Memorandum

U.S. Department of Transportation

6300 Georgetown Pike
McLean, Virginia 22101

Federal Highway Administration

Subject: **ACTION**: LTPP Directive D-65
Updates to DIM to Support HPMS and MEPDG Reporting

Date: March 24, 2017

From: Jack Springer
Long Term Pavement Performance Team

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Date: 2017.03.31 11:46:02 -04'00'

Reply to Attn of: HRDI-30

To: Mr. Gabe Cimini, PM - LTPP North Atlantic Regional Contract
Mr. Gabe Cimini, PM - LTPP North Central Regional Contract
Mr. James Sassin, PM - LTPP Southern Regional Contract
Mr. Kevin Senn, PM - LTPP Western Regional Contract

Attached is Long Term Pavement Performance (LTPP) Program Directive D-65 which makes a correction to recently issued D-62. All pavement performance data collection should follow these guidelines. Please ensure that all personnel involved with the process are aware of this new directive.

Should you have any questions concerning this directive, please do not hesitate to contact me on (202) 493-3144 or jack.springer@dot.gov.

Attachment

FHWA:
File: M:\LTPP Directives\Distress\D-65
cc:
Jonathon Groeger (TSSC)
Jack Springer
Directive Binder
Official File

LONG TERM PAVEMENT PERFORMANCE PROGRAM DIRECTIVE

For the Technical Direction of the LTPP Program

Program Area:	Monitoring	Directive Number:	D-65
Date:	March 23, 2017	Supersedes:	D-62
Subject:	Updates to DIM to Support HPMS and MEPDG Reporting		

INTRODUCTION

In order to support the creation of distress data sets compatible with Highway Performance Management System (HPMS), National Performance Management Measures for the Moving Ahead for Progress in the 21st Century (MAP-21) Act, and Mechanistic-Empirical Design Guide (MEPDG), several new distress types are necessary. This directive includes the information necessary to make the appropriate Distress Identification Manual (DIM) changes for these new distress types.

The following changes are included in this directive:

- Addition of wheelpath cracking for AC surveys.
- Collection of length of transverse cracking at least 1.83 meters for AC surveys.
- Addition of cracked slabs for JCP surveys.
- Collection of punchout area for CRCP surveys.
- Addition of survey width to the distress data sheets.

New Distress Type ACP 17 – Wheelpath Cracking

Distress type 17 is generally a combination of existing distresses – fatigue cracking (ACP 1) and longitudinal cracking (ACP 4). However, because those two distresses can exist at the same longitudinal station in the same wheelpath, they cannot be simply combined. Therefore, this new distress type is necessary.

In order to keep the type in the appropriate category (cracking), and not change the numbering of previously defined distresses, this new distress will be described in the manual after transverse cracking, but have the number 17 instead of 7. The following line should be added to table 1 of the DIM, below distress type 6 in category A:

DISTRESS TYPE	UNIT OF MEASURE	DEFINED SEVERITY LEVELS?
17. Wheelpath Cracking	Meters	No

The following should be added to the previously blank page 14 of the DIM:

WHEELPATH CRACKING

Description

Cracking in the wheelpath. Includes fatigue cracking and longitudinal cracks.

Severity Levels

Not Applicable. Associated distresses of any severity are to be included.

How to Measure

Record the length of each wheelpath that includes either fatigue cracking or longitudinal cracking of any severity. Include sealed and unsealed cracks. Lengths of a single wheelpath that include multiple distresses, such as parallel longitudinal cracks or both fatigue cracking and longitudinal cracking, shall only be counted once. The maximum recorded wheelpath cracking length cannot be more than twice the section length.

Additionally, the instructions for filling out distress maps, ACP section, needs to be modified to indicate how to treat the new distress on the maps. The following paragraph should be added after the first paragraph on page 90 of the DIM:

Wheelpath cracking is a combination of other distresses, and it therefore should not be drawn as a unique distress on the distress maps. The lengths must be summarized on the data summary sheets.

A new distress data sheet 1, with fields to accept this new data, is also included as an attachment to this directive.

Modified Distress Type ACP 6 – Transverse Cracking

In order to support the needs of the National Applications, it is necessary to determine the length of transverse cracking that is at least 1.83 meters long. This does not require a separate distress type, but it does require a separate summation of information already collected. For consistency, it is preferred that the new ACP 6 summation be identified by the label 6GT, to distinguish from other transverse crack values.

The following single sentence paragraph should be added after the second paragraph on page 13 of the DIM:

Also record the total length (in meters) of transverse cracks at any severity level that have a length of at least 1.83 meters.

A new distress data sheet 1, with fields to accept this new data, is also included as an attachment to this directive.

The following figures illustrate distress map pages that represents the preferred method of labelling a distress map with the new ACP17 and updated ACP6 distress types. These figures are not part of the DIM, but are provided here for guidance. Figure 1 shows an example of a section with multiple longitudinal wheelpath cracks and no qualifying transverse cracks.

