Memorandum

U.S. Department
Of Transportation

Federal Highway Administration

6300 Georgetown Pike
McLean, Virginia 22101

Subject: **ACTION**: LTPP Directive D-54
Distress Survey Photographs

Date: September 10, 2012

From: Jack Springer
Long Term Pavement Performance Team

Reply to
Attn of: HRDI-30

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

Attached is Long Term Pavement Performance (LTPP) Program Directive D-54, which revises LTPP Distress Survey Photographs guidelines. This directive supersedes D-44.

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)

FHWA:HRDI-30:BBellinger:mdeeney:493-3156:9/10/12
File: c:/mdeeney/directive/distress/D-54.docx
cc:
Jonathan Groeger
Directive Binder
LTPP Team
Official file
Chron

LONG TERM PAVEMENT PERFORMANCE PROGRAM DIRECTIVE

For the Technical Direction of the LTPP Program

Program Area: Monitoring **Directive Number**: D-54

Date: September 5, 2012 **Supersedes**: D-44

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.

- Take standard photographs, in order, of the following twenty-five (25) LTPP test section locations:

#	Location/Direction	Description in Software
1	Station 0+00, Sign (preferred) or section number on pavement if no sign	Standard photo - a view of the sign or section number on pavement of LTPP test section xxxxxx at station 0 meters.
2	Station 0+00, facing traffic, a general view of highway preceding the test section	Standard photo - a general view of highway preceding LTPP test section xxxxxx, photo taken at station 0 meters facing traffic.
3	Station 0-25 to Stations 5+00, a general view of the test section facing the direction of traffic	Standard photo - a general view of LTPP test section xxxxxx from 7.6 meters facing the direction of traffic.
4	Station 0+00 to station 0+25	Standard photo - a view of the asphalt concrete/Portland cement concrete surface of LTPP test section xxxxxx at station 0 meters.
5	Station 0+25 to station 0+50	Standard photo - a view of the asphalt concrete/ Portland cement concrete surface of LTPP test section xxxxxx at station 7.6 meters.

#	Location/Direction	Description in Software
6	Station 0+50 to station 0+75	Standard photo - a view of the asphalt concrete/ Portland cement concrete surface of LTPP test section xxxxxx at station 15.2 meters.
7	Station 0+75 to station 1+00	Standard photo - a view of the asphalt concrete/ Portland cement concrete surface of LTPP test section xxxxxx at station 22.9 meters.
8	Station 1+00 to station 1+25	Standard photo - a view of the asphalt concrete/ Portland cement concrete surface of LTPP test section xxxxxx at station 30.5 meters.
9	Station 1+25 to station 1+50	Standard photo - a view of the asphalt concrete/ Portland cement concrete surface of LTPP test section xxxxxx at station 38.1 meters.
10	Station 1+50 to station 1+75	Standard photo - a view of the asphalt concrete/ Portland cement concrete surface of LTPP test section xxxxxx at station 45.8 meters.
11	Station 1+75 to station 2+00	Standard photo - a view of the asphalt concrete/ Portland cement concrete surface of LTPP test section xxxxxx at station 53.4 meters.
12	Station 2+00 to station 2+25	Standard photo - a view of the asphalt concrete/ Portland cement concrete surface of LTPP test section xxxxxx at station 61 meters.
13	Station 2+25 to station 2+50	Standard photo - a view of the asphalt concrete/ Portland cement concrete surface of LTPP test section xxxxxx at station 68.6 meters.
14	Station 2+50 to station 2+75	Standard photo - a view of the asphalt concrete/ Portland cement concrete surface of LTPP test section xxxxxx at station 76.2 meters.
15	Station 2+75 to station 3+00	Standard photo - a view of the asphalt concrete/ Portland cement concrete surface of LTPP test section xxxxxx at station 83.9 meters.
16	Station 3+00 to station 3+25	Standard photo - a view of the asphalt concrete/ Portland cement concrete surface of LTPP test section xxxxxx at station 91.5 meters.
17	Station 3+25 to station 3+50	Standard photo - a view of the asphalt concrete/ Portland cement concrete surface of LTPP test section xxxxxx at station 99.1 meters.

