

2019

Highway Performance Monitoring System Quality Review



pennsylvania
DEPARTMENT OF TRANSPORTATION

Bureau of Planning and Research
Transportation Planning Division
11/4/2019

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Cover Photo: Smithfield Street Bridge, Allegheny County.

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INTRODUCTION

The Highway Performance Monitoring System (HPMS) is an annual data reporting program created by the Federal Highway Administration (FHWA) to meet their need to provide information to the Congress for development and analysis of national policy and programs relating to highways.

In Pennsylvania, HPMS serves as the primary source of highway information utilized in the allocation of highway maintenance funds, revenue enhancement initiatives and PennDOT's annual report of mileage and travel statistics. HPMS data is used to access the state's minimum pavement condition level for the interstate system on an annual basis and for determining significant progress towards pavement condition targets. HPMS data are also used to fulfill requests for information received from consulting firms, PennDOT District Offices, Metropolitan Planning Organizations (MPOs), and national organizations like The Road Information Program (TRIP), as well as the general public.

Each year, an annual quality review of Pennsylvania's HPMS is conducted. The review is performed by the Bureau of Planning and Research's (BPR) HPMS staff and consists of HPMS field views of randomly selected sample sections in several counties. The purpose of this review is:

1. To ascertain the current state of HPMS data quality and ensure that any errors found are corrected;
2. To determine if any common problem areas exist and identify subsequent training needs;
3. To determine if any organizational or procedural changes to the HPMS program are warranted;
4. To ensure that communications regarding HPMS are maintained between PennDOT, MPOs and PennDOT District Offices.

The HPMS program continues to deliver a high level of timely and accurate data for the purpose of allocating national and state highway funds, project planning and programming, assessing air quality conformity, and travel monitoring.

The following pages contain the results of this year's review.

EXECUTIVE SUMMARY

In August, September and October 2019, BPR's HPMS staff conducted its annual quality review of Pennsylvania's HPMS. The quality reviews were conducted with the appropriate MPO and/or PennDOT District Office HPMS representative present, resulting in improved communication between our HPMS staff and our data providers. The review included HPMS field views of sample sections on which HPMS data are provided by:

- Berks County Planning Commission
- Blair County Planning Commission
- Cambria County Planning Commission
- Delaware Valley Regional Planning Commission
- Luzerne County Planning Commission
- Lycoming County Planning Commission
- PennDOT District Office 3-0
- PennDOT District Office 4-0
- PennDOT District Office 6-0
- PennDOT District Office 8-0
- PennDOT District Office 9-0
- PennDOT District Office 10-0
- PennDOT District Office 12-0

Additionally, the HPMS staff provided HPMS data collection training to the following MPO's:

- Franklin County Planning Commission
- Lackawanna County Department of Planning and Economic Development
- Northeastern Pennsylvania Alliance
- SEDA Council of Governments
- York County Planning Commission

All thirteen (13) of the data providers reviewed this year recorded an accuracy rate of 98% or greater. The average overall accuracy rates of the data providers reviewed for the last ten years appear in chart # 1.

