37742	64	9	62	9	37921	62	9
65	12	37748	65	12	70	9	37932	68	9
63	9	37753	63	9	68	9	37941	68	9
65	11	37761	66	11	62	9	37943	62	9
64	9	37765	66	9	65	9	37951	64	9
60	11	37767	61	11	63	5	37954	63	4
63	9	37781	60	9	60	5	37961	67	8
67	9	37776	65	9	59	9	37966	59	9
60	9	37781	61	9	63	9	37968	65	9
61	9	37782	61	9	65	9	38115	63	9
67	10	37784	67	10	67	9	38123	65	9
66	10	37788	67	10	67	9	38125	65	9
60	9	37792	60	9	64	9	38133	62	9
57	5	37798	54	5	71	9	38139	72	9
68	9	37805	67	9	62	9	38144	61	9
65	9	37809	64	9	64	9	38147	64	9
64	9	37814	64	9	67	9	38150	66	9
65	9	37819	65	9	65	9	38153	64	9
67	9	37877	68	9	65	9	38156	64	9
62	9	37884	60	9	65	9	38162	64	9
63	9	37893	63	9	62	9	38167	63	9
67	9	37896	66	9	65	9	38171	65	9

bus 18.8' plu w/ trailer

start 1:32 stop 2:20

Sheet 21	* STATE_CODE 0 5
LTPP Traffic Data	*SPS PROJECT_ID 0 2 0 0
WIM System Test Truck Records 1 of 3	* DATE ~~12 / 19 / 2006~~ 5 15 2007

Rev. 08/31/2001

Pvmt temp	Radar Speed	Truck	Pass	Time	Record No.	WIM Speed	Axle A weight.	Axle B weight.	Axle C weight.	Axle D weight.	Axle E weight.	Axle F weight	GVW	A-B space	B-C space	C-D space	D-E space	E-F space
72.5	45	1	1	857	24579	45	5.6/5.2	9.5/8.6	9.5/8.1	8.4/7.8	8.6/7.6		78.9	16.8	4.3	35.2	4.4	
"	44	2	1	858	24580	44	5.1/5.3	7.4/6.9	7.5/6.7	5.9/5.9	6.6/5.3		62.6	17.4	4.3	31.5	4.0	
76	55	1	2	9:13	727	55	5.0/4.9	9.2/8.1	9.0/8.0	8.2/7.9	7.8/7.7		75.9	16.9	4.3	35.4	4.5	
"	53	2	2	9:13	728	53	4.9/5.5	7.1/6.7	7.3/6.6	6.3/5.7	6.1/5.3		61.4	17.5	4.3	31.6	4.0	
83	66	1	3	9:28	868	66	5.3/5.5	9.2/9.1	9.2/9.4	8.3/8.9	8.5/8.8		82.1	16.9	4.3	35.4	4.4	
"	63	2	3	9:29	869	63	5.0/5.7	7.8/7.1	7.7/7.3	6.5/6.3	6.4/6.3		66.6	17.4	4.4	31.3	3.9	
80.5	47	1	4	9:43	25006	45	5.5/5.1	9.4/8.9	9.6/8.4	8.5/7.6	7.7/8.5		79.3	16.8	4.3	35.0	4.4	
"	45	2	4	9:43	25007	45	5.2/5.5	7.6/6.9	7.7/6.7	6.3/5.5	6.4/5.5		63.2	17.4	4.3	31.4	4.0	
~~82.5~~	~~55~~	~~1~~	~~5~~	~~9:59~~	~~[illegible]~~	~~54~~	~~5.1/5.3~~	~~8.9/8.2~~	~~7.7/8.~~									
~~"~~	~~55~~	~~2~~	~~5~~	~~9:59~~	~~141~~	~~55~~	~~[illegible]~~	~~8.5/7.7~~										
82.5	55	1	5	9:59	140	54	5.1/5.3	8.9/8.4	8.9/8.2	8.5/8.3	7.7/8.1		77.3	16.9	4.3	35.4	4.4	
"	55	2	5	9:59	141	55	4.9/5.1	7.0/7.2	7.4/6.8	6.1/6.0	6.6/5.4		62.6	17.4	4.3	31.7	3.9	
82.5	66	1	6	10:15	310	65	5.3/5.8	9.3/9.6	9.1/9.7	8.4/8.2	7.9/8.5		81.8	16.9	4.3	35.4	4.3	
"	63	2	6	10:15	313	61	5.1/5.9	7.7/7.6	7.7/7.5	6.5/5.8	6.7/6.5		67.0	17.3	4.3	31.3	3.8	
89.0	47	1	7	10:29	452	47	5.5/5.3	9.5/8.9	9.3/8.6	8.5/7.6	7.2/8.1		78.4	16.9	4.3	35.3	4.5	
"	48	2	7	10:29	453	47	5.1/5.4	7.3/7.1	7.5/6.7	6.3/5.9	6.8/6.0		64.2	17.4	4.3	31.4	3.9	