#	Location/Direction	Description in Software
18	Station 3+50 to station 3+75	Standard photo - a view of the asphalt concrete/ Portland cement concrete surface of LTPP test section xxxxxx at station 106.8 meters.
19	Station 3+75 to station 4+00	Standard photo - a view of the asphalt concrete/ Portland cement concrete surface of LTPP test section xxxxxx at station 114.4 meters.
20	Station 4+00 to station 4+25	Standard photo - a view of the asphalt concrete/ Portland cement concrete surface of LTPP test section xxxxxx at station 122 meters.
21	Station 4+25 to station 4+50	Standard photo - a view of the asphalt concrete/ Portland cement concrete surface of LTPP test section xxxxxx at station 129.6 meters.
22	Station 4+50 to station 4+75	Standard photo - a view of the asphalt concrete/ Portland cement concrete surface of LTPP test section xxxxxx at station 137.2 meters.
23	Station 4+75 to station 5+00	Standard photo - a view of the asphalt concrete/ Portland cement concrete surface of LTPP test section xxxxxx at station 144.9 meters.
24	Station 5+00, facing the direction of traffic, a general view of highway downstream of the test section	Standard photo - a general view of highway downstream of LTPP test section xxxxxx, photo taken at station 152.5 meters.
25	Station 5+25 to station 0+00, a general view of test section facing traffic	Standard photo - a general view of LTPP test section xxxxxx, photo taken at station 160.1 meters facing traffic.

A tape measure or Rolotape must be used to delineate each 25-foot (7.6-meter) interval to insure that the entire pavement surface is photographed. Each 25-foot (7.6-meter) interval must be marked using paint or some other suitable marker. Care must be taken to frame each photo within the area outlined by the centerline, the edge of pavement or edgeline and the 25-foot (7.6-meter) marker. The photos taken at Station 0-25 to Station 5+00 and Station 5+25 to Station 0+00 (standard photos 3 and 25, respectively) should include a view of the entire test section including the horizon. The photos taken at Station 0+00 facing traffic and Station 5+00 facing the direction of traffic (standard photos 2 and 24, respectively) should include a view of the sampling area and highway beyond, including the horizon.

Note that forty-five (45) standard photos are required at 1000-foot (305-meter) 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 25-foot (7.6-meter) segment is captured.

- 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 has been created. 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
STATE_CODE	Number	Integer – 2 digit
SHRP_ID	Text	4 character max
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

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 contained in the table above, as appropriate. Guidelines for appropriate description of field entries for non-standard photos are provided in Attachment 1 of 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 160.0 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 second photo in a standard sequence, taken at Station 0+00 and to Station 0+25 should have a value of 7.6 in the coverage field. The field corresponds to the Point_Loc field in the pavement performance database (PPDB) 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. Instructions on downloading the software can be found in Attachment 2 and an example photolog template can be found in Attachment 3. 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. As long as the database table is populated correctly, any method may be used to do so.

Each 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. Where survey dates, section numbers or point distances (Start_Coverage) are unknown, the RSC shall make the best estimate possible and comment in the photo description that these values are estimates. 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 as outlined in directives GO-48 and GO-55 or their most current versions. Copies of the distress photograph database table shall be included with these annual submittals.

Prepared by: TSSC

Approved by:

Aramis López
LTPP Team Leader

Attachments (3)

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 photos.

