ALDOT-414-04
NETWORK-LEVEL PAVEMENT CONDITION DATA COLLECTION PROCEDURE

1. Scope

1.1. This method describes the required data items and the quality assurance process for network-level pavement condition data collection.

1.2. The values stated in English units are to be regarded as the standard. The values given in parentheses are for information only.

2. Referenced documents

2.1. "Highway Performance Monitoring System Field Manual," Office of Highway Policy Information, Federal Highway Administration, December 2016 (incorporating the most recent errata documents)

2.2. AASHTO R 87-18, Determining Pavement Deformation Parameters and Cross Slope from Collected Transverse Profiles

2.3. AASHTO R 36-21, Standard Practice for Evaluating Faulting of Concrete Pavements

2.4. ALDOT-448-12, Evaluating Pavement Profiles

3. Description of distresses and other data items

3.1. Each distress or data item shall be collected for the entire length of each 0.01-mile (16.1 m) road segment, unless otherwise noted, and reported in 0.01-mile (16.1 m) segments.

3.2. The information below shall be reported/collected for all pavements:

3.2.1. Location information—Report LRS route (corresponding to the state's milepost map network), milepost, and direction shall be considered as primary for reporting on the STATE network. GIS route (corresponding to the STATE's m-enabled network) and milepoint shall also be reported on the STATE network and shall be considered the primary network for off-system (inventory) routes. The milepost and milepoint shall be recorded for the start of each 0.01-mile (16.1 m) segment.

3.2.2. Surface type—Code surface type as hot mix asphalt (F), jointed concrete (R), continuously-reinforced concrete (C), or bridge deck (B). The coded surface type should reflect the predominant pavement type. Bridge decks overlaid with flexible pavement shall be coded as a bridge (B). Other pavement types shall be coded as ("X").

3.2.3. Construction status—Code "1" if segment is located in an active construction zone or if a new pavement surface does not have permanent stripe in place; code "0" otherwise.

3.2.4. Slope data—Report the following for a single point at the beginning of each 0.01-mile (16.1 m) segment:

- Cross slope of the pavement lane as a percentage.
- Longitudinal grade of the pavement as a percentage.

3.2.5. Global Positioning System (GPS) coordinates—Report longitude and latitude for a single point at the beginning of each 0.01-mile (16.1 m) segment. Report elevation data at the same point. For each record, report the vertical and horizontal dilution of precision (DOP) and date/time for the latitude, longitude, and elevation data.

3.2.6. Events—Code the following events on the DEPARTMENT's highway network for the corresponding 0.01-mile (16.1 m) record.

- Code "1" for any segments partially or wholly on railroad crossings (at-grade only); otherwise, code "0."
- Code "1" for multilane sections (at least two through lanes in each direction); otherwise, code "0."
- Code "1" for any segments in which the data collection vehicle is not collecting data in the rightmost through lane (unless otherwise instructed); otherwise, code "0."

3.2.7. Lane width—Report lane width, defined typically as the transverse distance between the inside of the left centerline stripe (whether double or single) and the inside of the right edgeline or centerline strip. Figure 1 shows the typical lane layout used for cracking categorization and rutting. For areas in which a right edgeline is not present, the right edge of the lane shall be defined as 6 in. (152 mm) from the edge of the asphalt pavement or 12 in. (305 mm) from the vertical face of a curb when asphalt is placed directly adjacent to the curb. In cases where neither centerline nor edgeline are present, subtract 12 in. (305 mm) from the distance between the centerline paving joint and the right edge of pavement.

3.2.8. Right of Way (ROW)/shoulder images—Collect color digital images at the beginning and midpoint of each 0.01-mile (16.1 m) segment from one or more cameras that show left and right shoulder and ROW. A file naming convention mutually agreed upon by the CONTRACTOR and DEPARTMENT shall be used such that imagery can be connected to route and location.

3.2.9. International Roughness Index (IRI)—Report average ride quality for each 0.01-mile (16.1 m) segment for each wheelpath in the survey lane in units of in./mi.

The data shall be Highway Performance Monitoring System (HPMS) compliant as described in the Highway Performance Monitoring System Field Manual.