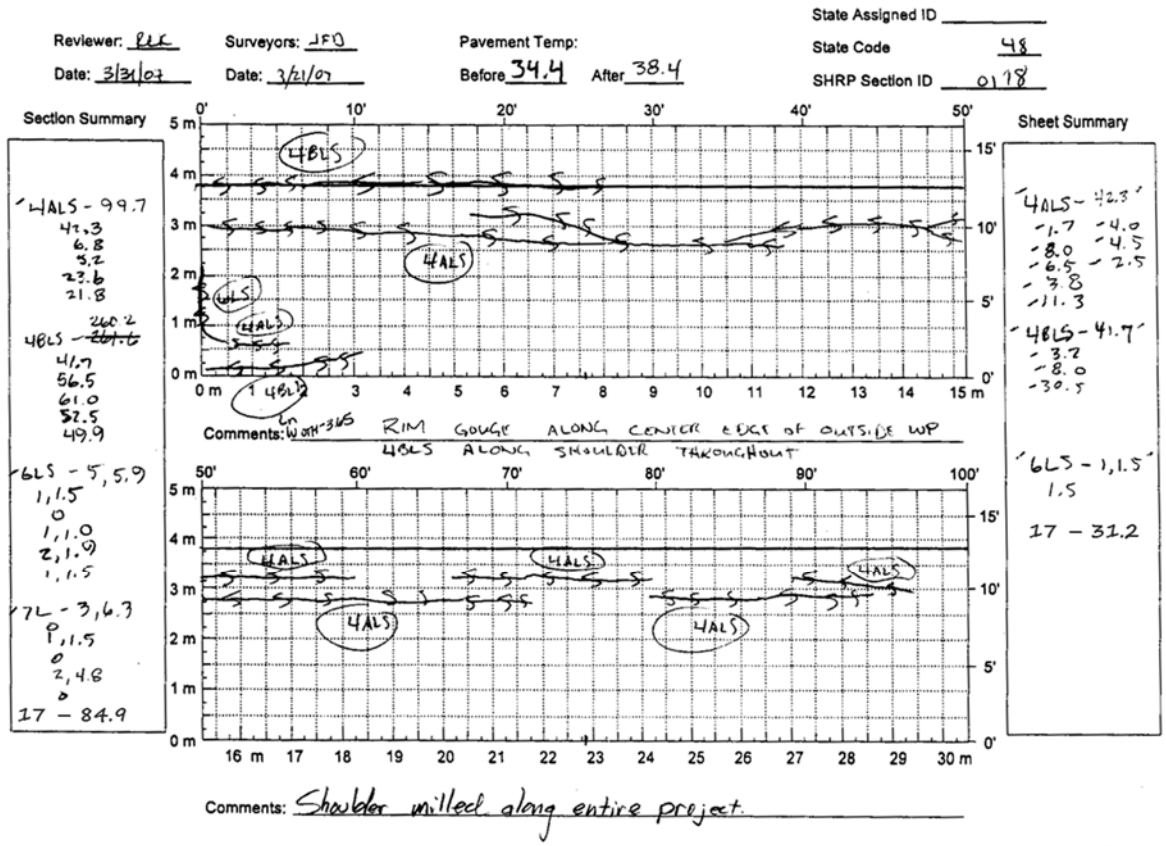

Figure 1. Example distress map showing new distress type ACP 17.

Figure 2 shows an example of a section with transverse cracking both below and above the threshold, as well as significant wheelpath cracking. As previously noted, the new ACP 6 summation is identified by the label 6GT.