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

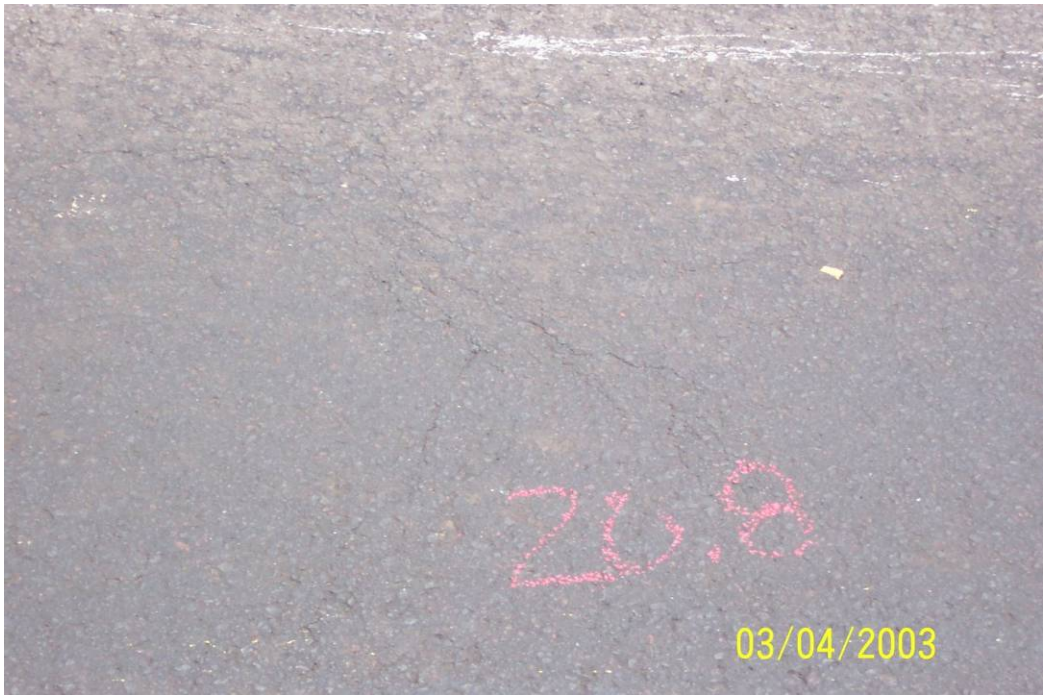
- Photographs are not required if the subject is a distress that can be readily assigned to a distress type as defined by the Distress Identification Manual. These should be documented within the MDS maps and forms. Exceptions can be made for features that the surveyor feels are noteworthy or of particular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