3.3. Information to be rated for flexible pavements:

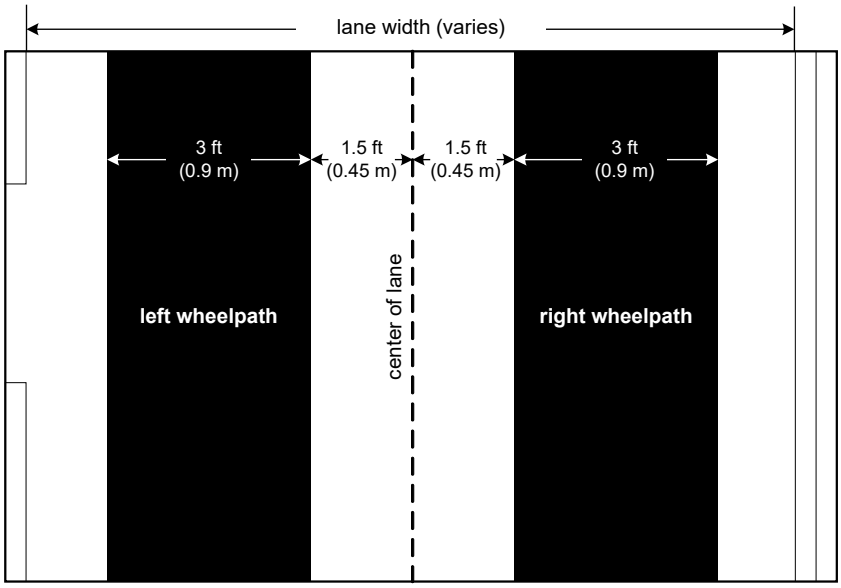


FIGURE 1. TYPICAL WHEELPATH DIMENSIONS

3.3.1. Transverse cracking—This type of cracking consists of cracks that occur at approximately right angles to the centerline. Transverse cracks shall be categorized as one of the following:

- Severity level 1: Cracks having widths > 1/25 in. and ≤ 1/8 in. (> 1 mm and ≤ 3 mm).
- Severity level 2: Cracks having widths > 1/8 in. and < 1/4 in. (> 3 mm and < 6 mm).
- Severity level 3: Cracks having widths ≥ 1/4 in. (≥ 6 mm).

Code "1" in the field TRANS_S to indicate the presence of crack sealant applied transversely, regardless of condition. The presence of fissures within the crack seal shall be rated as cracks according to the severity levels above.

Rate transverse cracks prior to rating other cracking; cracking shall be rated as feet of cracking per 0.01-mile (16.1 m) segment. In order for a crack to be categorized as transverse, a single crack must be greater than 6 ft (1.8 m) long and project within 30° of perpendicular to the pavement centerline. The crack shall be rated at the predominant severity level that occurs along the crack.

3.3.2. Wheelpath cracking—This type of cracking consists of any cracks longer than 3 in. (76 mm) found in the wheelpaths as defined in Figure 1 that were not

previously identified as transverse cracks. Severity of wheelpath cracking is categorized as follows:

- Severity level 1: Cracks having widths > 1/25 in. and ≤ 1/8 in. (> 1 mm and ≤ 3 mm).
- Severity level 2: Cracks having widths > 1/8 in. and < 1/4 in. (> 3 mm and < 6 mm).
- Severity level 3: Cracks having widths ≥ 1/4 in. (≥ 6 mm).

Rate wheelpath cracking as the number of linear feet (linear meters) of road segment containing such cracking. Rate the length of cracking at each severity level; the maximum length of wheelpath cracking possible in each 0.01-mile (16.1 m) segment is 52.8 ft (16.1 m). When cracking is present in both wheelpath zones simultaneously, rate the higher severity. Further exposition is given in Appendix A to clarify the rating of wheelpath cracking. The wheelpaths function together as a single zone for rating.

In addition, rate wheelpath cracking for each wheelpath zone independently. In this case, the wheelpaths function as separate zones for rating. The maximum length of wheelpath cracking possible per zone in each 0.01-mile (16.1 m) segment is 52.8 ft (16.1 m).

Code "1" ("0" otherwise) in the fields WHEELM_S, WHEELS_L, and WHEELR_S to indicate the presence of crack sealant in the wheelpath zones, regardless of condition. The presence of fissures within the crack seal shall be rated as cracks according to the severity levels above.

3.3.3. Nonwheelpath cracking—Rate cracks longer than 3 in. (76 mm) in the zones within the lane width not identified as wheelpaths, as described in Figure 1, that were not previously identified as transverse cracks. Nonwheelpath cracking shall be categorized as one of the following:

- Severity level 1: Cracks having widths > 1/25 in. and ≤ 1/8 in. (> 1 mm and ≤ 3 mm).
- Severity level 2: Cracks having widths > 1/8 in. and < 1/4 in. (> 3 mm and < 6 mm).
- Severity level 3: Cracks having widths ≥ 1/4 in. (≥ 6 mm).