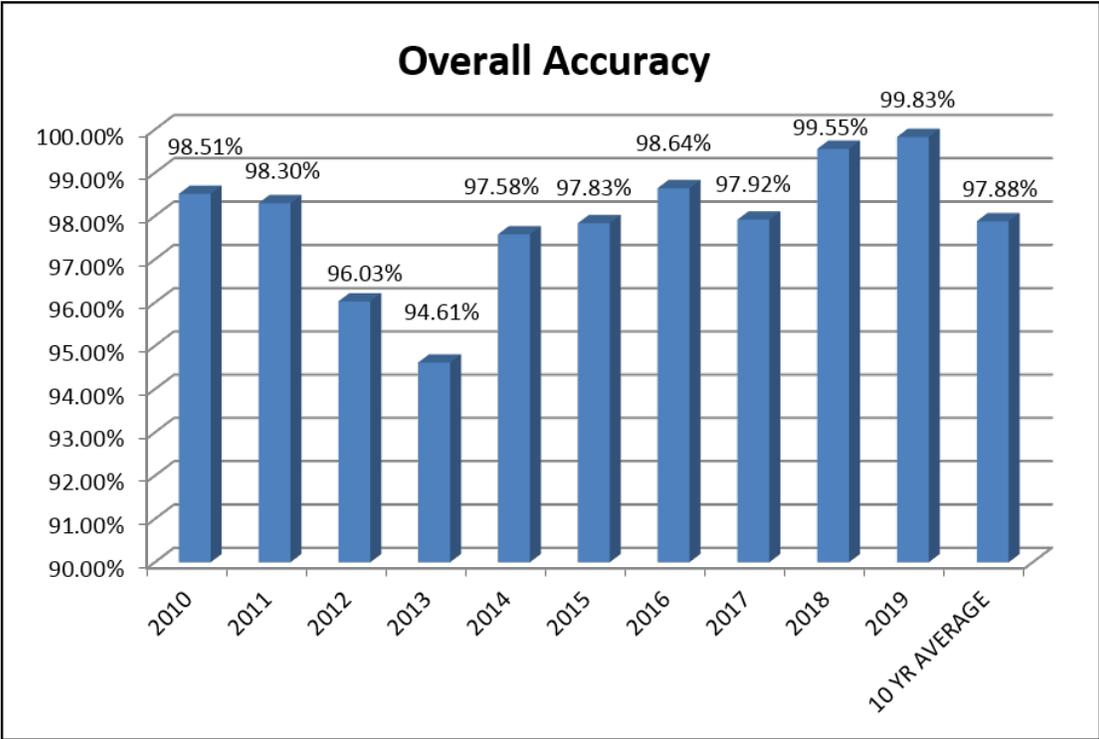


Chart # 1

2019 HPMS DATA REVIEWS / TRAINING SESSIONS

Organization	Participants	Counties Reviewed	Date
Berks County Planning Commission	Devon Hain Shanice Ellison John Moloney Patrick McVeigh Nicholas Guida* William Havrilchak* Grant Michaels* John Chovanes*	Berks	August 12
PennDOT District Office 12-0	Zac Cross Ronald Howell John Moloney Patrick McVeigh	Westmoreland	August 14
PennDOT District Office 10-0	Darren Zapsky John Moloney Patrick McVeigh	Clarion	August 15
Franklin County Planning Commission	Gabrielle Ratliff Steven Thomas Jeremy Freeland John Moloney Patrick McVeigh	Franklin	August 19
Lycoming County Planning Commission	Sal Vitko Ed Feigles Kevin Schreffler Chad Lutz Jeremy Freeland John Moloney Patrick McVeigh	Lycoming	August 20
PennDOT District Office 3-0	Kevin Schreffler Chad Lutz Jeremy Freeland John Moloney Patrick McVeigh	Lycoming	August 21
Lackawanna County Planning Commission	Steve Pitoniak Matthew Jones Jeremy Freeland John Moloney Patrick McVeigh	Lackawanna	August 22
PennDOT District Office 4-0	Sarah Fenton George Kapral Jeremy Freeland John Moloney Patrick McVeigh	Lackawanna	August 27

Northeastern Pennsylvania Alliance	Kate McMahon Annette Ginocchetti Alan Baranski Daniel Yelito Jeremy Freeland John Moloney Patrick McVeigh	Monroe	August 28
Luzerne County Planning Commission	Chris Chapman John Petrini Jeremy Freeland John Moloney Patrick McVeigh	Luzerne	August 29
Delaware Valley Regional Planning Commission	Chip Henry John Moloney Patrick McVeigh	Chester	September 12
PennDOT District Office 6-0	Gregory Vallette Neal Kerrigan John Moloney Patrick McVeigh	Delaware	September 13
PennDOT District Office 9-0	Kevin Boslet John Moloney Patrick McVeigh	Huntingdon	September 16
Blair County Planning Commission	Wes Burkett John Moloney Patrick McVeigh	Blair	September 17
Cambria County Planning Commission	Chris Allison Kevin Boslet Barbara Shaffer** John Moloney Patrick McVeigh	Cambria	September 18
York County Planning Commission	Emily Kelkis John Moloney Patrick McVeigh	York	September 19
PennDOT District Office 8-0	Christopher Pedrick Andrew Walak John Moloney Patrick McVeigh	Dauphin	October 1
SEDA - Council of Governments	James Saylor Steve Herman Katherine Lewis John Schneider Jeremy Freeland John Moloney Patrick McVeigh	Union/Snyder	October 3

* This served as cross training for other BPR staff.