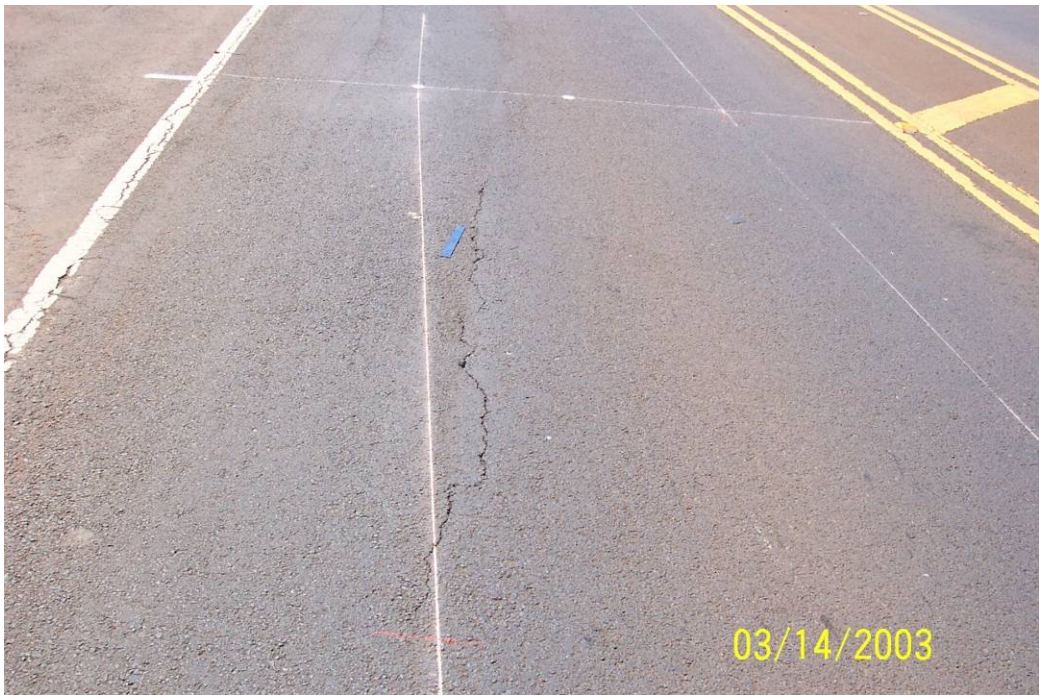
Image 1



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



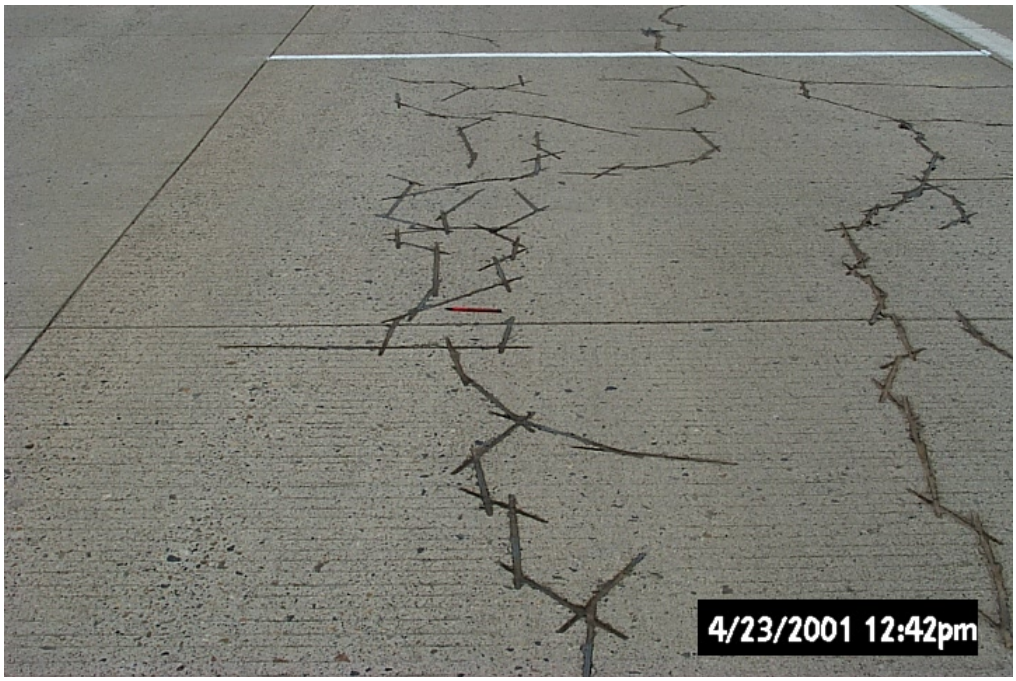
Description: "Non-standard photo - a crack in the AC surface developing along an unconventional longitudinal paving seam."

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 good reason why this photo was necessary and thus it may be omitted. Nonetheless, a possible description is provided below.

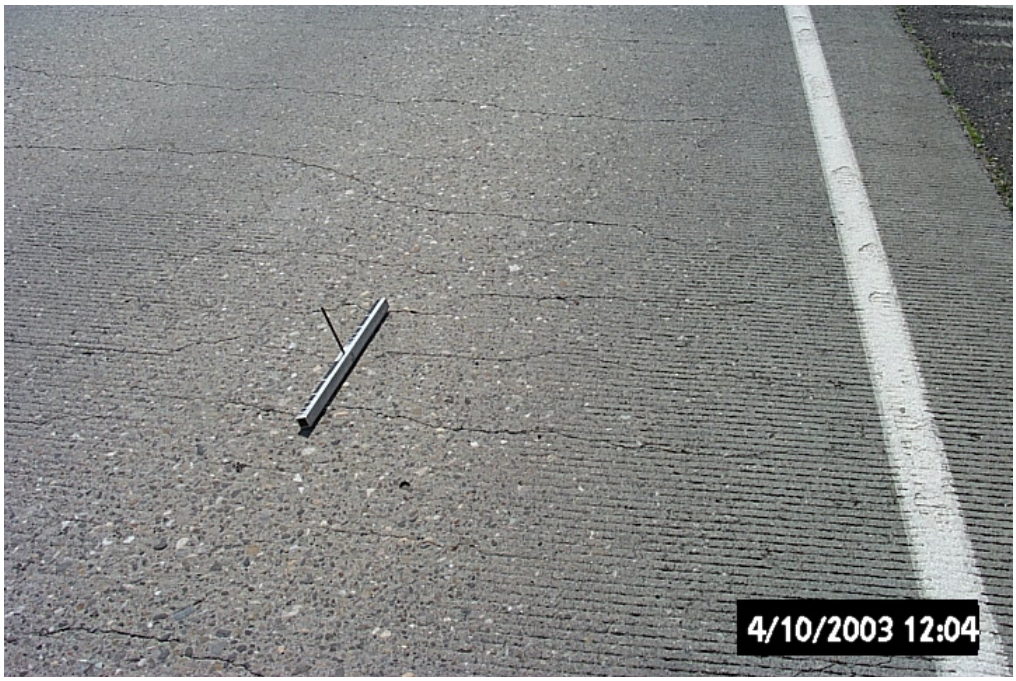
Description: "Non-standard photo - small closely spaced PCC surface patches."