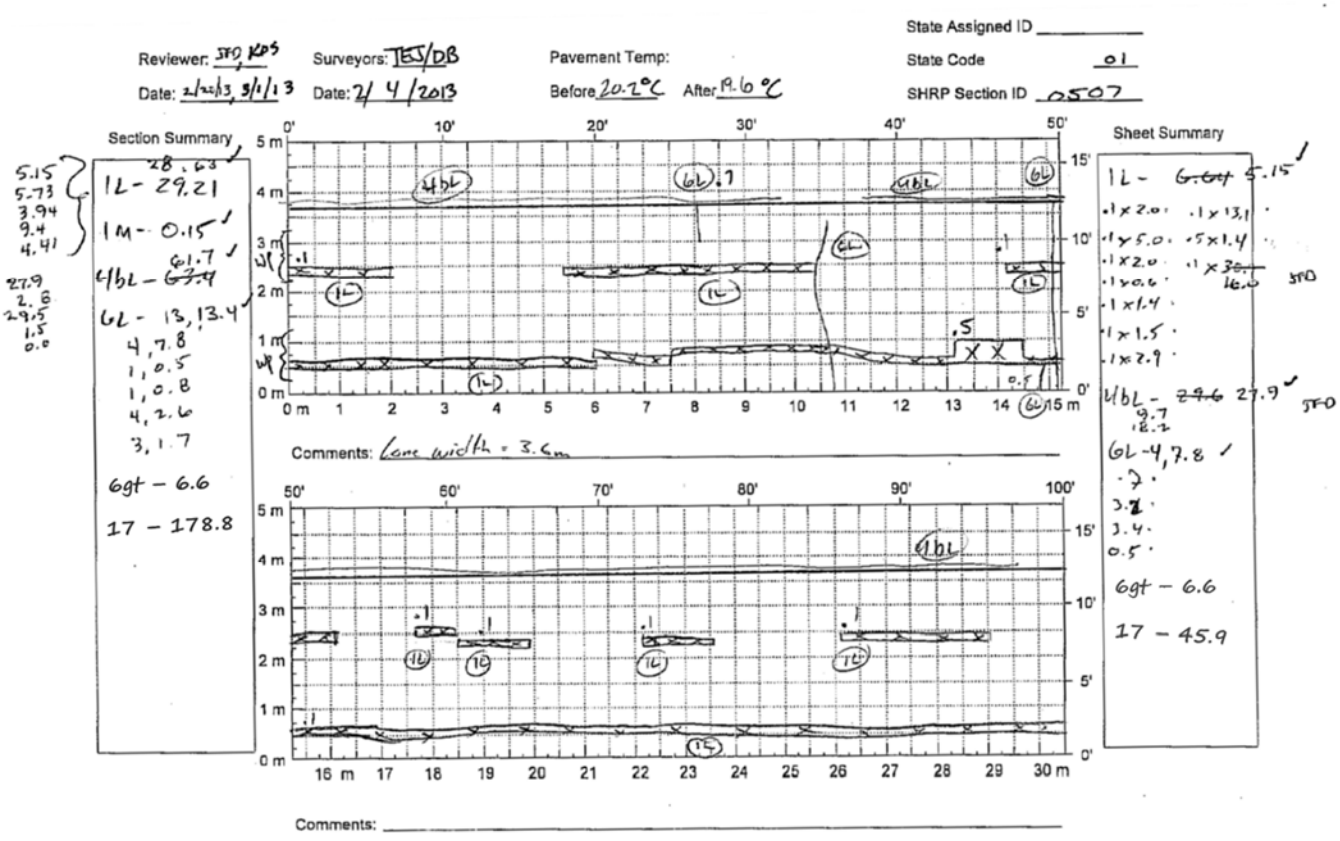

Figure 2. Example distress map showing new distress type ACP 17 and modified ACP 6.

New Distress Type JCP 18 – Cracked Slabs

Distress type 18 is also generally related to other distresses, but the distresses are treated on a slab by slab basis, instead of counts and lengths. A count of slabs with transverse cracking at least 0.6m in length, and a count of slabs with transverse cracking at least one-half slab width are required. In addition to cracked slabs, a count of total slabs is also necessary, and is included here because it applies mostly to the use of the cracked slab counts. We will use 18M for slabs with 0.6m cracks because this is used for MEPDG purposes, and 18H for half slab width cracks because this is used for HPMS purposes. The total slab count will be identified as 18.

As with the new AC distress, this new JCP distress should be added to the appropriate category, but have a number that does not disrupt current numbering. Therefore, cracked slabs is given the number 18, but included in the cracking category. The following line should be added to table 2 on page 33 of the DIM, below distress type 4 in category A:

DISTRESS TYPE	UNIT OF MEASURE	DEFINED SEVERITY LEVELS?
18. Cracked Slabs	Number of slabs	No

The following should be added to the previously blank page 42 of the DIM:

CRACKED SLABS

Description

Slabs that have individual transverse cracks with a minimum length – either 0.6m long or one-half slab width.

Severity Levels

Not Applicable. Associated distresses of any severity are to be included

How to Measure

Record the total number of slabs that have transverse cracks at least 0.6m long, transverse cracks extending at least one-half slab width, and the total number of slabs in the section.

In order to be considered a transverse cracks at least one-half slab width, the crack must be at least one-half slab length long, and meet the transverse mid-line of the slab. If a transverse crack is not exactly perpendicular to the direction of travel, it may have a length that is equal to or slightly greater than one-half of the slab width, but not meet the mid-line - cracks such as these are not considered transverse cracks at least one-half slab width.

For the purposes of this distress, a slab is counted if it is fully within the section boundaries and full width, regardless of length. This includes PCC patches. It also includes partial slabs that begin or end in the section boundaries, and are at least half the average length of all slabs entirely within the section. A slab that has multiple cracks should only be counted once.

Because this distress type accounts for cracking in patches, the instructions for how to measure patches on page 57 should be updated to include the following:

Additionally, if a rigid patch contains transverse cracking (JCP 4) of any severity and having a length of at least 0.6 meters, the crack should be drawn within the patch, but not labeled with the distress type, or included in the count or length summarizations. These cracks are illustrated for the purposes of supporting the cracked slab count (JCP 18).

