Memorandum

U.S. Department
of Transportation

**Federal Highway
Administration**

6300 Georgetown Pike
McLean, Virginia 22101

Subject: **ACTION**: LTPP Directive D-30
Guidance for RSC Time Series Review of Distress Data

Date: October 4, 2004

From: Jack Springer
Long Term Pavement Performance Team

Reply to
Attn of: HRDI-13

To: Dr. Frank Meyer, PM - LTPP North Atlantic Regional Contract
Dr. Frank Meyer, PM - LTPP North Central Regional Contract
Mr. Mark Gardner, PM - LTPP Southern Regional Contract
Mr. Kevin Senn, PM - LTPP Western Regional Contract

Attached is Long Term Pavement Performance (LTPP) Program Directive D-30, which provides guidance for RSC time series review of distress data.

Please make this directive available to all personnel involved in distress data processing and QC activities.

If you have any questions concerning this transmittal, please do not hesitate to call me at (202) 493-3144.

Attachment

LONG TERM PAVEMENT PERFORMANCE PROGRAM DIRECTIVE

For the Technical Direction of the LTPP Program

Program Area:	Monitoring	Directive Number:	D-30
Date:	September 10, 2004	Supersedes:	NA
Subject:	**Guidance for RSC Time Series Review of Distress Data**		

Background

Quality and consistency of distress data are critical requirements necessary to ensure confidence on the part of users of this data. The QC performed on data intended for the IMS currently consist of logic and range checks, which look only at the specific survey being processed for upload. Studies conducted on behalf of FHWA indicate that a variety of possible errors beyond those identified in existing QC checks may be searched for and addressed prior to release of data.

The intent of this directive is to provide guidance to the Regional Support Contractors (RSCs) for more specific criteria to be used in their reviews of new distress surveys (film or manual). The criteria are intended to allow reviews of prior surveys for the section and assessment of the logic of the time series data. The effort will involve using the latest version of the Distress Viewer and Analysis (DiVA) software. In addition, a couple of procedural steps must be incorporated into existing RSC office review processes to accommodate this time series evaluation.

Essential Elements of MDS QC – Office Reviews

Current LTPP directives require office review of all manual distress surveys. Personnel who are qualified by experience and who have satisfactorily completed a distress workshop perform the reviews. These reviews are an essential part of the data collection process and are intended to find and correct erroneous information, verify mapped information is accurately transcribed to the numerical values recorded on the distress data sheets, and ensure consistent application of definitions and procedures by the raters. A brief summary of the critical steps is shown below. Note that each contractor may approach the process in a different manner, but the objectives remain the same.

In the past, when a new manual distress survey was delivered to the RSC office by the rater, the survey went through the following general steps:

a. A detailed review to check for errors in math, summarization etc.
b. Visual comparison to prior survey – map to map, summary to summary
c. Comparison of distress types and total quantities

d. Differences refereed by distress coordinators
    i. Discussion with raters
    ii. DISTPR in some cases
e. Data entered in RIMS and existing IMS QC run

In order to introduce time series data assessment, the generalized procedure must be revised as follows to include steps for running the software, evaluating the results and for resolution of issues. This revised process is as follows with added elements in **bold**:

a. Detailed review to check for errors in math, summarization etc.
b. Visual comparison to prior survey – map to map, summary to summary
c. Comparison of distress types and total quantities
d. Differences refereed by distress coordinators
    i. Discussion with raters
    ii. DISTPR in some cases
e. Data entered in RIMS and existing IMS QC run
f. Perform time series check
g. Review results and effect appropriate corrections
h. Generate DISTPR in cases where resolution at the RSC cannot be accomplished

Additional Review Elements

When the new distress survey has been manually reviewed, corrected for errors and approved by the distress coordinator, it should be entered into RIMS. Perform a time series check of the section history of distress data surveys using ***DiVA (Distress Viewer and Analysis v1.0)***. The guidelines for installing and using the software are included with the DiVA software release, which is addressed under separate directive.

The results from the time series check should be reviewed to identify what issues may have been discovered by means of DiVA. Possible issues and how they should be addressed when encountered during time series reviews are contained in the following sections. The three categories of problems are processing errors, distress identification errors and other concerns (including small quantities of distress, undocumented maintenance and rehabilitation, etc.).