Image 4



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

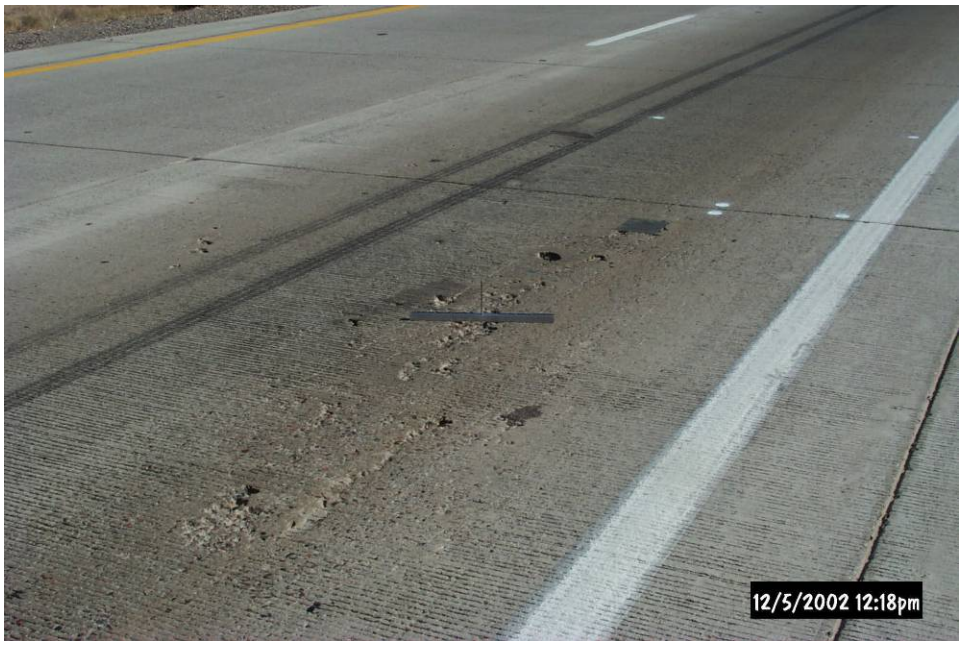
Image 5



These transverse cracks will have been noted on the survey forms and maps. A nonstandard 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.

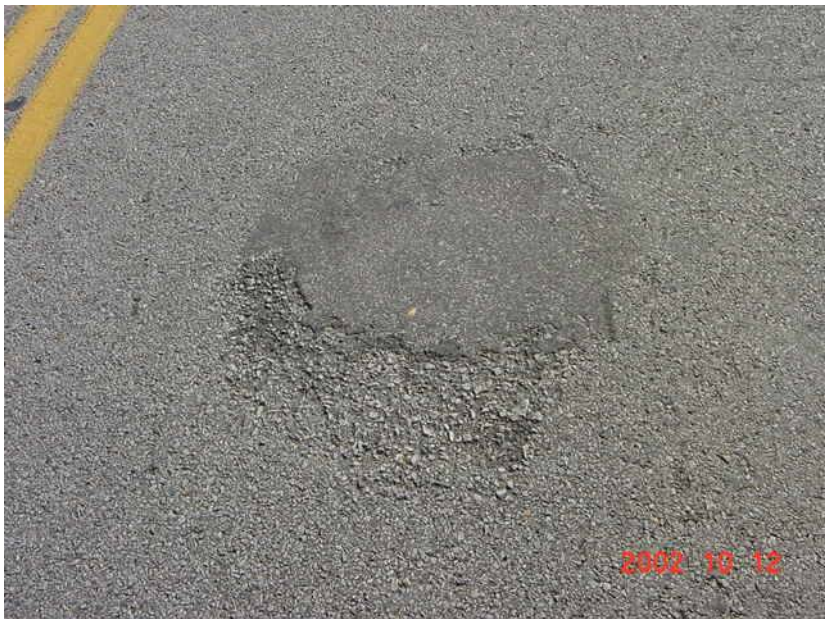
Description: "Non-standard photo - transverse cracks on CRCP pavement lacking apparent interconnection between adjacent cracks or extension to the outer pavement edge."