Recorded by RP Checked by [signature]

PROCOMM + TERMINAL
LOGON: IRO
PW - VPS306

Sheet 21	* STATE_CODE 0 5
LTPP Traffic Data	*SPS PROJECT_ID 0 2 0 0
WIM System Test Truck Records 2 of 2	* DATE ~~1 2 / 1 9 / 2 0 0 6~~ 5 15 2007

Rev. 08/31/2001

Pvmt temp	Radar Speed	Truck	Pass	Time	Record No.	WIM Speed	Axle A weight.	Axle B weight.	Axle C weight.	Axle D weight.	Axle E weight.	Axle F weight	GVW	A-B space	B-C space	C-D space	D-E space	E-F space
90.5	55	1	8	10:45	25608	55	5.3/5.4	8.9/9.3	9.0/7.8	7.5/7.7	7.3/7.0		75.1	16.8	4.3	35.3	4.4	
"	52	2	8	10:45	609	52	5.1/5.4	7.9/7.0	7.6/6.8	6.7/5.6	6.3/5.1		63.0	17.4	4.3	31.4	4.0	
92	67	1	9	11:00	765	66	5.4/5.6	9.3/9.9	8.8/9.9	8.2/8.8	8.9/9.1		83.3	16.9	4.3	35.5	4.4	
"	66	2	9	11:00	766	63	5.2/5.4	7.5/7.1	7.5/6.3	6.7/5.9	6.7/6.3		69.0	17.4	4.3	31.2	3.9	
98	44	1	10	11:23	990	44	5.2/6.0	8.2/8.4	8.5/8.7	6.4/8.5	8/7.4		77.7	16.8	4.3	35.2	4.5	
"	45	2	10	11:23	991	45	5.0/5.4	7.0/7.3	7.5/7.0	6.6/6.7	6.6/7.1		66.1	17.4	4.2	31.5	4.0	
96	47	1	11	11:38	26123	51	5.6/5.1	9.1/8.7	9.0/8.7	8.6/7.7	8.0/7.5		78.1	16.9	4.3	35.3	4.5	
"	44	2	11	11:38	26124	42	5.5/5.2	6.6/7.4	7/7.5	5.4/7.0	6.5/6.7		69.9	17.4	4.3	31.4	3.9	
100.5	48	1	12	11:53	26278	45	5.7/5.1	9.4/8.4	9.5/8.8	8.7/6.8	8.7/6.5		77.7	16.8	4.3	35.1	4.4	
"	46	2	12	11:53	26279	45	5.5/5.4	7.5/6.8	7.7/6.7	6.7/5.6	7.3/6.0		65.2	17.3	4.2	31.4	3.9	
104	56	1	13	12:19	26879	56	5.0/4.8	8.7/6.9	9.0/8.8	8.5/7.9	6.9/7.3		76.2	16.8	4.3	35.3	4.4	
109	54	2	13	12:19	875	53	5.0/5.1	7.0/6.6	7.0/6.4	6.7/5.9	6.3/5.7		61.3	17.4	4.3	31.3	4.0	
108	63	1	14	13:05	27026	65	5.5/5.4	8.8/9.0	8.8/8.8	8.1/8.3	8.0/8.0		78.6	16.8	4.3	35.5	4.4	
"	63	2	14	13:05	027	64	4.9/5.5	7.3/7.6	7.4/7.0	6.5/5.7	6.3/6.3		69.5	17.4	4.3	31.3	3.9	
106	47	1	15	13:20	27161	46	5.9/5.1	9.8/8.1	9.7/8.2	8.4/7.8	7.6/7.9		78.3	16.8	4.3	35.3	4.4	
"	45	2	15	13:20	162	44	5.3/5.2	7.5/6.9	7.6/6.6	6.9/5.5	6.8/6.3		69.6	17.3	4.3	31.4	4.0	