Additionally, several figures that illustrate JCP surveys need to be updated to be consistent with the new distress. This includes Figure 140 on page 95, and the sample completed forms on pages 100-102. The updated figures also provide reference for the preferred method of identifying distress JCP 18 on the maps

DIM Figure 140 should be replaced with the following figure shown here as Figure 3:

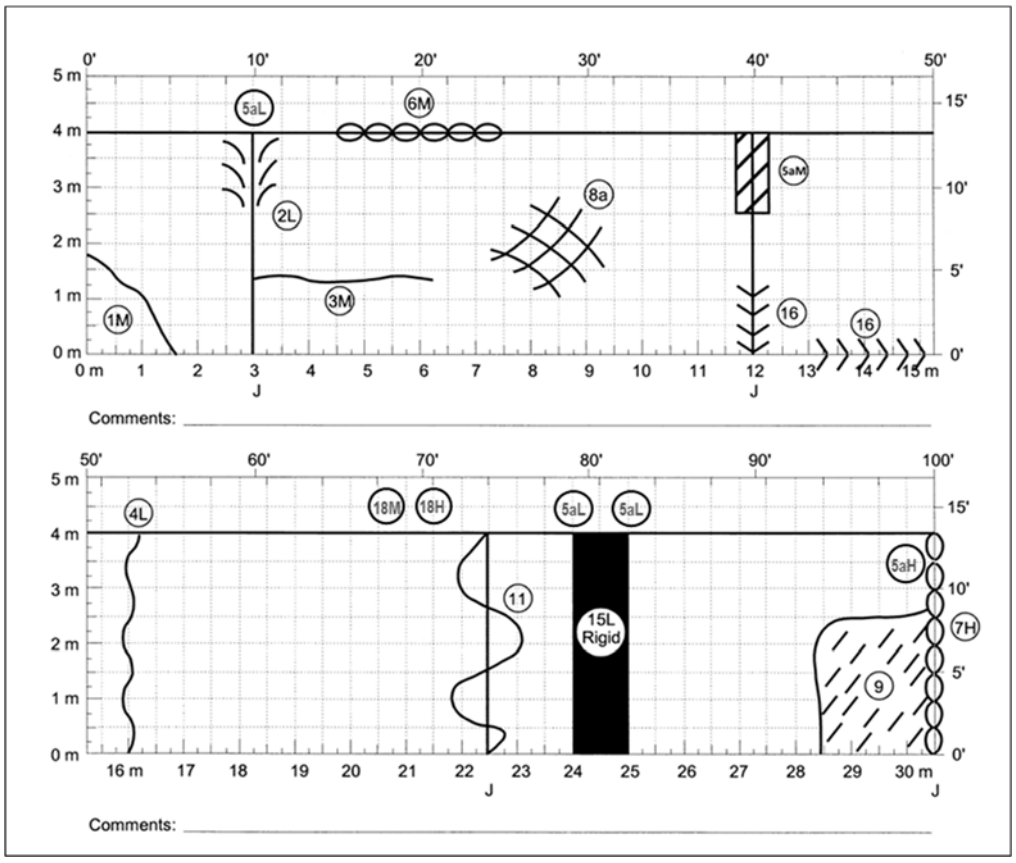

Figure 3. Replacement Figure 140 from DIM page 95.

The replacement pages 100-102 are included on the following pages in Figures 4-6.

A new distress sheet 4, with fields to accept this new data, is also included as an attachment to this directive.