Image 6



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

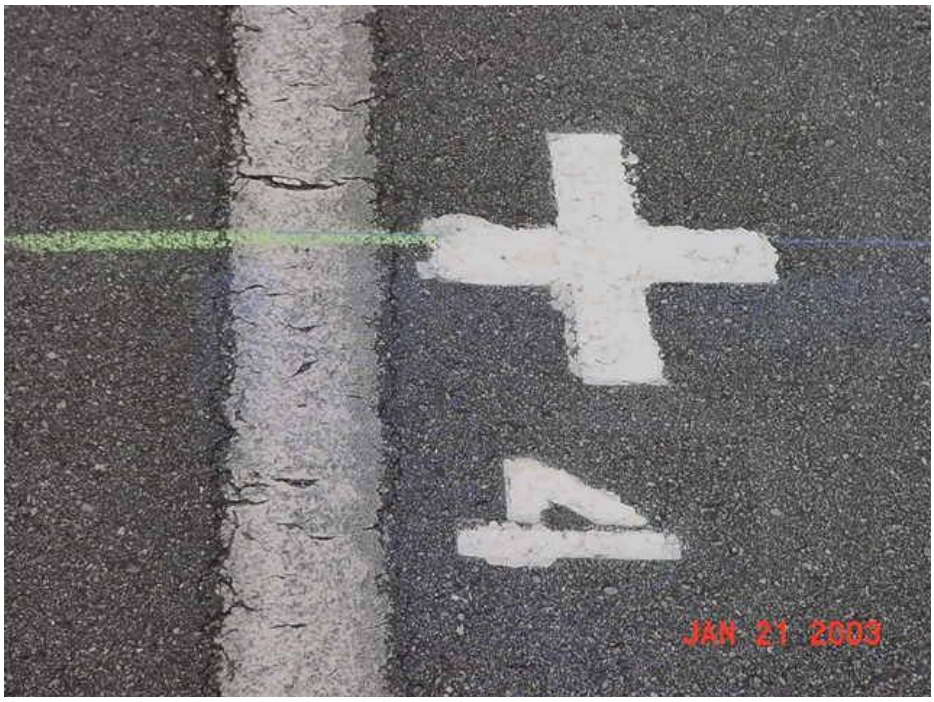
Image 7



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. Nonetheless, a possible description is provided below.

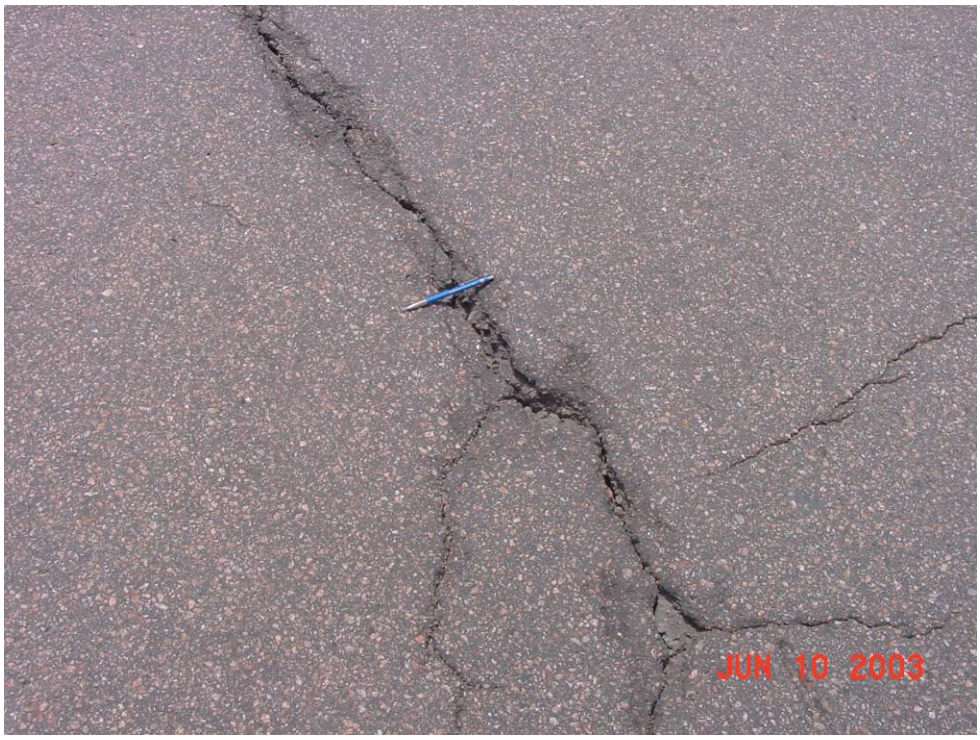
Description: "Non-standard photo - circular AC patch with small area of adjacent raveling."