Recorded by RP

Checked by

Sheet 21	* STATE_CODE	0 5
LTPP Traffic Data	*SPS PROJECT_ID	0 2 0 0
WIM System Test Truck Records 3 of 3	* DATE	~~1 2 / 1 9 / 2 0 0 6~~ 5 15 2007

Rev. 08/31/2001

Pvmt temp	Radar Speed	Truck	Pass	Time	Record No.	WIM Speed	Axle A weight.	Axle B weight.	Axle C weight.	Axle D weight.	Axle E weight.	Axle F weight	GVW	A-B space	B-C space	C-D space	D-E space	E-F space
109	58	1	16	13:36	27302	56	5.1/4.9	9.1/7.7	9.0/8.4	8.7/8.1	8.7/8.9		78.6	16.9	4.3	35.4	4.4	
"	56	2	16	13:36	303	54	4.8/5.0	7.2/6.7	7.2/6.9	6.6/5.5	7.0/5.6		62.0	17.4	4.3	31.5	4.0	
108	65	1	17	13:51	451	66	5.4/5.5	9.0/9.6	9.1/9.2	8.3/8.6	8.2/9.0		81.8	16.9	4.3	35.4	4.4	
"	65	2	17	13:51	452	64	5.1/5.7	7.2/7.6	7.6/7.7	7.1/6.2	6.5/5.9		66.5	17.5	4.3	31.7	4.0	
"	55	1	18	14:06	610	55	5.4/5.2	9.2/7.8	9.1/7.6	8.1/6.5	8.0/6.7		73.6	16.8	4.3	35.3	4.4	
"	54	2	18	14:06	611	54	5.1/5.4	7.2/6.1	7.5/6.1	7.2/5.5	7.1/5.2		62.5	17.4	4.2	31.4	4.0	
112	67	1	19	14:21	754	67	5.2/5.7	8.9/9.5	9.0/9.6	8.2/9.4	7.8/9.0		82.2	17.0	4.3	35.5	4.5	
"	65	2	19	14:21	755	64	5.0/5.7	7.2/7.6	7.2/7.1	6.5/5.8	6.2/6.3		64.8	17.4	4.3	31.5	4.0	
~~108~~	~~62~~	~~1~~	~~20~~	~~14:36~~	~~915~~	~~59~~	~~5.4/5.8~~	~~7.9/7.8~~	~~7.6/7.6~~	~~7.3/6.1~~	~~6.4/6.7~~		~~68.6~~	†				
~~"~~	~~62~~	~~2~~	~~20~~	~~14:36~~	~~917~~	~~63~~												
108	61	1	20	14:36	919	61	5.4/5.8	9.2/9.7	9.2/9.9	8.9/8.0	8.3/8.4	ok by	82.9	16.9	4.3	~~35.4~~	~~4.4~~	
"	60	2	20	14:36	915	59	5.4/5.8	7.9/7.8	7.6/7.6	7.3/6.1	6.4/6.7		68.6	17.4	4.3	31.5	4.0	
* 111	60	1	21	14:51	28071	60	5.9/4.9	9.2/8.6	9.3/9.4	8.8/8.3	7.6/8.1		67.1	16.7	4.3	35.1	4.4	
111	60	2	21	14:51	072	59	5.2/5.7	7.2/6.2	7.2/7.5	6.9/5.9	7.2/5.8		69.8	17.5	4.3	31.5	4.0	

Recorded by RP

Checked by

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77.4 63.3

Sheet 21	* STATE_CODE 0 5
LTPP Traffic Data	*SPS PROJECT_ID 0 2 0 0
WIM System Test Truck Records 1 of 1	* DATE ~~12/20/2006~~ 05 16 2007