Rate nonwheelpath cracking as the number of linear feet (linear meters) of road segment containing such cracking. Rate the length of cracking at each severity level; the maximum length of nonwheelpath cracking possible in each 0.01-mile (16.1 m) segment is 52.8 ft (16.1 m). When cracking is present in multiple nonwheelpath zones simultaneously, rate the higher severity. Further exposition is

given in Appendix A to clarify the rating of nonwheelpath cracking. The nonwheelpath zones function together as a single zone for rating.

Code "1" ("0" otherwise) in the NONS field to indicate the presence of crack sealant in the nonwheelpath zones, regardless of condition. The presence of fissures within the crack seal shall be rated as cracks according to the severity levels above.

3.3.4. Rutting—Report mean and maximum values for outside wheelpath and report mean and maximum values for inside wheelpath for each 0.01-mile (16.1 m) segment. Rut depths shall be determined according to AASHTO R 87.

3.3.5. High severity raveling—Code "1" ("0" otherwise) instances in which the aggregate and/or binder has worn away and the surface texture is extremely rough and pitted.

3.3.6. Patching—Code "1" ("0" otherwise) to indicate the presence of patching of any shape within the 0.1-mile segment, per the following:

- Patching should be coded for all lane locations, with no minimum size requirements
- Full lane width patching longer than 0.1 mi shall not be coded.
- Partial lane width patches, especially those occurring in the wheelpaths shall be coded as patching regardless of length of patch.

3.3.7. Macrotexture—For each 0.01-mile (16.1 m) segment, report the mean right wheelpath RMS amplitude of texture for wavelengths from 0.0196 in. (0.50 mm) to 1.196 in (50 mm).

3.4. Information to be reported for rigid pavements:

3.4.1. Transverse joint and crack faulting— Report the mean and maximum absolute values according to AASHTO R 36 for each wheelpath for each 0.01-mile (16.1 m) segment.

3.5. Additional information to be rated for rigid pavements—These data items are to be rated for 0.1-mile (161 m) segments to be specified by the DEPARTMENT. These segments are already represented in the route network but are reported over longer intervals due to the nature of these distresses.

3.5.1. Rate the percentage of slabs exhibiting transverse (fatigue) cracking at any severity level over the 0.1-mile (161 m) segment on jointed concrete pavement. A crack must extend at least 6 ft. (1.8 m) for the slab to be considered cracked. Sealed cracks are still counted as cracks. In determining the percent of slabs cracked, a slab with multiple cracks should still be counted as one cracked slab.

Partial slabs shall contribute to the section that contains the majority of the slab length.

3.5.2. Report the percent of lane area with punchouts on continuously reinforced concrete pavement. The area over each 0.1-mile (161 m) segment should be reported where punchouts, longitudinal cracking, and/or patching occur in the section at any severity level. A punchout is the area enclosed by two closely spaced (usually < 2 ft (0.6 m)) transverse cracks, a short longitudinal crack, and the edge of the pavement or longitudinal joint. Punchouts also include "Y" cracks that exhibit spalling, breakup, or faulting. The following figure illustrates conditions that constitute punchouts:

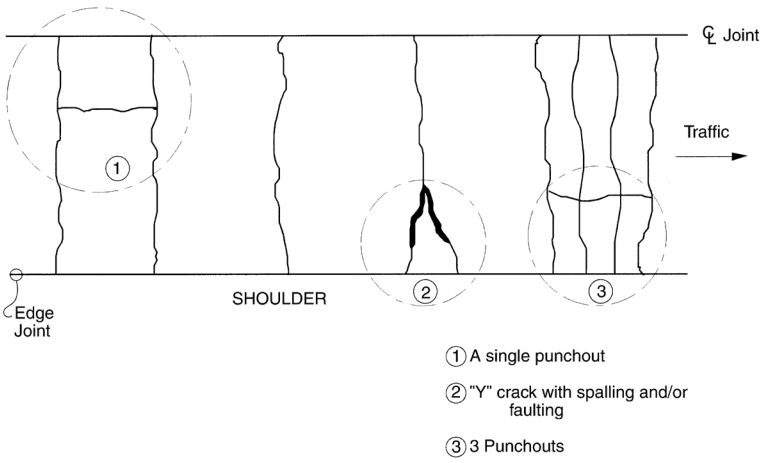


FIGURE 2. PUNCHOUT DEFINITIONS
Source: 2003 Distress Identification Manual for the Long-Term Pavement Performance Program

