Memorandum

U.S. Department
of Transportation

**Federal Highway
Administration**

6300 Georgetown Pike
McLean, Virginia 22101-2296

SUBJECT: ACTION: LTPP Directive TDP-12 May 11, 1998
Revisions to Protocols in Directives TDP-10 and TDP-11

FROM: Monte Symons
Pavement Performance Division

REPLY TO
ATTN OF: HNR-30

TO: Dr. William Phang, PI - LTPP North Atlantic Regional Contract
Mr. Dennis Morian, PI - LTPP Western Regional Contract
Dr. Brent Rauhut, PI - LTPP Southern Regional Contract
Dr. Michael Darter, PI - LTPP North Central Regional Contract

Enclosed are three pages issued for immediate replacement in the traffic data sampling scheme and calibration protocols. They are pages 5 and 9 of the *Protocol For Calibrating Traffic Data Collection Equipment* and page 3 of the *Revised Traffic Monitoring Protocol for LTPP Test Sites*. These changes were discussed at the Traffic conference call May 7th and are editorial in nature. They do not need to be transmitted to your state contacts except on request.

Please call me at (703) 285-2730 if you have questions about this transmittal.

Monte Symons

Attachments

cc:
LAW PCS
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Directive File
Official File (200.20)
HNR-1
Chron

When the system calibration has been confirmed, the data collected during the time that the scale is certain to be within calibration tolerances will be used to create an "expected loading pattern" for five-axle tractor semi-trailer gross vehicle weights (i.e., GVWs for 3S2 vehicles) at that site. At least 100 3S2s are needed to determine this pattern, which can be calculated with the LTPP quality control software.

Changes in this pattern, specifically movement in the location of the loaded or unloaded peaks in the GVW distribution, are a sign that scale calibration may have shifted. (See figure 1.) These observed changes are a preliminary indicator that the calibration at that site may be improper and that the site calibration factor requires confirmation or changing. A scale's calibration must be validated (and potentially changed) whenever one of the following happens:

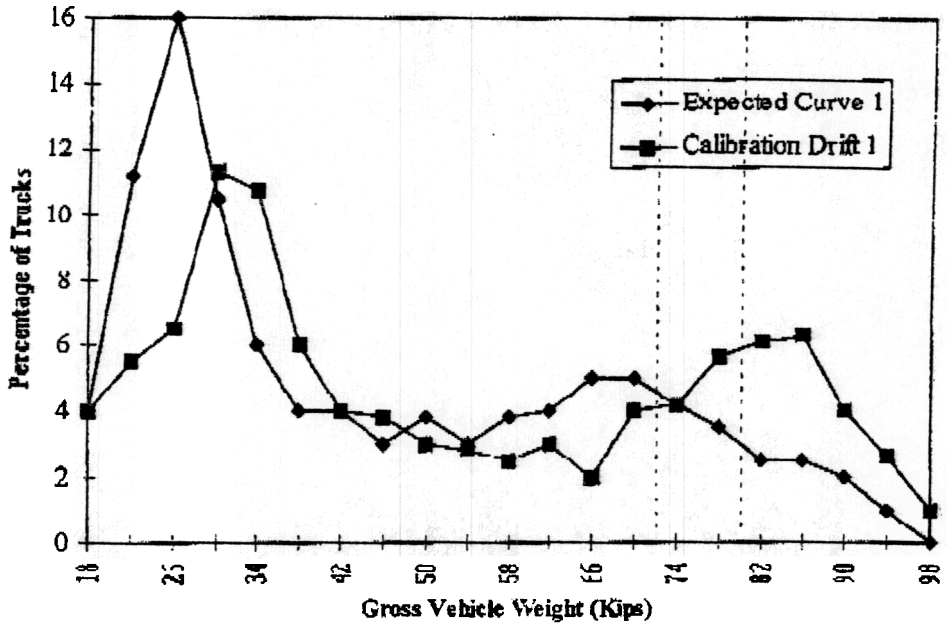

Figure 1 Calibration drift using GVW for five-axle tractor semi-trailer trucks.

- The unloaded peak in the quality control graph of the 3S2 GVW distribution shifts more than 4000 lb.
- The location of the loaded peak shifts 8000 lb or more.

QUALITY CONTROL STEPS TO BE TAKEN IN THE FIELD

Quality control checks are similar to, but should not be confused with, calibration tests. Both require the comparison of a set of system outputs with independent measurements of "truth." Both are intended to allow a user to set, check, or refine parameters that allow a data collection device to operate correctly. Calibration efforts are comprehensive. Quality control checks are intended to allow the application of simple rules of thumb to quickly confirm that a data collection device is working as expected. Quality control is only meant to ensure that a properly calibrated piece of equipment is working as intended in a given field installation. Therefore, the quality control steps described below should be followed for all LTPP traffic data collection.

AVC Equipment and Data

The field quality control check should be performed at least twice for each portable data collection effort: once when the counter is set out and once when the counter is picked up. In addition, for longer "short-duration" counts (e.g., a week or longer), it is recommended that these steps be undertaken at least once during the middle of the count.

Using a laptop computer:

- Set the counter to record vehicle by vehicle or in raw mode, and observe the category assigned and the number of axles on each vehicle.
- Check the axle spacing on class 9 vehicles (three-axle tractor pulling a two-axle semi-trailer). The drive axles should be greater than 4.1 ft and less than 4.9 ft, and the trailer tandem axle's spacing should be greater than 3.8 ft and less than 4.9 ft unless the trailer tandem is a spread tandem. In this case, the tandem spacing could be up to approximately 8 ft apart (depending on State laws). If the spacing is consistently larger or smaller than the above, remeasure the road-tube spacing, then check the road-tube spacing setting in the recorder.

Manually checking the AVC unit:

- If the AVC counter can collect data on an individual truck's characteristics, perform the following checks. Observe the passing vehicles and how they are recorded by the AVC unit. Look for the unit's ability to correctly count the number of axles and measure the axle spacing of the vehicle. If the number of axles is correct and the axle spacing looks reasonable (e.g., a small car's axle spacing is near 9 feet; a 3S2's front axle spacing can vary from 9.9 ft to 13.0 ft, depending on the cab), then the equipment can be considered to be functioning correctly.

removed from further pavement performance data collection (e.g., that are being reconstructed in a manner that does not fit within one of the General Pavement Study (GPS) experiments) will not require continued traffic monitoring; however, all valid data previously collected will remain available through the LTPP Information Management System (IMS).

Table 1. Summary of expected errors for selected sampling plans.

Sampling Plan		Expected Bias to the Annual Estimate	Expected Error (percent)	95 Percent Confidence Interval
Classification	WIM			
1 weekday	1 weekday	+20	45	200
1 weekend day	1 weekend day	-50	55	50
2 weekdays	2 weekdays	+20	45	100
1 week	1 week	0	30	50
1 week during each of four seasons	1 week during each of four seasons	0	30	50
1 weekday and 1 weekend day per season for four seasons	1 weekday and 1 weekend day per season for four seasons	0	35	80
Continuous	1 weekday	0	30	50
Continuous	2 weekdays	0	25	50
Continuous	1 weekday and 1 weekend day	0	25	50
Continuous	1 week	0	25	40
Continuous	1 weekday during each of four seasons	0	12	30
Continuous	2 weekdays during each of four seasons	0	10	25
Continuous	1 week during each of four seasons	0	8	20

All values are expressed as a percentage of annual load.

Source: Results of the Empirical Analysis of Alternative Data Collection Sampling Plans for Estimating Annual Vehicle Loads at LTPP Test Sites, July 1997.