Memorandum

U.S. Department
of Transportation

**Federal Highway
Administration**

6300 Georgetown Pike
McLean, Virginia 22101

Subject: **ACTION**: LTPP Directive D-41
Distress Survey Photographs

Date: November 17, 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-41, which presents guidelines to be followed when taking photographs for manual distress surveys.

Please make this directive and attachments available to all personnel involved in distress data collection and processing.

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

Attachments (4)

LONG TERM PAVEMENT PERFORMANCE PROGRAM DIRECTIVE

For the Technical Direction of the LTPP Program

Program Area: Monitoring **Directive Number**: D-41

Date: November 10, 2004 **Supersedes**: D-34

Subject: Distress Survey Photographs

Photographs are an important component of LTPP manual distress surveys and must be taken during each survey. To promote quality and consistency among the four regions, the following guidelines shall be followed, effective immediately, when taking photographs for manual distress surveys:

- Use a digital camera that meets the requirements specified by LTPP Directive GO-24: General Specifications for LTPP Digital Cameras or most current directive. If a digital camera is not available due to unavoidable circumstances, a 35 mm film camera may be used with the permission of the RSC Distress Coordinator, provided that digital images are obtained during film processing that meet the resolution requirements below.

- Take standard photographs, in order, at the following six (6) LTPP test section locations:
  - Station 0-50 looking at station 0+00
  - Station 0+50 looking at station 1+00
  - Station 1+50 looking at station 2+00
  - Station 2+50 looking at station 3+00
  - Station 3+50 looking at station 4+00
  - Station 4+50 looking at station 5+00

Note that eleven (11) standard photos are required at 305-meter (1000 ft.) sections. All standard photographs shall be taken while standing at mid-lane of the test section and may be taken in reverse order depending on the location of the sun as long as each 100 ft. station is captured.

For example, if the photos are taken starting at the end of the section, the six locations would be:

- Station 5+50 looking at station 5+00
- Station 4+50 looking at station 4+00
- Station 3+50 looking at station 3+00
- Station 2+50 looking at station 2+00

- Station 1+50 looking at station 1+00
- Station 0+50 looking at station 0+00

- Additional photographs shall be taken of unique distresses that do not fall into a distress identification manual distress type category, distresses that the surveyor interprets differently from previous surveyors, other distresses that are noteworthy, or other features of interest to users of the manual distress survey (MDS) data. These may include distresses that are recorded on the distress maps and are not unique.

- To the extent possible, the following photography guidelines shall be followed.
  - Photographs shall be taken between the hours of 9:00 a.m. and 3:00 p.m. local time, but the 9:00 a.m. to 11:00 a.m. or 1:00 p.m. to 3:00 p.m. time intervals are preferred.
  - Distresses should be photographed from a direction facing the sun's rays to enhance the distress by capturing the shadow effect created by the sun.
  - A reference scale or marking shall be used in every non-standard photograph. If possible, a standard reference scale manufactured for the LTPP program should be used in the photograph and it should be placed so as to not cast a shadow over the distress.

- Photographs shall be saved in *.jpeg format at a resolution of 1280 x 960 pixels or better. The following file naming convention shall be used:

  MDPaannnnsyyyy##.jpg

  where:

MDP	=	fixed characters that indicate file contains a **M**anual **D**istress **P**hotograph
aa	=	LTPP agency code (STATE_CODE)
nnnn	=	SHRP ID number (SHRP_ID)
s	=	annual survey sequence letter (visit identifier or code)
yyyy	=	year of survey
##	=	photograph sequence number on survey day
jpg	=	jpeg file format extension

For example, MDP483739B200011.jpg represents a jpeg file containing the eleventh (## = 11) photograph taken during the second visit (s=B) of the year 2000 (yyyy = 2000) on test section 3739 (nnnn=3739) located in the state of Texas (aa = 48).

Since distress survey photos will form part of the Ancillary Information Management System (AIMS), it is necessary for the information associated with them to be systematically recorded and stored, allowing users of the AIMS to sort, search and retrieve the photos as well as to correctly associate them with data retrieved from the pavement performance database.

To assist in this task, a paper photolog form, a Microsoft® Access database table

(AIMS_DIS_IMAGE) within which distress photo information will be stored and an associated data entry screen have been created. These are included with this directive. Descriptions of the structure of AIMS_DIS_IMAGE and each of its fields are provided below.

Table structure – AIMS_DIS_IMAGE

Field Name	Data Type	Format
Title	Text	255 character max
Organization	Text	255 character max
Description	Text	255 character max
Survey_Date	Date/Time	"yyyy/mm/dd" (ISO 8601)
Type	Text	255 character max
Format	Text	255 character max
Start_Coverage	Number	Single Precision – 1 decimal
End_Coverage	Number	Single Precision – 1 decimal
State_Code	Number	Decimal – 2 digit
Shrp_Id	Text	Field Size = 4

Field descriptions – AIMS_DIS_IMAGE

- **Title** will contain the name of the photo file - MDPaannnnsyyyy##.jpg.