4. Data Quality Requirements

4.1. Pavement condition data—The following table describes the required resolution of the collected and rated pavement condition data:

DATA ELEMENT	REQUIRED RESOLUTION
1. Ride quality (IRI)	1 in./mile (.016 m/km)
2. Cross slope, superelevation, and grade data	0.1%
3. Wheelpath cracking	0.1 linear ft (3 cm) per 0.01-mile (16.1 m) segment
4. Nonwheelpath cracking	0.1 linear ft (3 cm) per 0.01-mile (16.1 m) segment
5. Transverse cracking	0.1 linear ft (3 cm) per 0.01-mile (16.1 m) segment
6. Rut depth	0.01 in. (0.25 mm)
7. Faulting	0.01 in. (0.25 mm)
8. Raveling	present/not present
9. Patching	present/not present
10. Macrotexture	0.01 in. (0.25 mm)
11. Transverse joint faulting	0.01 in. (0.25 mm)
12. Percent cracked slabs	1%
13. Punchout area	1%

TABLE 1. DATA RESOLUTION REQUIREMENTS

4.2. GPS and elevation data—Latitude and longitude shall be reported in decimal degrees to at least eight digits after the decimal; elevation data shall be reported in feet. Positional accuracy for latitude and longitude shall not exceed ±10 feet (±3 m).

4.3. ROW/Shoulder images—ROW images shall be taken at sufficient resolution to ensure 10 in. (250 mm) sign lettering is legible at a distance of 15 ft (4.5 m) from the edge of the travel lane while traveling at highway speeds. All exterior cameras shall be capable of collecting images during normally encountered fair weather conditions in Alabama. In addition, camera lenses or enclosures shall be cleaned regularly to prevent buildup of road debris and insects.

5. Quality Control Requirements

5.1. The CONSULTANT shall develop a written quality control plan and log. The QC plan shall be submitted to the DEPARTMENT before collection, and a copy kept in the collection vehicle(s).

5.2. The QC log shall be maintained throughout data collection, with a copy provided to the DEPARTMENT upon completion of data collection.

5.3. International Roughness Index

5.3.1. Profiler and operator certification:The CONSULTANT's data collection vehicle and operator(s) shall be certified at the NCAT Pavement Test Track in accordance with ALDOT-448.

5.3.2. Pre-production verification: The CONSULTANT shall make five passes at ten or more of the DEPARTMENT-selected 1000 ft (305 m) long IRI control sites. These sites will be distributed throughout the state for use in production verification, subject to the following:

- A cross-correlation using ProVAL of 88% or greater between runs is required.
- The average of the five runs shall become the target IRI for the section during production.
- All profiles obtained in pre-production verification shall be provided to the DEPARTMENT.
- Any discrepancies will be jointly investigated by the DEPARTMENT and CONSULTANT; a mutual resolution is required before data collection begins.

5.3.3. Production verification: The CONSULTANT shall make a single pass over one IRI control site at least weekly and at the end of a collection cycle. These results shall be reported to the DEPARTMENT immediately. Typically, no single IRI determination (for either wheelpath) should vary more than 5 percent from the original control section IRI. A profile file in .ppf format shall be provided to the DEPARTMENT when ROW images are delivered.

- Sites visited should be varied throughout the collection period.

- In the event of discrepancies, all data collected between verification runs is considered rejected. The DEPARTMENT will consider partial acceptance of the suspect data if a cause and time of occurrence can be established for the faulty equipment.

5.4. Rutting

5.4.1. Pre-production verification: The CONSULTANT shall make five passes over at least ten of the DEPARTMENT-selected rutting control sites. These sites are co-located with and consist of the first 0.1 mi (161 m) of the IRI control sites. For all 0.01-mile (16.1 m) segments, the CONSULTANT shall report mean and maximum rutting for both left and right wheelpath in a mutually agreed upon file format. In addition, the following requirements shall apply:

- Repeatability: Mean rutting values for each 0.01-mi (16.1m) segment should be within 0.05 in. (1.3 mm) of the average of the five runs.

- Accuracy: The DEPARTMENT will measure rutting using a manual rut depth gauge at 0.01-mi (16.1 m) intervals. CONSULTANT five-run average values shall be within 0.1 in. (2.5 mm) of DEPARTMENT values over at least 95% of the 0.01-mile (16.1 m) segments.