Rev. 08/31/2001

Pvmt temp	Radar Speed	Truck	Pass	Time	Record No.	WIM Speed	Axle A weight.	Axle B weight.	Axle C weight.	Axle D weight.	Axle E weight.	Axle F weight	GVW	A-B space	B-C space	C-D space	D-E space	E-F space
70	55	1	1	9:48	35502	55	5.4/4.9	9.0/8.0	9.3/8.7	8.0/8.3	7.6/7.6		76.9	16.9	4.3	35.3	4.4	
70	55	2	1	9:48	503	54	5.2/5.3	7.1/6.5	7.4/6.8	6.4/5.2	7.2/5.3		62.4	17.4	4.3	31.4	4.0	
74	65	1	2	10:03	640	66	4.7/5.2	8.7/8.6	8.5/9.2	8.1/8.0	7.0/8.0		76.0	16.9	4.3	35.6	4.4	
74	65	2	2	10:03	643	64	4.8/5.5	7.3/7.4	7.2/6.8	5.9/5.8	5.9/6.3		62.7	17.5	4.3	31.4	3.9	
82	47	1	3	10:18	794	46	5.8/5.4	9.4/8.8	9.3/8.5	8.6/7.6	7.9/7.2		78.4	16.8	4.3	35.2	4.5	
82	48	2	3	10:18	796	46	5.6/5.4	7.1/7.1	7.7/6.7	6.7/5.3	7.0/5.7		64.2	17.4	4.3	31.4	4.0	
81.5	57	1	4	10:35	970	55	5.0/5.2	8.7/8.9	8.7/7.7	8.5/8.0	6.9/7.2		74.6	16.8	4.3	35.3	4.4	
81.5	55	2	4	10:35	971	54	5.2/5.0	7.2/7.2	6.9/6.8	6.5/6.0	6.6/5.3		62.7	17.4	4.3	31.6	4.0	
85.5	66	1	5	10:50	36082	66	4.9/5.3	8.8/9.1	8.6/9.1	8.0/8.3	6.8/8.2		77.1	16.8	4.3	35.5	4.4	
~~83.5~~	~~66~~	~~2~~	~~5~~	~~10:50~~	~~0854~~	~~66~~	~~5.4/5.1~~	~~8.3/8.0~~	~~7.8/8.1~~	~~8.6/7.2~~	~~8.8/7.8~~							
85.5	66	2	5	10:50	36014	65	5.5/4.8	7.1/7.3	6.8/7.1	6.0/6.1	6.1/6.0		62.8	17.4	4.3	31.6	3.9	

Recorded by DJW

Checked by _____

Sheet 21	* STATE_CODE 0 5
LTPP Traffic Data	*SPS PROJECT_ID 0 2 0 0
WIM System Test Truck Records 1 of 2	* DATE ~~1 2~~ / ~~2 0~~ / ~~2 0 0~~ 6

Rev. 08/31/2001

05 / 16 / 2007

Pvmt temp	Radar Speed	Truck	Pass	Time	Record No.	WIM Speed	Axle A weight.	Axle B weight.	Axle C weight.	Axle D weight.	Axle E weight.	Axle F weight	GVW	A-B space	B-C space	C-D space	D-E space	E-F space
85.5	47	1	6	11:05	36238	47	5.0/5.1	9.3/9.0	9.1/8.9	8.6/7.9	7.3/8.3		78.5	16.9	4.3	35.3	4.5	
85.5	44	2	6	11:05	36240	44	5.0/5.6	7.3/7.0	7.6/7.0	6.4/5.4	7.1/5.9		64.4	17.4	4.3	31.5	3.9	
86	55	1	7	11:20	36388	55	5.2/4.9	9.3/8.1	9.2/8.1	8.4/7.9	7.9/8.5		77.6	16.9	4.3	35.5	4.4	
86	54	2	7	11:20	389	54	5.3/5.3	7.6/6.5	7.6/5.7	7.1/5.0	6.7/5.0		61.7	17.4	4.3	31.4	4.0	
89.5	67	1	8	11:36	538	67	4.6/5.2	8.6/9.0	8.3/8.9	7.8/8.7	7.1/8.6		76.9	16.9	4.3	35.6	4.4	
89.5	65	2	8	11:36	539	64	5.0/5.4	7.5/7.8	7.0/6.9	6.3/6.3	5.9/5.9		64.0	17.4	4.3	31.5	4.0	
91.0	47	1	9	11:50	679	45	5.5/5.7	9.7/8.1	9.7/8.2	8.8/7.6	7.8/7.3		78.3	16.8	4.3	35.2	4.5	
91.0	45	2	9	11:50	680	44	5.2/5.5	7.4/7.0	7.5/6.6	6.5/5.4	6.9/6.2		64.4	17.4	4.3	31.5	4.0	
97.5	56	1	10	12:47	37225	56	4.8/4.8	9.0/8.5	8.8/8.0	8.2/8.3	8.5/9.5		78.5	16.9	4.3	35.4	4.4	
97.5	54	2	10	12:47	226	54	5.3/5.7	7.3/6.8	7.3/6.9	7.1/5.8	6.7/5.8		64.7	17.4	4.3	31.4	4.0	
104	66	1	11	13:02	367	67	4.9/5.4	9.0/9.4	8.3/9.7	7.9/8.4	8.3/8.6		79.9	17.0	4.3	35.6	4.5	
104	64	2	11	13:02	368	64	5.0/5.5	7.1/7.5	7.3/7.7	6.1/5.9	6.7/6.1		64.8	17.4	4.3	31.6	3.9	
100	47	1	12	13:17	501	46	5.6/4.9	9.1/8.6	9.5/8.3	8.5/7.5	8.2/7.8		78.1	16.8	4.3	35.2	4.4	
100	46	2	12	13:17	502	44	5.4/5.6	7.6/6.9	7.8/7.0	6.9/5.2	7.0/6.2		65.6	17.4	4.3	31.4	4.0	
* ~~97.5~~	~~54~~	~~1~~	~~13~~	~~13:32~~	~~659~~	~~56~~	5.1/5.1	8.8/7.9	9.0/7.6	8.3/4.3	7.8/6.7		~~70.6~~	~~16.8~~	~~4.3~~	~~35.2~~	~~4.4~~	
97.5	53	2	13	13:32	660	54	4.9/5.3	7.2/7.1	7.5/6.9	6.4/5.7	6.4/6.1		63.6	17.4	4.3	31.6	4.0	