- **Organization** will hold the name of the entity (regional support contractor) that generated the photo. Ensure that the RSC company name that was current at the time of the survey is entered here.

- **Description** will record the surveyor's description of the photo's subject. Note that this description must meet the requirements for compliance with Section 508 of the Rehabilitation Act of 1973, 29 U.S.C. For each shot in a standard photo set, this field will contain only the words "standard photo – a view of the (asphalt/portland cement) concrete surface of LTPP test section xxxxxx at station xx.x meters" as appropriate. Guidelines for appropriate description field entries for non-standard photos are provided in the attachment to this directive.

- **Survey_Date** will hold the date on which the photo was taken. The format will be yyyy/mm/dd (ISO 8601).

- **Type** will record the nature of the AIMS database element. In the case of distress photos, type will always be "IMAGE".

- **Format** will record physical or digital manifestation of the AIMS element. In the case of distress photos, format will always be "JPEG".

- **Start_Coverage** is the longitudinal station where the photo was taken. Units are in meters and are recorded to 1 decimal place. Typical values will be between 0.0 and 152.5 but might occasionally fall outside these limits. Note that Start_Coverage corresponds to the area appearing in the photo rather than the point at which the camera

was placed i.e. the first photo in a standard sequence, taken at station 0-50ft and looking at station 0+00ft should have a value of 0.0 in the coverage field. The field corresponds to the Point_Loc field in the pavement performance database monitoring tables.

- **End_Coverage** will remain null for distress photographs. This field will be used for future entry of data for digitized distress maps, film, etc.

The RSC distress raters are required to record this information in paper (photolog) or electronic (Access database) format prior to leaving the test section. The distress rater may use one or the other of these in the field but both are not required. A master copy of the database table is to be stored at the contractor's office and updated at the end of each MDS data collection circuit. An individual decision is to be made by the distress coordinator on whether photos meet the criteria to be included within the AIMS. Those that do not may be removed from the database table.

Population of the database will require the least effort if the distress photos are collected in sequence with the standard set taken first, followed by any additional pictures. This will allow software associated with the data entry screen to automatically populate most fields for the standard set. Failure to follow the sequence means that manual entry of field values will be required. The data entry screen is provided as a convenience to the RSC. So long as the database table is populated correctly, any method may be used to do so.

Each Regional Support Contractor (RSC) shall populate the database table with information on all previously generated distress photographs going back to the beginning of their present RSC contracts as well as on all photographs taken during ongoing operations. For photographs taken under previous contracts, entries are required for all fields with the exception of 'Description'. Null values will populate fields with values that cannot be determined. Photos for which a survey date, section number or point distance (Start_Coverage) cannot be determined shall be eliminated from the database. The database table should contain information on all photos taken in response to the requirements of this directive. Pictures taken by the RSC for their own internal use or for other purposes may be included in the database at the discretion of the RSC if it is felt that they have some value to the program. This directive is not meant to limit in any way the number or content of photos taken during distress surveys but rather to establish a baseline for these parameters.

Each RSC will continue to make regular submittals of distress photos to the FHWA and TSSC as outlined in directive GO-31 or its most current version. Copies of the distress photograph database table shall be included with these annual submittals beginning in July 2005. The backlog of photographs that have not been entered to the database shall be cleared by that date.

Prepared by: TSSC

Approved by:

Aramis López
LTPP Team Leader

3 Attachments

Attachment 1: Guidelines for Non-Standard Distress Photo Descriptions

Guidelines

- Non-standard photographs should be taken only after all standard views have been photographed. A non-standard photo is not required if the feature of interest can be clearly seen and identified within one of the standard shots.

- Photographs should include an indication of scale and orientation. If these are absent, the description field should include the information.

- Photographs are not required if the subject is a distress that can be readily assigned to a distress type as defined by the Distress Identification Manual. These should be documented within the MDS maps and forms. Exceptions can be made for features that the surveyor feels are noteworthy or of particular interest to users of the MDS survey data.

- The description field should specify the feature of interest. Extraneous details, as well as speculation or interpretation of distress causes, should be omitted.

- The color of any feature need not be noted unless it is pertinent to the feature of interest or is a significant part of the reason that the photograph was taken.

Sample Photos & Descriptions

Image 1

This photo has nothing to indicate scale or direction. When such a photo is taken, these need to be included within the description. An example of a good description is provided below.

Description: "Non-standard photo - AC surface with several unusual low severity cracks running transverse to lane."

Image 2

Description: "Non-standard photo - a crack in the AC surface developing along an unconventional longitudinal paving seam."