- Production targets: The average of the 0.01-mile (16.1 m) five-run averages results in an average over the 0.1-mile (161 m) control site. This shall become the target rutting value for the section during production. The entire process is illustrated in Figure 3.

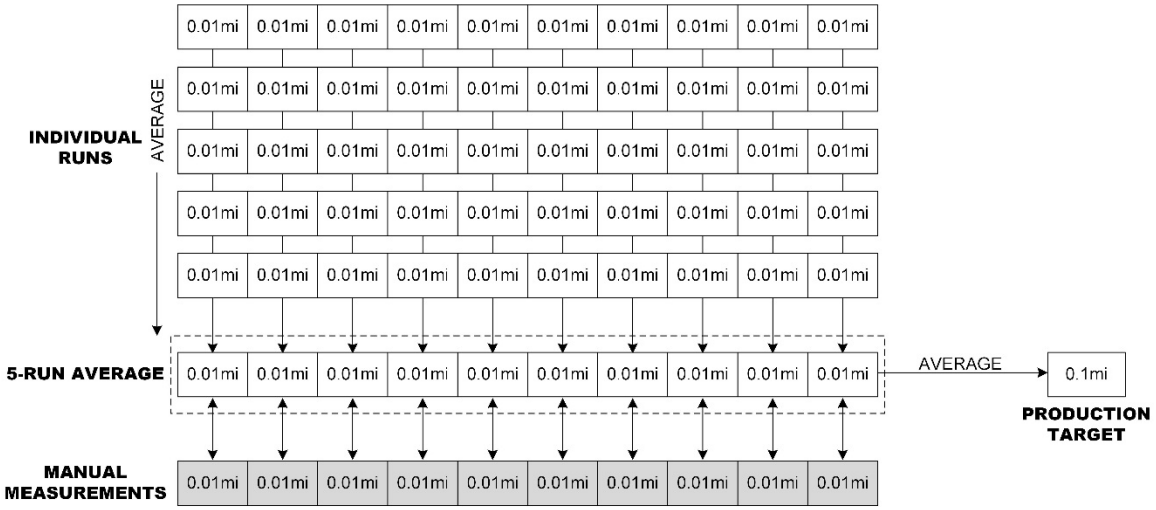


FIGURE 3. RUTTING AGGREGATION PROCESS

- Any discrepancies will be jointly investigated by the DEPARTMENT and CONSULTANT; a mutual resolution is required before data collection begins.

5.4.2. Production verification

- The CONSULTANT should make a single pass over one IRI control site at least weekly and at the end of the collection cycle. An electronic file shall be provided to the DEPARTMENT when ROW images are delivered. The average 0.1-mile (16.1 m) rut value should be within 0.10 in. (2.5 mm) of the target rut measurement.

- In the event of discrepancies, all data collected between verification runs is considered rejected. The DEPARTMENT will consider partial acceptance of the suspect data if a cause and time of occurrence can be established for the faulty equipment.

5.5. General

5.5.1. Multiple vehicles may be used for data collection, but all must undergo the QC process outlined above.

5.5.2. If a vehicle leaves the state for any reason, the CONSULTANT shall rerun at least a portion of the control sites for IRI, rutting, and faulting to be determined by the DEPARTMENT before resuming data collection.

6. Quality Assurance Requirements

6.1. Cracking data

6.1.1. Pre-production verification

- The CONSULTANT shall run each DEPARTMENT-selected 0.3-mi long verification site and rate the pavement using the same methods that will be employed for production data reduction. Data should be reported to a 0.1-mile (16.1 m) resolution.
- The DEPARTMENT will conduct manual cracking surveys at each verification site.
- A Pearson's r correlation and/or other statistical means will be employed on the reduced data to determine whether the sample data is acceptable. Significant deviation from a positive linear relationship between DEPARTMENT ground truth and CONSULTANT data will be jointly investigated and resolved before data collection begins.

6.1.2. Production verification:

- The DEPARTMENT will rate up to three percent of pavement mileage collected and compare its results with production data.
- A Pearson's r correlation and/or other statistical means will be used to determine whether the sample data is acceptable. Significant deviation from a positive linear relationship between DEPARTMENT-rated data and CONSULTANT-rated data will be jointly investigated and may require re-rating by the CONSULTANT.

6.2. Faulting

6.2.1. Calculation verification: The DEPARTMENT will select at least two segments of at least one mile in length and evaluate faulting over 0.1-mi sections from a CONSULTANT-supplied .ppf file using Method A (ProVAL) of R 36. CONSULTANT values shall be within 0.1 in. (2.5 mm) of DEPARTMENT values over at least 95% of the 0.1-mi samples. Deviation will be jointly investigated and may require re-rating by the CONSULTANT.