Recorded by DW

Checked by _____

First 10 rows from Call-Sheet

Sheet 21	* STATE_CODE	0 5
LTPP Traffic Data	*SPS PROJECT_ID	0 2 0 0
WIM System Test Truck Records 2 of 2	* DATE	~~1 2 / 2 0 / 2 0 0 6~~ 05 / 16 / 2007

Rev. 08/31/2001

Pvmt temp	Radar Speed	Truck	Pass	Time	Record No.	WIM Speed	Axle A weight.	Axle B weight.	Axle C weight.	Axle D weight.	Axle E weight.	Axle F weight	GVW	A-B space	B-C space	C-D space	D-E space	E-F space
97	65	1	13	13:47	37821	65	4.9/5.4	8.5/9.9	8.6/8.5	8.2/8.7	7.1/10.1		79.9	17.0	4.4	35.2	4.5	
97	64	2	14	13:47	37822	64	5.0/5.6	7.4/7.5	6.9/11.5	6.6/5.9	6.6/6.1		65.2	17.5	4.3	31.5	3.9	
100.5	46	1	14	14:10	38065	46	5.5/5.3	9.6/8.1	9.5/8.0	8.6/7.4	7.2/8.3		77.5	16.9	4.3	35.3	4.4	
100.5	43	2	15	14:10	38066	43	5.0/5.5	7.5/7.2	7.3/7.4	6.9/5.5	7.5/6.6		66.2	17.4	4.3	31.5	3.9	
98	56	1	16	14:25	38236	55	5.4/5.0	9.0/8.7	9.0/8.2	8.5/8.0	8.5/8.5		78.7	16.9	4.3	35.4	4.5	
98	54	2	16	14:25	38238	54	5.5/5.5	7.5/6.8	7.4/7.1	6.6/5.4	6.6/5.8		64.3	17.4	4.3	31.6	4.0	
103	47	1	16	14:55	38547	47	5.0/5.1	9.1/8.7	9.5/8.4	8.7/7.2	8.3/7.3		77.2	16.9	4.3	35.3	4.4	
103	44	2	17	14:55	38549	44	5.1/5.3	7.3/7.1	7.5/7.0	6.5/5.5	6.9/6.3		64.4	17.4	4.3	31.5	4.0	
101	55	1	17	15:10	38691	55	5.0/4.9	8.9/9.0	9.1/8.7	8.4/8.1	7.9/7.2		77.1	16.8	4.3	35.2	4.4	
101	54	2	18	15:10	38692	54	5.1/5.2	7.3/6.9	7.4/6.5	6.9/5.6	6.0/5.3		62.3	17.3	4.3	31.3	4.0	
102.5	66	1	18	15:26	38877	66	4.8/5.3	8.7/9.3	8.3/9.2	7.7/8.9	7.8/7.9		77.9	16.9	4.3	35.6	4.5	
102.5	64	2	19	15:26	38879	64	5.1/5.5	7.2/7.5	7.2/7.5	6.3/6.1	6.3/6.0		64.7	17.4	4.3	31.5	4.0	
99	63	1	19	15:40	39031	63	5.0/5.2	8.5/8.9	8.7/9.4	8.5/8.3	7.7/7.3		77.6	16.9	4.3	35.4	4.5	
99	64	2	20	15:40	39032	64	4.9/5.6	7.3/7.5	7.0/7.7	6.6/5.8	6.8/5.8		65.0	17.4	4.3	31.6	3.9	
98.5	~~53~~	2	20	15:55	39201	54	5.2/4.5	7.5/7.5	7.4/6.4	6.7/5.6	6.1/6.2		63.1	17.3	4.3	31.5	4.0	
		2	~~21~~															

