Memorandum

U.S. Department
of Transportation

Federal Highway
Administration

6300 Georgetown Pike
McLean, Virginia 22101-2296

Subject: DRAFT LTPP TRAFFIC
DIRECTIVE NO: TDP-04

Date: January 4, 1996

From: Kris Gupta KG

Reply to
Attn. of: HNR-30

To: Mr. Ivan Pecnik, LTPP Regional Engineer (NA)
Mr. Morris Reinhardt, LTPP Regional Engineer (S)
Mr. Richard Ingberg, LTPP Regional Engineer (NC)
Mr. Cal Berge, LTPP Regional Engineer (W)

Attached for your **review and comment** is the Draft LTPP Program Directive Number TDP 04 titled," Monitored Traffic Data—Current Policy Clarification and Changes". The directive documents and updates the traffic data collection requirements and data procesing procedures for the LTPP program. The document has taken into consideration the experiences gained from 1990-93 data processing activities and the comments recieved from the various participants.

I will appreciate receiving your and RCOC staff's comments by February 5, 1996.

Please, contact me at 703/285-2376 if you have any question(s).

Attachments

cc:
Shahed Rowshan
Barbara Ostrom
Joe Wilkinson
Mark Hallenbeck

LONG TERM PAVEMENT PERFORMANCE PROGRAM DIRECTIVE

For The Technical Direction Of The LTPP Program

DRAFT DRAFT DRAFT

Program Area: Traffic Directive Number: TDP 4

Date: January 4, 1996

Subject: Monitored Traffic Data--Current Policy Clarification and Changes.

This document briefly describes the required traffic data collection and manipulation for the LTPP program. It discusses expectations for the participating state and provincial highway agencies (SHAs), lists the data manipulation tasks that will be performed, and defines the assumptions inherent in the plan. This represents an update of work previously performed by the Strategic Highway Research Program (SHRP) and incorporates responses to comments made by various SHAs, both directly to LTPP and to respective Regional Engineers and Regional Contractors.

Background

Traffic data collection to support both the GPS and SPS experiments is a complex task that requires the commitment of resources from participating SHAs. In developing the LTPP traffic data collection and manipulation plan, the SHRP Traffic Data Collection and Analysis and Weigh-in-motion Expert Task Groups (ETGs) attempted to create a system that would meet the needs of the required research program while also accounting for both the known limitations in SHA resources and the profession's limited knowledge of the variation in truck volumes and weights on U.S. highways.

The SHRP ETG data collection plan incorporated the following major principles:

> Traffic loads should be the result of actual measurements of truck volumes and weights wherever possible, not approximations based on traffic on nearby facilities or statewide averages, as volumes and weights can vary significantly from road to road.

Data from all LTPP test sites should be treated consistently to maintain uniformity in the database. (This means that states should not arbitrarily adjust data on the basis of "professional judgment," to make submitted data points fit some "expected" value. addition, In a single aggregation procedure should be followed for all submitted data so that estimation of annual conditions is consistent for all LTPP sites.)

All data in the database should be clearly labeled ("truth in data").

Sufficient truck volume and load data should be collected at each LTPP test site to accurately estimate and account for the effects of seasonal and day of week changes in pavement loadings.

These basic principles resulted in the initial LTPP traffic data collection plan and the creation of the LTPP regional and central traffic databases. **The FHWA LTPP still endorses these principles.**

The initial LTPP traffic data collection plan consisted of three levels of effort. Individual SHAs selected a level of effort and adopted a data collection plan for each LTPP test section on the basis of the availability of data collection resources and data collection equipment. These three levels of effort are:

preferred (continuous WIM)
desirable (continuous AVC with site-specific seasonal WIM)
minimum (one year of continuous AVC some time in a five-year period, with seasonal WIM within that same period).

Wherever physically possible, all traffic data collection was to take place adjacent to the LTPP test sections to minimize the effects of changes in traffic loadings between the test section and data collection location. Where it was not physically possible to collect traffic measurements adjacent to the test section, the SHA was to provide measured data that would allow an accurate determination of differences in loading between the LTPP test section and the traffic data collection site that was used.

SHRP also requested that SHAs estimate the annual loads that had been applied to the test sections before the start of the LTPP traffic monitoring activity. These estimates, called Historical Loading Estimates, are stored separately from the actual load measurements, called Traffic Monitoring Data.

The purpose of this separation was to reinforce the fact that the majority of these "historical estimates" were based on very limited data (often no data) and, therefore, might not accurately represent actual loading rates, although they represented the best information available to the SHAs at the time they were submitted.

As a result of preliminary analyses of the traffic data submitted by the SHAs to date, a number of additions and refinements to the LTPP traffic data collection procedures have been made. The following section describes the changes and documents the current requirements for traffic data collection from SHAs.