6.3. Right of way images

6.3.1. Pre-production verification—Right of way images taken at the cracking verification sites shall be provided to the DEPARTMENT for review and approval prior to the start of data collection.

6.3.2. Production verification

- Images shall be delivered to the DEPARTMENT weekly using any practical means with sufficient supporting files to allow playback.
- The CONSULTANT shall also provide a list of sections ran along with the images.
- The DEPARTMENT will randomly sample and review images for clarity and brightness within two weeks of receipt and inform the CONSULTANT if the images are acceptable. If the images are not acceptable, all data shall be recollected for the affected pavement segments.

6.4. Location data

6.4.1. Pre-production—The DEPARTMENT will provide a NAD83 shapefile of the road network to be collected prior to the beginning of data collection. This shapefile will contain the route segments to be collected. Information provided will include route, beginning and ending milepost of the segment, beginning and ending events (such as route intersection or county lines), and primary direction. In addition, the attributes of the secondary linear referencing system will be provided.

6.4.2. Production—The DEPARTMENT will review linear referencing data as a part of the ROW image review process.

6.4.3. Post-production: CONSULTANT values shall be within 0.05 mi (80 m) of expected locations over at least 95% of the 0.01-mile segments. Deviation will be jointly investigated and may require re-rating by the CONSULTANT. Data overlaps of greater than 100 ft (31 m) as determined by GPS location should be eliminated from the datafile before delivery. This requirement also includes overlaps between partial data submittals.

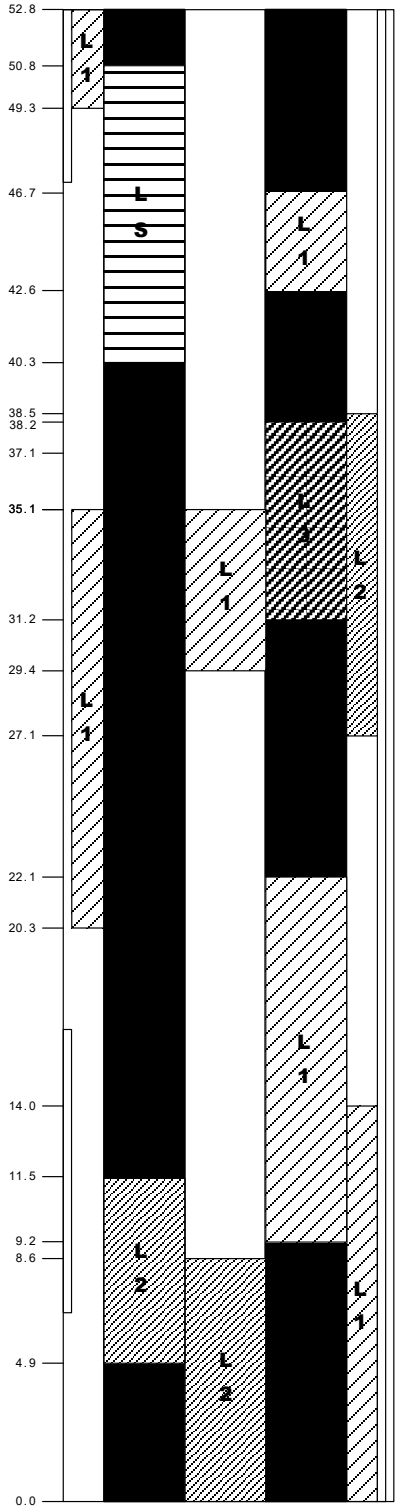
7. References

7.1. AASHTO R 56-14, Standard Practice for Certification of Inertial Profilers

7.2. AASHTO R 57-14, Standard Practice for Operating Inertial Profiling Systems

Appendix A

Tables 2 through 5 show the calculation steps required in determining wheelpath and nonwheelpath cracking over a hypothetical 0.01-mile (16.1 m) segment of roadway, shown in Figure 4.