Recorded by DJW

Checked by _____

3.11.2. Iteration 1 Worksheet

Date 5/15/07

Beginning factors:

Speed Point (mph)	Name	Value
Overall		1/2
Front Axle		
50 1–(80) km	SPEED BIN 1	~~42~~ 3975/3975
55 2–(88)	2	3530/3530
60 3–(97)	3	3655/3655
65 4–(105)	4	3600/3600
70 5–(113)	5	3670/3670

Errors (Pre-Validation):

	Speed Point 1 (50)	Speed Point 2 (55)	Speed Point 3 (60)	Speed Point 4 (65)	Speed Point 5 (70)
F/A					
Tandem					
GVW	0	~~-2~~ -1.3	~~+8~~ ~~+7.85~~ +2	+ 5	+7

Adjustments:

	Raise	Lower	Percentage
Overall	☐	☐	
Front Axle	☐	☐	
Speed Point 1	☐	☐	
Speed Point 2	☒	☐	2.09% 1.017
Speed Point 3	☐	☒	2 %
Speed Point 4	☐	☒	5 %
Speed Point 5	☐	☒	7 %

End factors:

Speed Point (mph)	Name	Value
Overall		
Front Axle		
50 1–(80) km	SPEED BIN 1	3975/3975
55 2–(88)	2	~~3602~~ 3576/3576
60 3–(97)	3	~~3728/3728~~ 3582/3582
65 4–(105)	4	~~3780~~ 3420/3420
70 5–(113)	5	~~3913~~ 3913/3913

Task Leader Initials: MJC

☑ Open WIM Controller Log File – filename _____

☑ 10 runs (equal distribution)

- ☑ Varying speeds
- ☑ Separate Sheet 21s (pages = 1)
- ☑ Recorded on Spreadsheet

☑ Errors from 1st Iteration –

	Mean	1SD	2SD	P/F
☑ GVW	-.8 %	1.5 %	3.3 %	P
☑ Tandem	-.3 %	2.6 %	5.4 %	P
☑ Axle	-3.2 %	3.7 %	8.5 %	P
☑ Spacing	-.1 ft		.1 ft	P

☑ Data meets performance requirements?

- ○ No – go to 3.11.3.
- ☑ Yes – go to 3.12

Task Leader Initials: _____

TEST VEHICLE PHOTOGRAPHS FOR SPS WIM VALIDATION

May 15 and 16, 2007

STATE: Arkansas

SHRP ID: 0200

Photo 1 - 6420060018_SPSWIM_TO_16_05_2.76_0200_Truck_1_Tractor.JPG – 5/15/2007

Photo 2 - 6420060018_SPSWIM_TO_16_05_2.76_0200_Truck_1_Trailer.JPG – 5/15/2007

Photo 3 - 6420060018_SPSWIM_TO_16_05_2.76_0200_Truck_1_Kingpin.JPG – 5/15/2007

Photo 4 - 6420060018_SPSWIM_TO_16_05_2.76_0200_Truck_1_Suspension_1.JPG – 5/17/2007