** FHWA Division Representative.

DATA ITEMS

Each review consisted of field verifying data that could be measured through field observations in accordance with the Federal Highway Administration's HPMS Field Manual. The field verifiable data items included in this assessment are listed below. Those items shown in **bold type** are data items collected by the MPOs and PennDOT District Offices exclusively for the HPMS program. All other items reside in the Roadway Management System (RMS) and are controlled by the PennDOT District Offices' RMS staff. MPOs must notify the PennDOT District Offices of inaccuracies found in the RMS data items and the PennDOT District Offices are responsible for correcting the errors.

Data Item	Description
3	Facility Type
4	Structure ID
5	Access Control
7	Through Lanes
8	HOV Type
9	HOV Lanes
10	Peak Lanes
11	Counter Peak Lanes
12	Right Turn Lanes
13	Left Turn Lanes
14	Speed Limit
17	Route Number
18	Route Signing
19	Route Qualifier
20	Road Name
29	Signal Type
30	Percent Green Time
31	Signalized Intersections
32	Stop Sign Controlled Intersections
33	At-Grade Other Intersections
34	Lane Width
35	Median Type
36	Median Width
37	Shoulder Type
38	Right Shoulder Width
39	Left Shoulder Width
40	Peak Parking
41	Widening Obstacle
42	Widening Potential
44	Terrain Type
46	Percent Passing Sight Distance