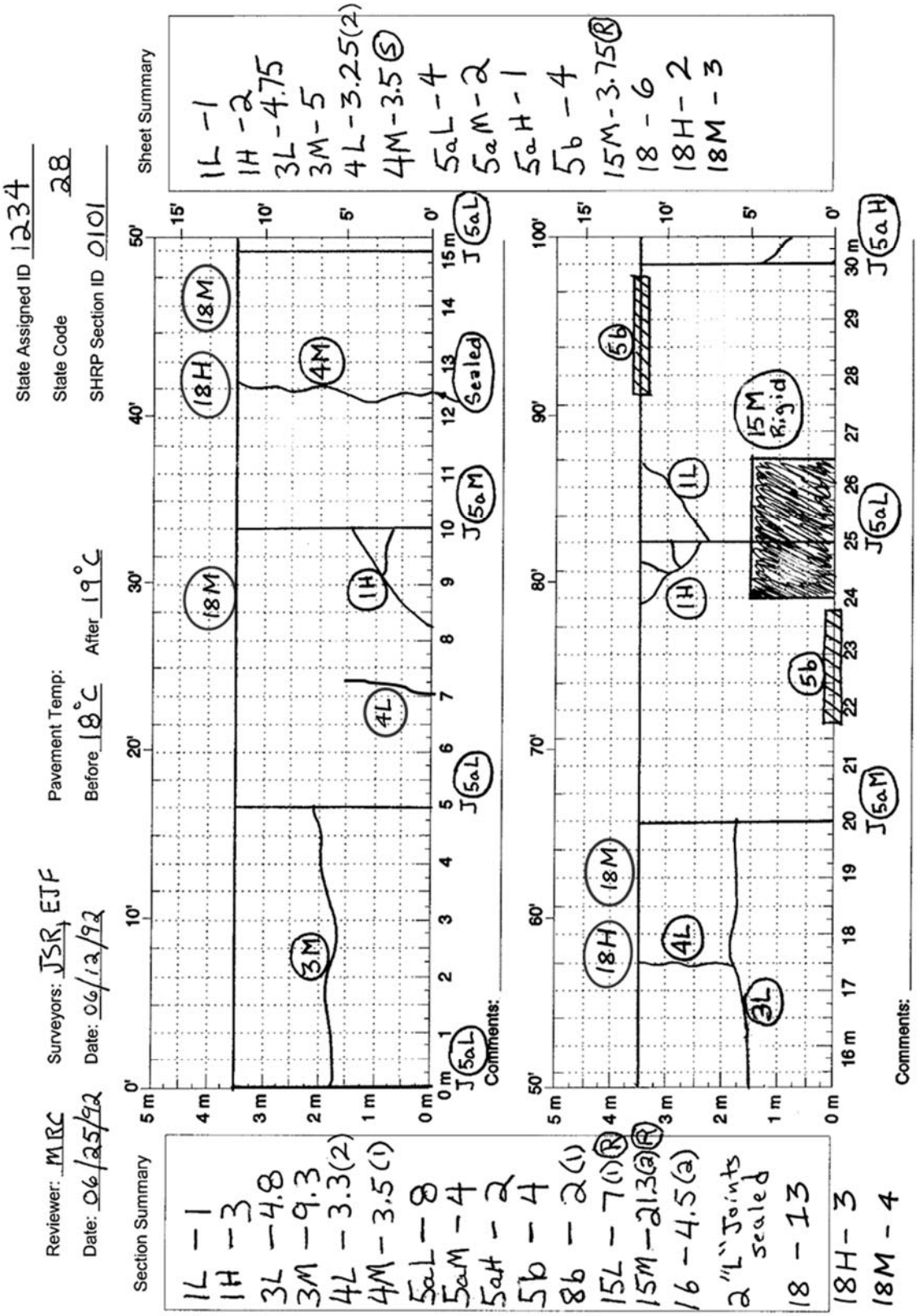

Figure 4. Replacement DIM page 100

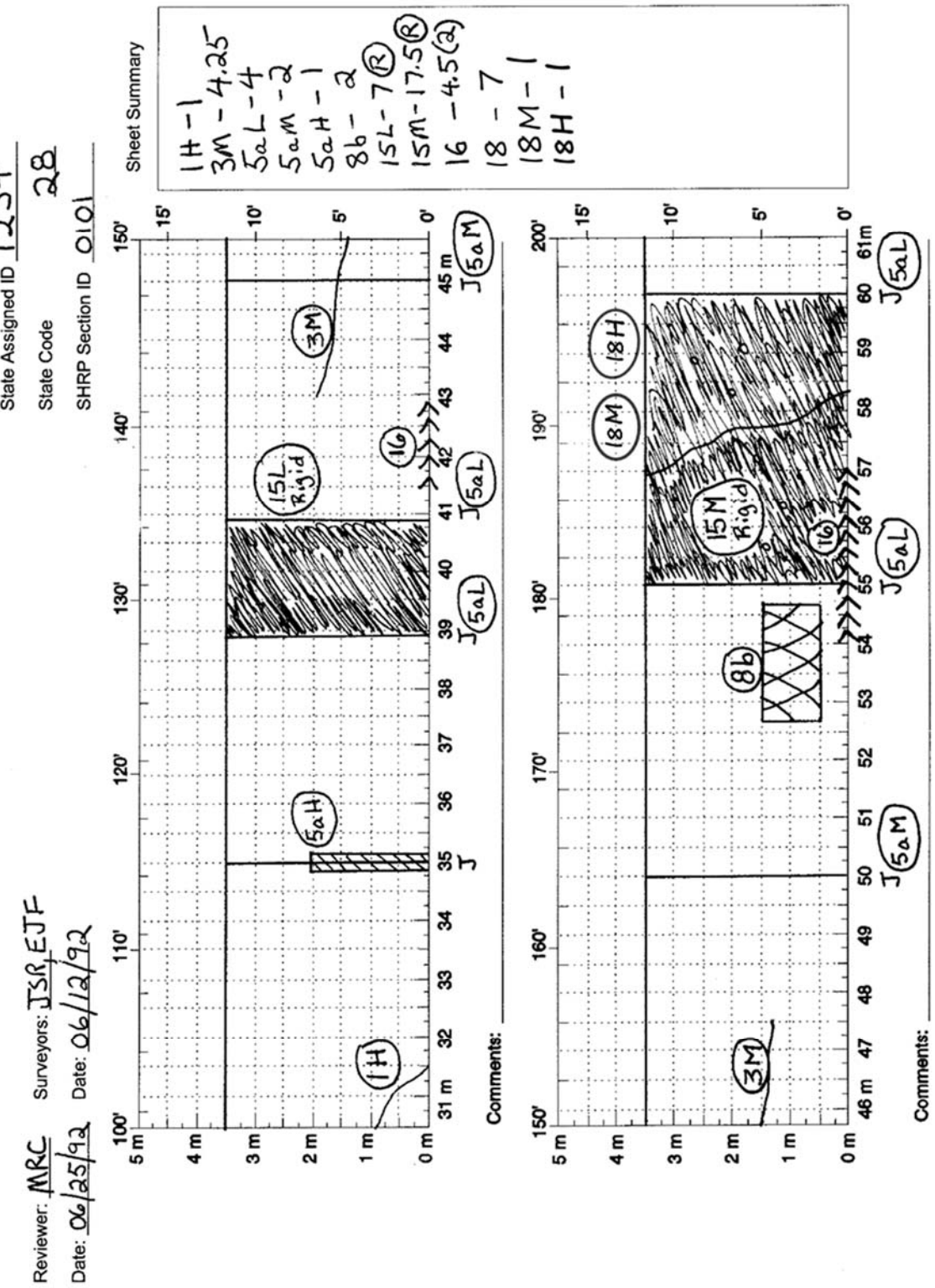

Figure 5. Replacement DIM page 101

Revised May 29, 1992; September 1998; January 2017

SHEET 4

DISTRESS SURVEY

LTPP PROGRAM

STATE CODE 28

SHRP SECTION ID 0101

DISTRESS SURVEY FOR PAVEMENTS WITH JOINTED PORTLAND CEMENT CONCRETE SURFACES

DATE OF DISTRESS SURVEY (MONTH/DAY/YEAR) 06/12/92
SURVEYORS: JSR, ESF
PAVEMENT SURFACE TEMP - BEFORE 18 °C; AFTER 19 °C
PHOTOS, VIDEO, OR BOTH WITH SURVEY (P, V, B) P
SURVEY WIDTH (Meters) 3.50

DISTRESS TYPE	SEVERITY LEVEL LOW	MODERATE	HIGH
CRACKING			
1. CORNER BREAKS (Number)	1	0	3
2. DURABILITY "D" CRACKING (Number of Affected Slabs)	0	0	0
AREA AFFECTED (Square Meters)	0.0	0.0	0.0
3. LONGITUDINAL CRACKING (Meters)	4.8	9.3	0.0
Length Sealed (Meters)	0.0	0.0	0.0
4. TRANSVERSE CRACKING (Number of Cracks)	2	1	0
(Meters)	3.3	3.5	0.0
Length Sealed (Meters)	0.0	3.5	0.0
18. CRACKED SLABS			
Slabs with transverse cracks >=0.6m (Number of Slabs)			4
Slabs with transverse cracks >=1/2 slab width (Number of Slabs)			3
Slab Count (Number of Slabs)			13
JOINT DEFICIENCIES			
5a. TRANSVERSE JOINT SEAL DAMAGE Sealed (Y, N)			Y
If "Y" Number of Joints	8	4	2
5b. LONGITUDINAL JOINT SEAL DAMAGE Number of Longitudinal Joints that have been sealed (0, 1, or 2)			2
Length of Damaged Sealant (Meters)			4.0
6. SPALLING OF LONGITUDINAL JOINTS (Meters)	0.0	0.0	0.0
7. SPALLING OF TRANSVERSE JOINTS Number of Affected Joints	0	0	0
Length Spalled (Meters)	0.0	0.0	0.0

Figure 6. Replacement DIM page 102

Modified Distress Type CRCP 12 – Punchouts

Because punchouts already exist, and are already defined appropriately, the only necessary change to this distress is the addition of collecting area of the distress in addition to the count. In order to make this change, two minor changes are necessary. The following change should be made to table 3 on page 59 of the DIM for distress type 12:

DISTRESS TYPE	UNIT OF MEASURE	DEFINED SEVERITY LEVELS?
12. Punchouts	Number, square meters	Yes

Also, the following sentence should replace the first sentence in the 'How to Measure' section on page 79 of the DIM:

> Record the number of punchouts and square meters of total affected area at each severity level.

New Sheets 8 and 9, with fields to accept punchout area, are included as an attachment to this directive.

Survey Width

Previously mentioned data sheets 1, 4, and 8 have been modified to include survey width. This value was previously only recorded on the distress maps. Because it is entered with the summary data, it should be included with the summary data.