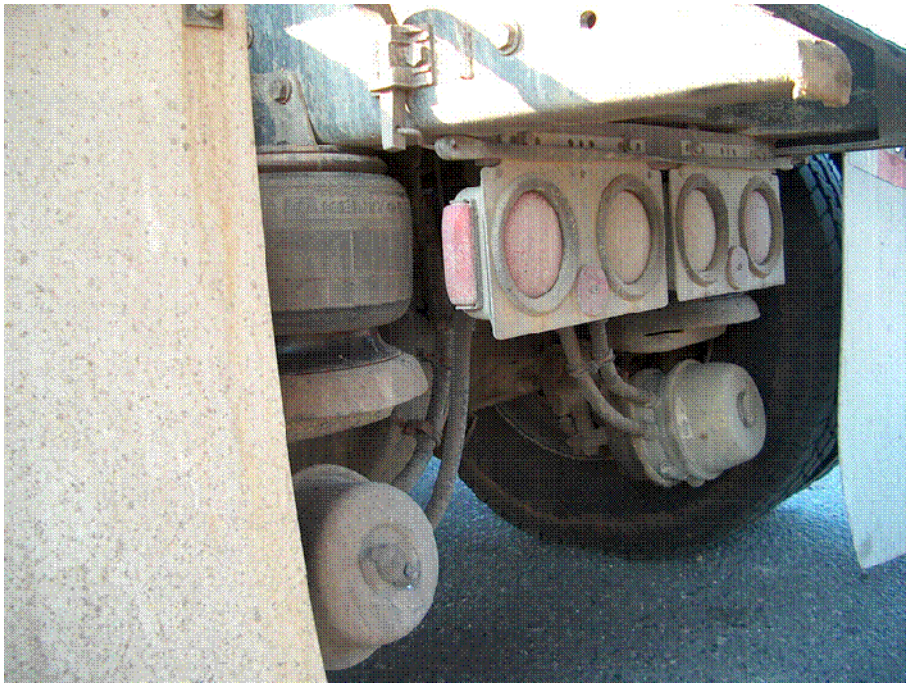

Photo 5 - 6420060018_SPSWIM_TO_16_05_2.76_0200_Truck_1_Suspension_2.JPG – 5/15/2007

Photo 6 - 6420060018_SPSWIM_TO_16_05_2.76_0200_Truck_1_Suspension_3.JPG – 5/15/2007

Photo 7 - 6420060018_SPSWIM_TO_16_05_2.76_0200_Truck_2_Tractor.JPG - 5/15/2007

Photo 8 - 6420060018_SPSWIM_TO_16_05_2.76_0200_Truck_2_Trailer.JPG - 5/15/2007

Photo 9 6420060018_SPSWIM_TO_16_05_2.76_0200_Truck_2_Kingpin.JPG - 5/15/2007

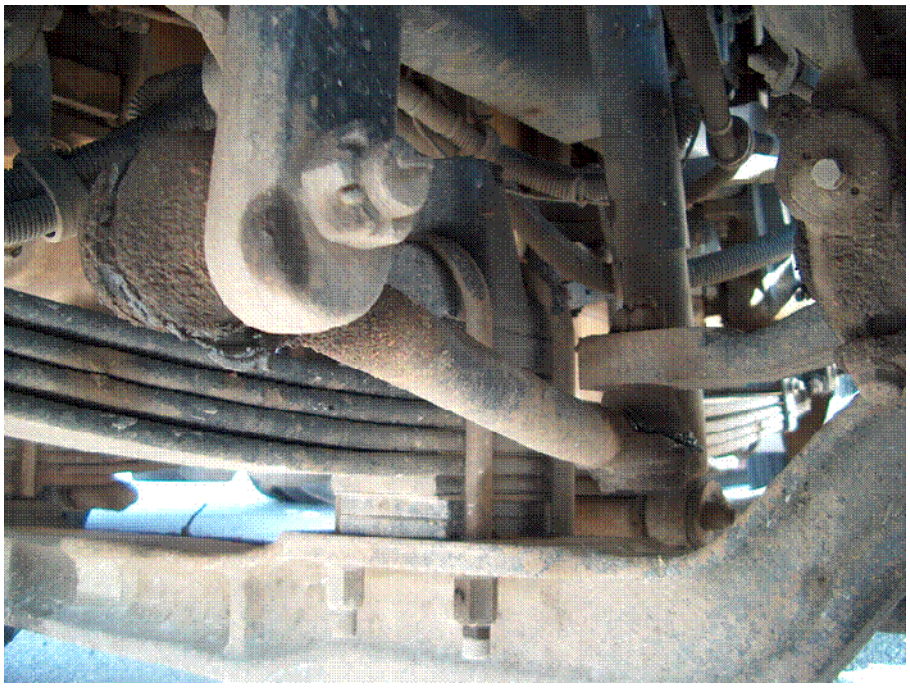

Photo 10 - 6420060018_SPSWIM_TO_16_05_2.76_0200_Truck_2_Suspension_1.JPG – 5/15/2007

Photo 11 - 6420060018_SPSWIM_TO_16_05_2.76_0200_Truck_2_Suspension_2.JPG - 5/15/2007