Image 8



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

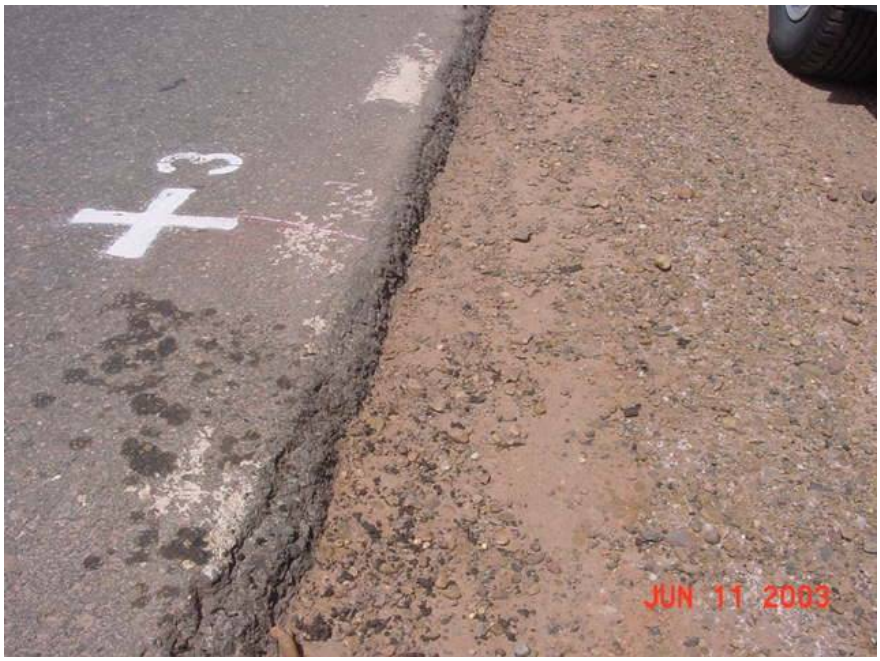
Image 9



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.

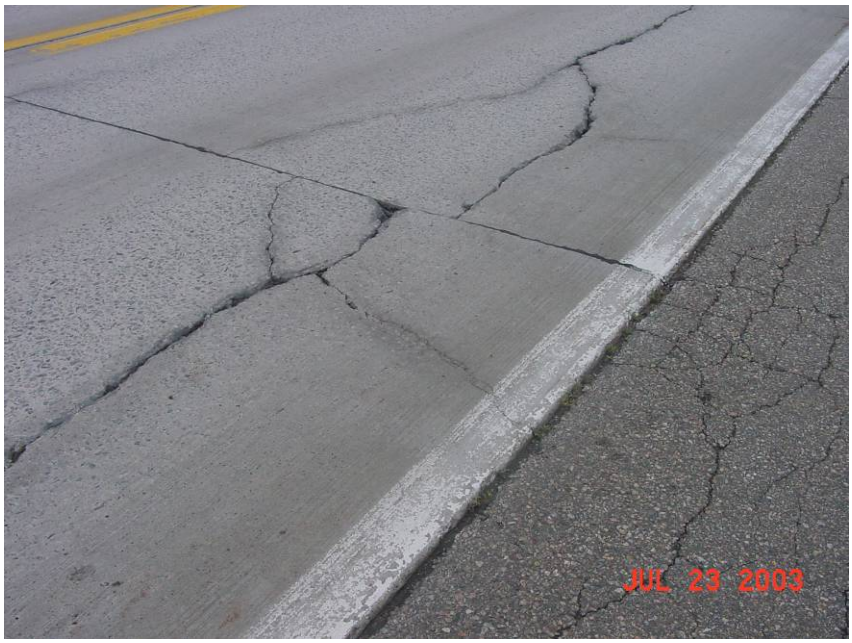
Description: "Non-standard photo - severe transverse crack extending across the lane and a series of smaller cracks radiating from it, perpendicular and diagonal to the lane."