Current Policy Clarification and Changes

It may be noted that the basic LTPP data collection requirements have not changed, however, review of the traffic data submitted to LTPP by the SHAs has resulted in the following additions and clarification to LTPP policy:

Editing of Traffic Data

SHRP told states to "not edit" traffic data, but also to not submit data from "equipment that had failed." These instructions were interpreted differently by different SHAs. Many SHAs submitted whatever "data" their field equipment produced, regardless of the performance of that equipment. Other SHAs carefully reviewed the data they submitted and indicated when they believed the data did not accurately reflect actual volumes and loads. The following instructions are meant to clarify this requirement.

> **SHAs are encouraged to review their data before submitting them to LTPP.** Where this review indicates that equipment has malfunctioned and the data are invalid, the data should not be submitted unless a "minor" adjustment can be made to correct the observed/known error. This "correction" is primarily intended to allow adjustment of vehicle weight data where the calibration for a device has drifted a known amount. IF an SHA believes other "minor" adjustments are warranted, the SHA is encouraged to discuss the proposed adjustments with the LTPP its regional office's traffic representative.
>
> **SHAs should not adjust their traffic data but should inform the LTPP Regional Office of necessary adjustments.** If the SHA notices an error that it needs to "correct," it should

explain on the data transmittal sheet what the error is, how it should be corrected, and the scientific basis that justifies that correction. (For example, "The data for site XX2003 are from a WIM scale that is under-calibrated by 15 percent. All weights from January 1 through March 31, 1995, should be multiplied by 1.15. This adjustment is based on the recalibration of the scale on April 1, 1995, and the comparison of the new calibration factor with the factor in effect from the start of the year.")

LTPP is currently revising the traffic database software to allow for adjustment of traffic data. The new software will maintain a complete audit trail of all adjustments made to the submitted data.

Day of week and seasonal adjustments

The original LTPP traffic database aggregated the traffic data submitted for a single year to calculate annual loads. The software assumed that the data submitted (assumed to be collected primarily at the preferred and desired levels) would contain measurements for multiple seasons and all days of the week. From a preliminary review of the 1990-93 submitted data it has become apparent that this is not the case. Furthermore, the data shows that both day-of-week and seasonal variations in truck volumes can have a substantial impact on the annual load experienced by a site. (Weekend truck volumes at many sites are less than 20 percent of weekday volumes.) To accommodate this variation, LTPP staff will use data submitted for different calendar years to estimate the effects of this variation at each test site. The use of data from multiple years at a site to improve the annual load estimate for a single year at that site was anticipated by the SHRP ETGs, but it has not been programmed into the current data aggregation software. Revisions to the current software are planned to make the aggregation process more flexible in using data from multiple years. Initially, LTPP or contract staff will perform the calculations necessary to allow consideration of data from multiple years in the estimation of a single year's annual load estimate. SHAs will be consulted before LTPP staff undertake this procedure, and SHA staff will have the opportunity to review and comment on the results of these procedures.

SHA review of traffic loading estimates

Many SHAs are concerned about the quality of the loading estimates that will be made available though LTPP. As a result, the LTPP will provide SHAs with the results of all quality control checks run on submitted data. In addition, LTPP will provide SHAs with the opportunity to review the

computed annual loading estimate for each year before the release of that estimate. SHAs will have the opportunity to indicate when they believe these estimates to be erroneous. LTPP and RCOC staff will then work with the SHAs to identify the cause of the potential errors and to determine whether those errors can be removed from the database. Data that an SHA believes do not accurately represent traffic and loading conditions for a site will not be used in the estimation of annual loads for that site.

Periodic calibration of field equipment

All SHAs should review the calibration of their WIM devices at least once per year. This review may be completed either with a calibrated test truck, by comparison of WIM scale output with static weights for the same vehicles from a nearby enforcement scale (or portable scales), or through methodologies developed under NCHRP project 3-39 (2). Calibration should be performed more frequently when either the LTPP's or the SHA's own quality control process determines that a scale's calibration has drifted. SHAs should also test (and calibrate as necessary) their vehicle classification equipment to ensure that it is providing accurate measurements of volumes by vehicle classification.

Anticipated changes to the traffic data collection requirements

LTPP is currently reviewing the traffic data collection policy, especiallye for the SPS experiments, with the various AASHTO representatives. Any modifications/changes in the required data collection levels will be discussed at the "Improving Pavements with LTPP Products" Conference scheduled for Spring 1996.

Maintenance of field equipment and replacement of faulty sensors and electronics

SHAs are encouraged to repair and replace traffic data collection equipment at LTPP test sites. Where SHA resources are not sufficient to maintain the equipment at all sites, the SHAs are encouraged to work with the LTPP regional engineer to prioritize the repair and replacement of that equipment.

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