FROM	TO	NONE	LEVEL 1	LEVEL 2	LEVEL 3	SEALED
0.0	4.9	4.9				
4.9	11.5			6.6		
11.5	22.1		10.6			
22.1	31.2	9.1				
31.2	38.2				7.0	
38.2	40.3	2.1				
40.3	42.6					2.3
42.6	46.7		4.1			
46.7	50.8					4.1
50.8	52.8	2.0				
	Totals	18.1	14.7	6.6	7.0	6.4
					Grand Total	52.8

TABLE 2. WHEELPATH CRACKING TOTALS FOR CRACKING EXAMPLE

FROM	TO	NONE	LEVEL 1	LEVEL 2	LEVEL 3	SEALED
0.0	4.9	4.9				
4.9	11.5			6.6		
11.5	40.3	28.8				
40.3	50.8					10.5
50.8	52.8	2.0				
	Totals	35.7	0.0	6.6	0.0	10.5
					Grand Total	52.8

TABLE 3. LEFT WHEELPATH CRACKING TOTALS FOR CRACKING EXAMPLE

FROM	TO	NONE	LEVEL 1	LEVEL 2	LEVEL 3	SEALED
0.0	9.2	9.2				
9.2	22.1		12.9			
22.1	31.2	9.1				
31.2	38.2				7.0	
38.2	42.6	4.4				
42.6	46.7		4.1			
46.7	52.8	6.1				
	Totals	28.8	17.0	0.0	7.0	0.0
					Grand Total	52.8

TABLE 4. RIGHT WHEELPATH CRACKING TOTALS FOR CRACKING EXAMPLE

FROM	TO	NONE	LEVEL 1	LEVEL 2	LEVEL 3	SEALED
0.0	8.6			8.6		
8.6	14.0		5.4			
14.0	20.3	6.3				
20.3	27.1		6.8			
27.1	38.5			11.4		
38.5	49.3	10.8				
49.3	52.8		3.5			
	Totals	17.1	15.7	20.0	0.0	0.0
					Grand Total	52.8

TABLE 5. NONWHEELPATH CRACKING TOTALS FOR CRACKING EXAMPLE

FIGURE 4. CRACKING EXAMPLE

Appendix B: Data Dictionary for Items Reported at 0.01-mi Intervals

FIELD NAME	DATA TYPE	UNITS	MIN	MAX	DESCRIPTION
LRS_ROUTE	Text	N/A	N/A	N/A	LRS route (corresponding to milepost map network—Interstate and state routes only—6 or 7 characters)
MILEPOST	Double	mi	0	816	LRS milepost at start of segment (corresponding to milepost map network—Interstate and state routes only)
DIRECTION	Boolean	N/A	0	1	Direction of travel (0=primary/increasing milepost, 1=secondary/decreasing milepost)
GIS_ROUTE	Text	N/A	N/A	N/A	GIS route (corresponding to m-measured network—12-character)
MILEPOINT	Double	mi	0	400	Milepoint at start of segment (corresponding to m-measured network—12-character)
VEHICLE	Text	N/A	N/A	N/A	Vehicle ID/serial number
DATE_RATED	Date/ Time	mm/dd/yy	N/A	N/A	Date data was collected
SURFACE_TYPE	Text	N/A	F	R	Surface type (F=asphalt, R=jointed concrete, C=continuously-reinforced concrete, B=concrete bridge deck)
CONSTRUCTION	Boolean	N/A	0	1	Construction flag (segment is located in construction zone)
CROSS_SLOPE_PERCENT	Single	%	-15	15	Percent cross-slope
GRADE	Single	%	-10	10	Percent grade
LATITUDE	Double	°	30	35	GPS latitude (decimal degrees) at start of segment
LONGITUDE	Double	'	-85	-85	GPS longitude (decimal degrees) at start of segment
ELEVATION	Double	ft	0	2500	Elevation at start of segment
VDOP	Double	N/A	1	6	Vertical dilution of precision of elevation measurement
HDOP	Double	N/A	1	6	Horizontal dilution of precision of latitude/longitude measurement
UTC_TIMESTAMP	Text	N/A	N/A	N/A	GPS Date/Time
RAILROAD_CROSSING	Boolean	N/A	0	1	Railroad crossing flag (at-grade crossing)
MULTILANE	Boolean	N/A	0	1	Presence of four or more lanes
LANE_CHANGE	Boolean	N/A	0	1	Lane change flag (vehicle left data lane due to obstruction)
LANE_WIDTH	Single	ft	0	14	Lane width (inside of stripe to inside of stripe)