Image 10



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

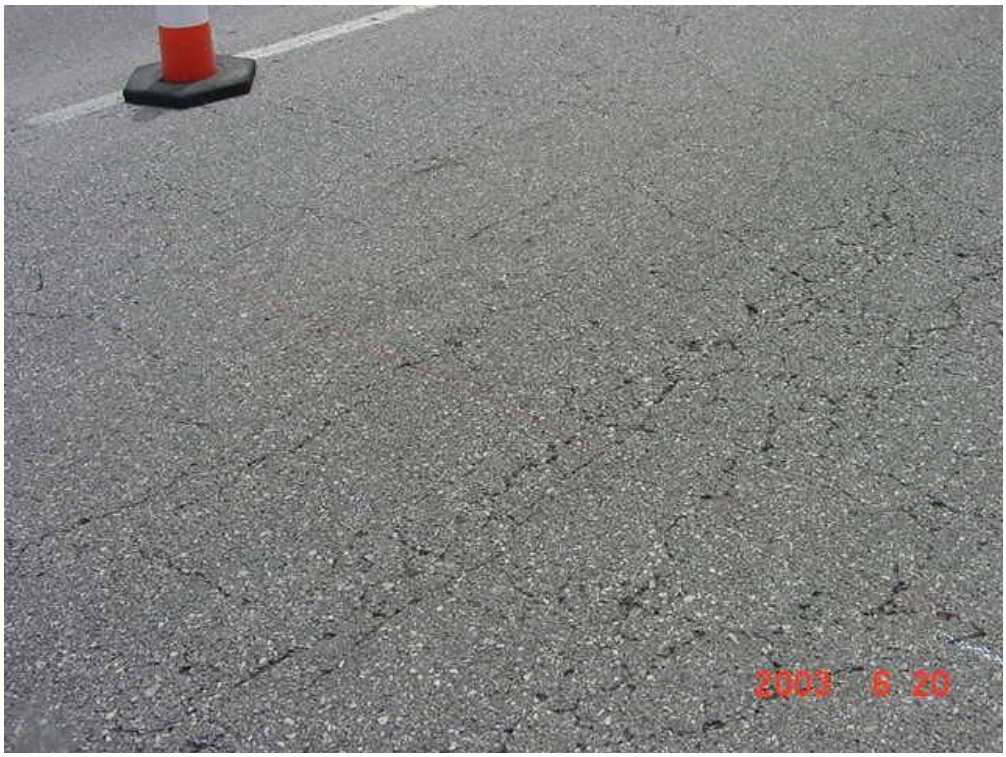
Image 11



Note: If the diamond grinding in this image is visible in standard photos, then this non-standard photo 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. Uninstall the previous version of the software.
2. Download from the www.ltpp.org ftp site: D-54_setup.zip.
3. Unzip the file, close all currently running software applications, and then run setup.exe.
4. The software will be installed in the default directory (nominally c:\program files(x86)\LTPP\LTPP Distress Photos) shown on the screen. Press the "Browse" button to specify a different location.
5. Begin the installation by pressing the "Next" button twice.
6. Installation may be aborted by pressing "Cancel'.
7. Click "Close" after the software is installed.
8. To migrate from the old D44.mdb data file to the new D54.mdb data file copy the records from D44.mdb tables AIMS_DIS_IMAGE and DESCRIPTION to the similarly named tables in the new D54.mdb file prior to the first use of D54.mdb.

Software Operation:

1. Select: Start
   All Programs
   LTPP Distress Photos
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 (this is usually "1").
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 the order specified in this directive. 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
   START COVERAGE
   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 D54.mdb file in the AIMS_DIS_IMAGE table. This mdb file will reside in the default directory unless another directory 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 the Microsoft Access database software.

Attachment 3: Photolog Form

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

Date of Distress Survey (YYYY/MM/DD) __ __ __ __/__ __ / __ __

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 _____ rev. Sept. 1, 2012