Processing Errors

Processing errors are probably the easiest to identify and resolve. These may be typographical errors made when the data were entered into the database. There can be instances in which maps were incorrectly summarized (i.e., there were errors in determining the total quantity of distress). Some math errors were identified from 1994 when the surveys were converted from English units to metric units. There may be some instances for which it is determined that data were acceptable, contrary to the original reviewer's concerns. These errors may be correctable, and thus effort should be undertaken to make corrections directly in the RIMS.

Distress Identification Concerns

Differences in distress identification are the most likely explanation for problem surveys. These may be difficult problems to correct as correcting them would require changing prior data. However, some of these can be rectified (i.e., patches noted with less than a tenth of a square meter in area). Some of the concerns, such as fatigue versus longitudinal cracking in the wheel path, would require changing old surveys to reflect newer interpretations of the DIM or overriding observations made by previous surveyors. Surveys shall not be changed unless an obvious error in interpretation can be documented (i.e., patch sizes).

Other Concerns

The "other" group consists of a number of discrepancies, though some may not require resolution. Those distresses with minimal quantities and nonlinear growth rates should be considered acceptable.

Some sections may be identified for which a maintenance or rehabilitation activity is known to have occurred by the original reviewer but not recorded in the database, or an activity that was recorded in the database but possibly overlooked by the original reviewer. Abrupt changes in a trend line immediately prior to a construction event could indicate that the either the construction event or distress survey date is incorrect. The DiVA software was written to examine data by construction event; therefore, sections in which a maintenance or rehabilitation event has occurred and was appropriately recorded in the data will be clearly shown by the software.

PADIAS surveys may be identified as a cause for discrepancies. Because PADIAS maps may not be available for the review, manual surveys that indicate discrepant PADIAS surveys should be pursued via the DISTPR process.

Review shall be documented by maintaining a log where date and section information are recorded for time series reviews. An indication of the outcome of the review shall be noted and, where problems were encountered, a printed copy of the graph for each affected distress shall be appended to the distress survey. The graph sheets shall be annotated to indicate actions taken (DISTPR created, errors corrected, no action needed, no action possible, etc.) to provide continuity for future reviews. The sheets shall be attached to the distress survey forms and filed.

To ensure consistency and uniformity amongst the regions, a Microsoft© access database table (DISTRESS_REVIEW) has been created for their use in creating and maintaining the log. The table was sent to the RSCs previously. Descriptions of the structure of DISTRESS_REVIEW and each of its fields are provided below.

Table Structure – DISTRESS_REVIEW

Field Name	Data Type	Format
State Code	Integer	2 digit number
SHRP ID	Text	Field size = 4
Review Date	Date	dd/mmm/yy
Error	Text	12 characters maximum
Error Other	Text	255 characters maximum
Action	Text	25 characters maximum
Action Other	Text	255 characters maximum
DISTPR Number	Text	6 characters maximum

Field Descriptions – DISTRESS_REVIEW

- **State Code** is the two digit number used to identify the state or Canadian province the test section in question is located. The state codes are defined in Table A.1, Appendix A of the LTPP Data Collection Guide.

- **SHRP ID** is the four character code assigned to the test section in question.

- **Review Date** is the date the time series review of distress data was conducted.

- **Error** is the type of issue observed in the time series data review. A list box is provided in the database to allow for several specific types of errors including: *None, Processing, Distress ID,* and *Other*.

- **Error Other** should be completed when the "*Other"* type is selected under the "*Error"* field. This field is used for providing additional information regarding the type of issue encountered.

- **Action** is the type of corrective action that has been pursued, if necessary, to remedy the situation. A list box has been provided allowing for selection of several specific types of action taken including: *None Required, Corrected in RIMS, Discuss with Raters, DISTPR, No Action Possible,* and *Other*.

- **Action Other** is used when the "*Other*" type is selected under the "*Action*" field. This field is used for providing information regarding the type of correction that has been/is being pursued.

- **DISTPR Number** is the number of the distress problem report (DISTPR) submitted to the FHWA and TSSC for review and resolution of the situation where one was submitted.

If there are any problems regarding this directive, please submit a problem report in accordance with the *LTPP Monitoring Directive D-04: Distress Problem Report (DISTPR) Form* or latest version of directive.

Prepared by: TSSC

Approved by:

Aramis López, Jr.
LTPP Team Leader