Image 3

The Portland cement concrete patches in this image will have been noted on the survey maps and forms. There does not appear to be a reason why this photo is necessary and thus it may be omitted unless the surveyor feels that it is noteworthy in some other respect. Nonetheless, a possible description is provided below.

Description: "Non-standard photo - small closely spaced PCC surface patches."

Image 4

Description: "Non-standard photo - PCC pavement with a series of short interconnected cracks that have been saw-cut and sealed."

Image 5

These transverse cracks will have been noted on the survey forms and maps. A non-standard photo is not warranted unless the surveyor feels that this photo is noteworthy for another reason. If this was the case, the reason should be included in the description of the photo. A possible description is provided below.

Description: "Non-standard photo - transverse cracks on CRCP pavement lacking apparent interconnection between adjacent cracks or extension to the outer pavement edge."

Image 6

Description: "Non-standard photo - PCC pavement with surface material missing from the left wheel path."

Image 7

The distresses in this photo are easily recognizable and should have been recorded on the distress maps and forms. Unless the surveyor feels that the photo is noteworthy or of particular interest to users of the distress survey data, then the photo is not warranted under D-34. Nonetheless, a possible description is provided below.

Description: "Non-standard photo - circular AC patch with small area of adjacent raveling."

Image 8

Description: "Non-standard photo - fine cracks propagate across the painted edge line as well as longitudinally along both sides."

Image 9

This photo lacks an indication of direction. It is important that the orientation of the cracks can be determined. The description should clearly state this. A possible description is provided below.

Description: "Non-standard photo - severe transverse crack extending across the lane and a series of smaller cracks radiating from it, perpendicular and diagonal to the lane."

Image 10

Description: "Non-standard photo - worn pavement edge line."

Image 11

Note: If the diamond grinding in this image is visible in standard photos, then this non-standard one is not required.

Description: "Non-standard photo - transverse joint, a severe longitudinal crack with polished aggregate to the left and striations caused by diamond grinding to the right of it."

Image 12

"Non-standard photo – a chicken wire pattern of cracking across the whole lane."

Attachment 2: Installation and Operation of Distress Survey Data Entry Software

Software Installation:

1. Download www.ltpp.org/D-41_soft.zip
2. Unzip the file, close all currently running software applications, and then run setup.exe.
3. The software will be installed in the C:\Program Files\Distress Survey directory. Press the 'Change Directory' button to specify a different location.
4. Begin the installation by pressing the 'Click here to begin setup' button.
5. The default program group is Distress Survey. To choose a different group, select one from the pick-list of existing groups.
6. Press 'Continue'.
7. Installation may be aborted by pressing "Exit Setup'.

Software Operation:

1. Select: Start
   Programs
   Program Group Distress Survey
   Distress Survey
2. Enter appropriate values for:
   STATE CODE
   SHRP ID
   ORGANIZATION
   SURVEY DATE and
   ANNUAL SURVEY SEQUENCE
3. Select an appropriate value for PHOTO SEQUENCE BEGINS AT. The value chosen will indicate the photograph sequence number of the first standard photo.
4. Select the 'Standard Photo' option. This will activate the fields within the 'Standard Photos' group.
5. Enter appropriate values for:
   NUMBER
   STARTING STATION and
   SURFACE
6. Press the LOAD button. A message box will display the number of standard photos successfully loaded.

Note that this process will work correctly ONLY if all standard photos were taken in sequence from station 0.0 to the end of the section (or the reverse). If this was

not the case, these photos may be entered individually via the ‘Non-Standard Photos’ option.

7. Select the ‘Non-Standard Photos’ option. This will activate the fields within the ‘Non-standard Photos’ group. For each non-standard photo:
   Enter appropriate values for:
   - TITLE
   - DESCRIPTION and
   - POINT DISTANCE

   Values of TYPE and FORMAT should remain unchanged from their default values.
8. Press the LOAD button. A message box will display the number of non-standard photos successfully loaded (typically 1).
9. Shut down the software by pressing ‘Close’.
10. Entries that have been loaded will be stored within the AIMS_DIS_IMAGE table. This table will reside in the C:\Program Files\Distress Survey directory unless another one was specified during software installation.
11. Editing or deleting entries after they have been loaded can be done only by accessing the AIMS_DIS_IMAGE table through Microsoft Access® database software.

LTPP DISTRESS DATA PHOTOLOG	STATE CODE [__ __] SHRP SECTION ID [__ __ __ __]

Date of Distress Survey (Month/Day/Year) __ __/__ __ / __ __

Number of standard photos _____

Photo Sequence begins at station _____ meters

Non-Standard Photos

Filename _____ Point Distance _____ meters

Description _____

Filename _____ Point Distance _____ meters

Description _____

Filename _____ Point Distance _____ meters

Description _____

Filename _____ Point Distance _____ meters

Description _____

Filename _____ Point Distance _____ meters

Description _____

Preparer _____

Organization _____

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