FIELD NAME	DATA TYPE	UNITS	MIN	MAX	DESCRIPTION
IRIL	Single	in./mi	30	400	Left wheelpath IRI
IRIR	Single	in./mi	30	400	Right wheelpath IRI
TRANS1	Single	ft	0	200	Level 1 transverse cracking (asphalt)
TRANS2	Single	ft	0	200	Level 2 transverse cracking (asphalt)
TRANS3	Single	ft	0	200	Level 3 transverse cracking (asphalt)
TRANSS	Boolean	N/A	0	1	Presence of transversely applied crack seal (0=not present, 1=present)
WHEEL1_M	Single	ft	0	52.8	Level 1 wheelpath cracking both wheelpaths
WHEEL2_M	Single	ft	0	52.8	Level 2 wheelpath cracking, both wheelpaths
WHEEL3_M	Single	ft	0	52.8	Level 3 wheelpath cracking, both wheelpaths
WHEELS_M	Boolean	N/A	0	1	Presence of crack seal, both wheelpaths (0=not present, 1=present)
WHEEL1_L	Single	ft	0	52.8	Level 1 wheelpath cracking, left wheelpath
WHEEL2_L	Single	ft	0	52.8	Level 2 wheelpath cracking, left wheelpath
WHEEL3_L	Single	ft	0	52.8	Level 3 wheelpath cracking, left wheelpath
WHEELS_L	Boolean	N/A	0	1	Presence of crack seal, left wheelpath (0=not present, 1=present)
WHEEL1_R	Single	ft	0	52.8	Level 1 wheelpath cracking, right wheelpath
WHEEL2_R	Single	ft	0	52.8	Level 2 wheelpath cracking, right wheelpath
WHEEL3_R	Single	ft	0	52.8	Level 3 wheelpath cracking, right wheelpath
WHEELS_R	Boolean	N/A	0	1	Presence of crack seal, right wheelpath (0=not present, 1=present)
NON1	Single	ft	0	52.8	Level 1 nonwheelpath cracking
NON2	Single	ft	0	52.8	Level 2 nonwheelpath cracking
NON3	Single	ft	0	52.8	Level 3 nonwheelpath cracking
NONS	Boolean	N/A	0	1	Presence of crack seal, nonwheelpath (0=not present, 1=present)
RUTL	Single	in.	0	3	Left wheelpath rutting (average of segment)
RUTL_MAX	Single	in.	0	3	Left wheelpath rutting (maximum within segment)

FIELD NAME	DATA TYPE	UNITS	MIN	MAX	DESCRIPTION
RUTR	Single	in.	0	3	Right wheelpath rutting (average of segment)
RUTR_MAX	Single	in.	0	3	Right wheelpath rutting (maximum within segment)
LFAULT	Single	in.	0	2	Left wheelpath faulting (average of segment)
LFAULT_MAX	Single	in.	0	2	Right wheelpath faulting (maximum within segment)
RFAULT	Single	in.	0	2	Left wheelpath faulting (average of segment)
RFAULT_MAX	Single	in.	0	2	Right wheelpath faulting (maximum within segment)
RAVELING	Boolean	N/A	0	1	Presence of raveling in segment
PATCHING	Boolean	N/A	0	1	Presence of patching in segment
MACROTEXTURE	Single	mm	0	7	Mean right wheelpath RMS amplitude

Appendix C: Data Dictionary for Items Reported at 0.1-mi Intervals

FIELD NAME	DATA TYPE	UNITS	MIN	MAX	DESCRIPTION
LRS_ROUTE	Text	N/A	N/A	N/A	LRS route (corresponding to milepost map network—Interstate and state routes only—6 or 7 characters)
MILEPOST	Double	mi	0	816	LRS milepost at start of segment (corresponding to milepost map network—Interstate and state routes only)
DIRECTION	Boolean	N/A	0	1	Direction of travel (0=primary/increasing milepost, 1=secondary/decreasing milepost)
GIS_ROUTE	Text	N/A	N/A	N/A	GIS route (corresponding to m-measured network—12-character)
MILEPOINT	Double	mi	0	400	Milepoint at start of segment (corresponding to m-measured network—12-character)
VEHICLE	Text	N/A	N/A	N/A	Vehicle ID/serial number
DATE_RATED	Date/ Time	mm/dd/yy	N/A	N/A	Date data was collected
LANE_WIDTH	Single	ft	0	14	Lane width (inside of stripe to inside of stripe)
SLAB_COUNT	Integer	N/A	8	40	Number of slabs in 0.1-mi section (jointed concrete)
CRACKED_SLABS	Integer	N/A	0	40	Number of cracked slabs in 0.1-mi section (jointed concrete)
PERCENT_CRACKED	Single	%	0	100	Punchouts (percent of entire lane area) in each 0.1-mi segment (continuously reinforced concrete)