Photo 12 - 6420060018_SPSWIM_TO_16_05_2.76_0200_Truck_2_Suspension_3.JPG – 5/15/2007

ETG LTPP CLASS SCHEME, MOD 3

Class	Vehicle Type	No. Axles	Spacing 1	Spacing 2	Spacing 3	Spacing 4	Spacing 5	Spacing 6	Spacing 7	Spacing 8	Gross Weight Min-Max	Axle 1 Weight Min *
1	Motorcycle	2	1.00-5.99								0.10-3.00	
2	Passenger Car	2	6.00-10.10								1.00-7.99	
3	Other (Pickup/Van)	2	10.11-23.09								1.00-7.99	
4	Bus	2	23.10-40.00								12.00 >	
5	2D Single Unit	2	6.00-23.09								8.00 >	2.5
2	Car w/ 1 Axle Trailer	3	6.00-10.10	6.00-25.00							1.00-11.99	
3	Other w/ 1 Axle Trailer	3	10.11-23.09	6.00-25.00							1.00-11.99	
4	Bus	3	23.10-40.00	3.00-7.00							20.00 >	
5	2D w/ 1 Axle Trailer	3	6.00-23.09	6.30-30.00							12.00-19.99	2.5
6	3 Axle Single Unit	3	6.00-23.09	2.50-6.29							12.00 >	3.5
8	Semi, 2S1	3	6.00-23.09	11.00-45.00							20.00 >	3.5
2	Car w/ 2 Axle Trailer	4	6.00-10.10	6.00-30.00	1.00-11.99						1.00-11.99	
3	Other w/ 2 Axle Trailer	4	10.11-23.09	6.00-30.00	1.00-11.99						1.00-11.99	
5	2D w/ 2 Axle Trailer	4	6.00-26.00	6.30-40.00	1.00-20.00						12.00-19.99	2.5
7	4 Axle Single Unit	4	6.00-23.09	2.50-6.29	2.50-12.99						12.00 >	3.5
8	Semi, 3S1	4	6.00-26.00	2.50-6.29	13.00-50.00						20.00 >	5.0
8	Semi, 2S2	4	6.00-26.00	8.00-45.00	2.50-20.00						20.00 >	3.5
3	Other w/ 3 Axle Trailer	5	10.11-23.09	6.00-25.00	1.00-11.99	1.00-11.99					1.00-11.99	
5	2D w/ 3 Axle Trailer	5	6.00-23.09	6.30-35.00	1.00-25.00	1.00-11.99					12.00-19.99	2.5
7	5 Axle Single Unit	5	6.00-23.09	2.50-6.29	2.50-6.29	2.50-6.30					12.00 >	3.5
9	Semi, 3S2	5	6.00-30.00	2.50-6.29	6.30-65.00	2.50-11.99					20.00 >	5.0
9	Truck+FullTrailer (3-2)	5	6.00-30.00	2.50-6.29	6.30-50.00	12.00-27.00					20.00>	3.5
9	Semi, 2S3	5	6.00-30.00	16.00-45.00	2.50-6.30	2.50-6.30					20.00 >	3.5
11	Semi+FullTrailer, 2S12	5	6.00-30.00	11.00-26.00	6.00-20.00	11.00-26.00					20.00 >	3.5
10	Semi, 3S3	6	6.00-26.00	2.50-6.30	6.10-50.00	2.50-11.99	2.50-10.99				20.00 >	5.0
12	Semi+Full Trailer, 3S12	6	6.00-26.00	2.50-6.30	11.00-26.00	6.00-24.00	11.00-26.00				20.00 >	5.0
13	7 Axle Multi's	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			20.00 >	5.0
13	8 Axle Multi's	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		20.00 >	5.0
13	9 Axle Multi's	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	20.00 >	5.0

Spacings in feet
Weights in kips (Lbs/1000)
* Suggested Axle 1 minimum weight threshold if allowed by WIM system's class algorithm programming

Final System Operating Parameters

Arkansas SPS-2 (Lane 1)

Validation Visit – 15 May, 2007

Calibration factor for sensor #1:

80 kph:	3475
88 kph:	3576
96 kph :	3582
104 kph:	3420
112 kph:	3413

Calibration factor for sensor #2:

80 kph:	3475
88 kph:	3576
96 kph :	3582
104 kph:	3420
112 kph:	3413