In addition to the data sheet changes, the following should replace the third paragraph of page 90 of the DIM:

> In the common data section appearing in the upper right-hand corner of each of the distress survey data sheets the two-digit State code and the four-digit SHRP Section ID is entered. The date the survey was conducted, the initials of up to two raters, before and after surface temperature readings, the code indicating whether photographs and/or video were obtained at the time of the survey, and the survey width are entered in the appropriate spaces.

Questions or clarifications relating to this directive should be addressed to the FHWA LTPP member responsible for pavement distress operations with copies to the LTPP FHWA Team Leader and the LTPP TSSC Program Manager and Principal Investigator.

Prepared by: TSSC

Approved by:
JACK H SPRINGER
Jack Springer
LTPP Team Leader

Digitally signed by JACK H SPRINGER
DN: c=US, o=U.S. Government, ou=DOT FHWAMcLeanVA, ou=FHWA FHWAMcLeanVA, cn=JACK H SPRINGER
Date: 2017.03.31 11:47:26 -04'00'

SHEET 1

DISTRESS SURVEY

LTPP PROGRAM

STATE CODE __ __

SHRP SECTION ID __ __ __ __

DISTRESS SURVEY FOR PAVEMENTS WITH ASPHALT CONCRETE SURFACES

DATE OF DISTRESS SURVEY (MONTH/DAY/YEAR) __ __ /__ __ /__ __
SURVEYORS: __ __ __, __ __ __
PAVEMENT SURFACE TEMP - BEFORE __ __ __°C; AFTER __ __ __°C
PHOTOS, VIDEO, OR BOTH WITH SURVEY (P, V, B) __
SURVEY WIDTH (Meters) __.__ __

DISTRESS TYPE	SEVERITY LEVEL LOW	MODERATE	HIGH
CRACKING			
1. FATIGUE CRACKING (Square Meters)	__ __ __.__	__ __ __.__	__ __ __.__
2. BLOCK CRACKING (Square Meters)	__ __ __.__	__ __ __.__	__ __ __.__
3. EDGE CRACKING (Meters)	__ __ __.__	__ __ __.__	__ __ __.__
4. LONGITUDINAL CRACKING			
4a.Wheelpath (Meters)	__ __ __.__	__ __ __.__	__ __ __.__
Length Sealed (Meters)	__ __ __.__	__ __ __.__	__ __ __.__
4b.Non-Wheelpath (Meters)	__ __ __.__	__ __ __.__	__ __ __.__
Length Sealed (Meters)	__ __ __.__	__ __ __.__	__ __ __.__
5. REFLECTION CRACKING AT JOINTS	Not Recorded		
6. TRANSVERSE CRACKING Number of Cracks	__ __ __	__ __ __	__ __ __
Length (Meters)	__ __ __.__	__ __ __.__	__ __ __.__
Length Sealed (Meters)	__ __ __.__	__ __ __.__	__ __ __.__
Total Length at least 1.83m (Meters)			__ __ __.__
17. WHEELPATH CRACKING (Meters)			__ __ __.__
PATCHING AND POTHOLES			
7. PATCH/ PATCH DETERIORATION (Number)	__ __ __	__ __ __	__ __ __
(Square Meters)	__ __ __.__	__ __ __.__	__ __ __.__
8. POTHOLES (Number)	__ __ __	__ __ __	__ __ __
(Square Meters)	__ __.__ __	__ __.__ __	__ __.__ __

SHEET 4

DISTRESS SURVEY

LTPP PROGRAM

STATE CODE __ __

SHRP SECTION ID __ __ __ __

DISTRESS SURVEY FOR PAVEMENTS WITH JOINTED PORTLAND CEMENT CONCRETE SURFACES

DATE OF DISTRESS SURVEY (MONTH/DAY/YEAR __ __ /__ __ /__ __
SURVEYORS: __ __ __, __ __ __
PAVEMENT SURFACE TEMP - BEFORE __ __ __°C; AFTER __ __ __°C
PHOTOS, VIDEO, OR BOTH WITH SURVEY (P, V, B) __
SURVEY WIDTH (Meters) __.__ __

DISTRESS TYPE	SEVERITY LEVEL LOW	MODERATE	HIGH
CRACKING			
1. CORNER BREAKS (Number)	__ __ __	__ __ __	__ __ __
2. DURABILITY "D" CRACKING (Number of Affected Slabs)	__ __ __	__ __ __	__ __ __
AREA AFFECTED (Square Meters)	__ __ __.__	__ __ __.__	__ __ __.__
3. LONGITUDINAL CRACKING (Meters)	__ __ __.__	__ __ __.__	__ __ __.__
Length Sealed (Meters)	__ __ __.__	__ __ __.__	__ __ __.__
4. TRANSVERSE CRACKING (Number of Cracks)	__ __ __	__ __ __	__ __ __
(Meters)	__ __ __.__	__ __ __.__	__ __ __.__
Length Sealed (Meters)	__ __ __.__	__ __ __.__	__ __ __.__
18. CRACKED SLABS			
Slabs with transverse cracks >=0.6m (Number of Slabs)			__ __ __
Slabs with transverse cracks >=1/2 slab width (Number of Slabs)			__ __ __
Slab Count (Number of Slabs)			__ __ __
JOINT DEFICIENCIES			
5a. TRANSVERSE JOINT SEAL DAMAGE			
Sealed (Y, N)			__
If "Y" Number of Joints	__ __	__ __	__ __
5b. LONGITUDINAL JOINT SEAL DAMAGE			
Number of Longitudinal Joints that have been sealed (0, 1, or 2)			__
Length of Damaged Sealant (Meters)			__ __ __.__
6. SPALLING OF LONGITUDINAL JOINTS (Meters)	__ __ __.__	__ __ __.__	__ __ __.__
7. SPALLING OF TRANSVERSE JOINTS			
Number of Affected Joints	__ __	__ __	__ __
Length Spalled (Meters)	__ __ __.__	__ __ __.__	__ __ __.__

SHEET 8

DISTRESS SURVEY

LTPP PROGRAM

STATE CODE __ __

SHRP SECTION ID __ __ __ __

DISTRESS SURVEY FOR PAVEMENTS WITH CONTINUOUSLY REINFORCED PORTLAND CEMENT CONCRETE SURFACES

DATE OF DISTRESS SURVEY (MONTH/DAY/YEAR) __ __ /__ __ /__ __
SURVEYORS: __ __ __, __ __ __
PAVEMENT SURFACE TEMP - BEFORE __ __ __°C; AFTER __ __ __°C
PHOTOS, VIDEO, OR BOTH WITH SURVEY (P, V, B) __
SURVEY WIDTH (Meters) __.__ __

DISTRESS TYPE	SEVERITY LEVEL LOW	MODERATE	HIGH
CRACKING			
1. DURABILITY "D"CRACKING			
(No. of affected Trans Cracks)	__ __ __	__ __ __	__ __ __
(Square Meters)	__ __ __.__	__ __ __.__	__ __ __.__
2. LONGITUDINAL CRACKING			
(Meters)	__ __ __ __	__ __ __.__	__ __ __.__
Length Well Sealed			
(Meters)	__ __ __ __	__ __ __.__	__ __ __.__
3. TRANSVERSE CRACKING			
(Total Number of Cracks)			__ __ __
(Number of Cracks)	__ __ __	__ __ __	__ __ __
(Meters)	__ __ __.__	__ __ __.__	__ __ __.__
SURFACE DEFECTS			
4a. MAP CRACKING (Number)			__ __ __
(Square Meters)			__ __ __.__
4b. SCALING (Number)			__ __ __
(Square Meters)			__ __ __.__
5. POLISHED AGGREGATE			
(Square Meters)			__ __ __.__
6. POPOUTS Not Recorded			

SHEET 9

DISTRESS SURVEY

LTPP PROGRAM

STATE CODE __ __

SHRP SECTION ID __ __ __ __

DATE OF DISTRSS SURVEY (MONTH/ DAY/ YEAR) __ __/ __ __/ __ __

SURVEYORS: __ __ __, __ __ __

DISTRESS SURVEY FOR PAVEMENTS WITH CONTINUOUSLY REINFORCED PORTLAND CEMENT CONCRETE SURFACES (CONTINUED)

DISTRESS TYPE	SEVERITY LEVEL LOW	MODERATE	HIGH
MISCELLANEOUS DISTRESSES			
7. BLOWUPS (Number)			__ __ __
8. TRANSVERSE CONSTRUCTION JOINT DETERIORATION (Number)	__ __	__ __	__ __
9. LANE-TO-SHOULDER DROPOFF - REFER TO SHEET 10			
10. LANE-TO-SHOULDER SEPARATION - REFER TO SHEET 10			
11. PATCH/ PATCH DETERIORATION Flexible (Number)	__ __ __	__ __ __	__ __ __
(Square Meters)	__ __ __.__	__ __ __.__	__ __ __.__
Rigid (Number)	__ __ __	__ __ __	__ __ __
(Square Meters)	__ __ __.__	__ __ __.__	__ __ __.__
12. PUNCHOUTS (Number)	__ __	__ __	__ __
Area (Square Meters)	__ __.__ __	__ __.__ __	__ __.__ __
13. SPALLING OF LONGITUDINAL JOINT (Meters)	__ __ __.__	__ __ __.__	__ __ __.__
14. WATER BLEEDING AND PUMPING (Number of Occurrences)			__ __ __
Length Affected (Meters)			__ __ __.__
15. LONGITUDINAL JOINT SEAL DAMAGE Number of Longitudinal Joints that have been sealed (0, 1, or 2)			__
If Sealed Length w/ Damaged Sealant (Meters)			__ __ __.__

16. OTHER (Describe) _____

_____

_____