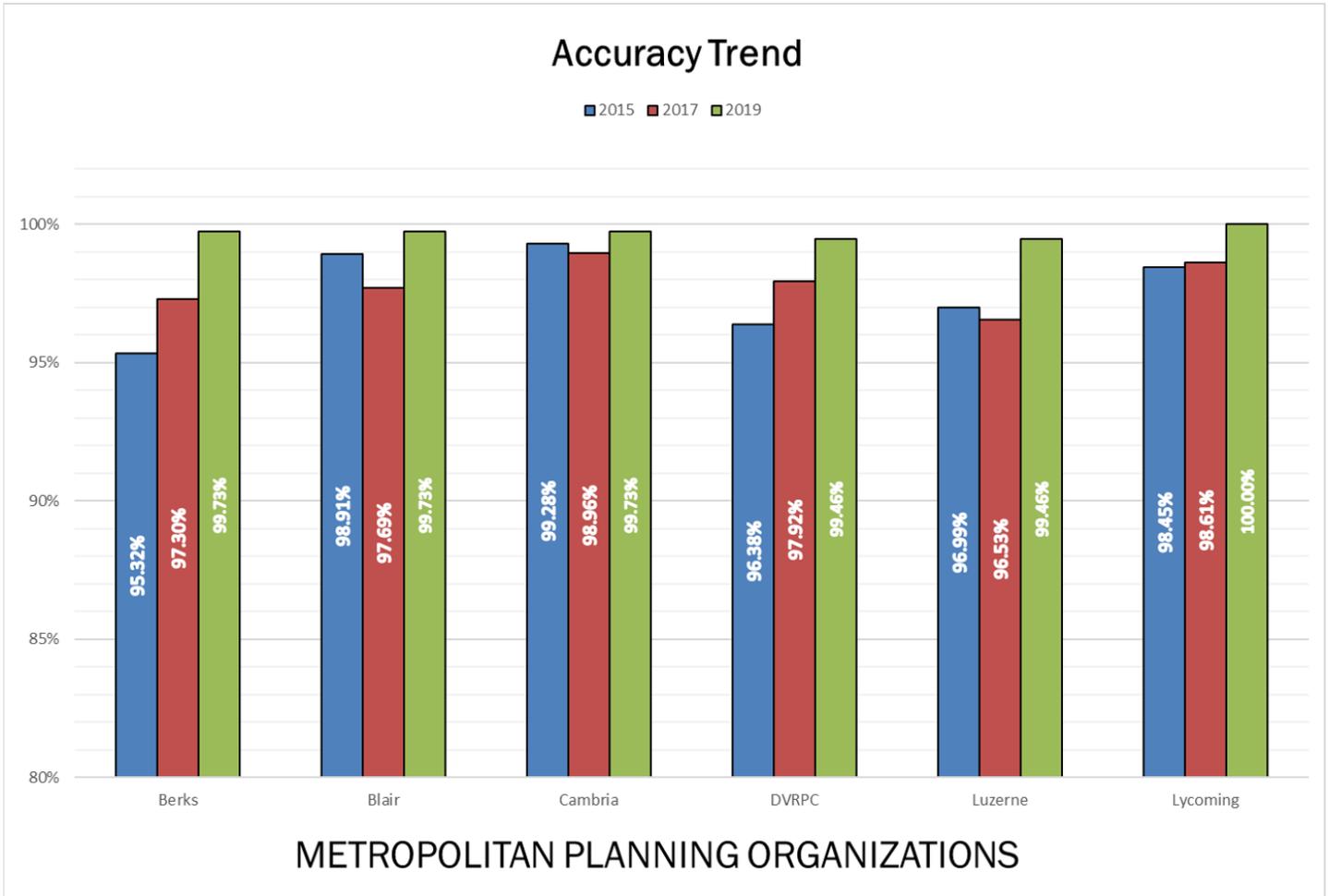
REVIEW ANALYSIS

The following table quantifies the findings of this year's quality reviews. The table indicates, by data source, the number of errors found for each field verifiable data item for each of the agencies reviewed the total number of errors for each agency, and the percent of error for each agency. The overall accuracy rate for each agency is also included in this table. Percent of error was calculated by dividing the total number of errors by the number of segments reviewed in each agency multiplied by the number of data items reviewed per data source.

2019 QUALITY REVIEW SUMMARY														
AGENCY CODING ERRORS PER ITEM REVIEWED														
Data Items Reviewed	Berks MPO	Blair MPO	Cambria MPO	DVRPC MPO	Luzerne MPO	Lycoming MPO	District 3-0	District 4-0	District 6-0	District 8-0	District 9-0	District 10-0	District 12-0	TOTAL
3 - Facility Type	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4 - Structure ID	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5 - Access Control	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7 - Through Lanes	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8 - HOV Type	0	0	0	0	0	0	0	0	0	0	0	0	0	0
9 - HOV Lanes	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10 - Peak Lanes	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11 - Counter Peak Lanes	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12 - Right Turn Lanes	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13 - Left Turn Lanes	0	0	0	1	1	0	0	0	0	0	0	1	0	3
14 - Speed Limit	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17 - Route Number	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18 - Route Signing	0	0	0	0	0	0	0	0	0	0	0	0	0	0
19 - Route Qualifier	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20 - Road Name	0	0	0	0	0	0	0	0	0	0	0	0	0	0
29 - Signal Type	0	0	0	0	0	0	0	0	0	0	0	0	0	0
30 - Percent Green Time	0	0	0	0	0	0	0	0	0	0	0	0	0	0
31 - Signalized Intersections	0	0	0	0	0	0	0	0	0	0	0	0	0	0
32 - Stop Sign Controlled Intersections	1	0	0	0	0	0	0	0	0	0	0	0	0	1
33 - At-Grade Other Intersections	0	0	0	0	0	0	0	0	0	0	0	0	0	0
34 - Lane Width	0	0	1	0	0	0	0	0	0	0	0	0	0	1
35 - Median Type	0	0	0	1	0	0	0	0	0	0	0	0	0	1
36 - Median Width	0	0	0	0	0	0	0	0	0	0	0	0	0	0
37 - Shoulder Type	0	0	0	0	0	0	0	0	0	0	0	0	0	0
38 - Right Shoulder Width	0	0	0	0	0	0	0	0	0	0	0	0	0	0
39 - Left Shoulder Width	0	0	0	0	0	0	0	0	0	0	0	0	0	0
40 - Peak Parking	0	0	0	0	0	0	0	0	0	0	0	0	0	0
41 - Widening Obstacle	0	1	0	0	1	0	0	0	0	0	0	0	0	2
42 - Widening Potential	0	0	0	0	0	0	0	0	0	0	0	0	0	0
44 - Terrain Type	0	0	0	0	0	0	0	0	0	0	0	0	0	0
46 - Percent Passing Sight Distance	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Errors	1	1	1	2	2	0	0	0	0	0	0	1	0	8
Error Rate	0.27%	0.27%	0.27%	0.54%	0.54%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.40%	0.00%	0.17%
Local Fed. Aid Seg. Reviewed	5	8	6	2	4	5	0	0	0	0	2	0	0	32
State Segments Reviewed	7	4	6	10	8	7	12	12	12	12	8	8	12	118
Total Segments Reviewed	12	12	12	12	12	12	12	12	12	12	10	8	12	150
Overall Accuracy Rate	99.73%	99.73%	99.73%	99.46%	99.46%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	99.60%	100.00%	99.83%

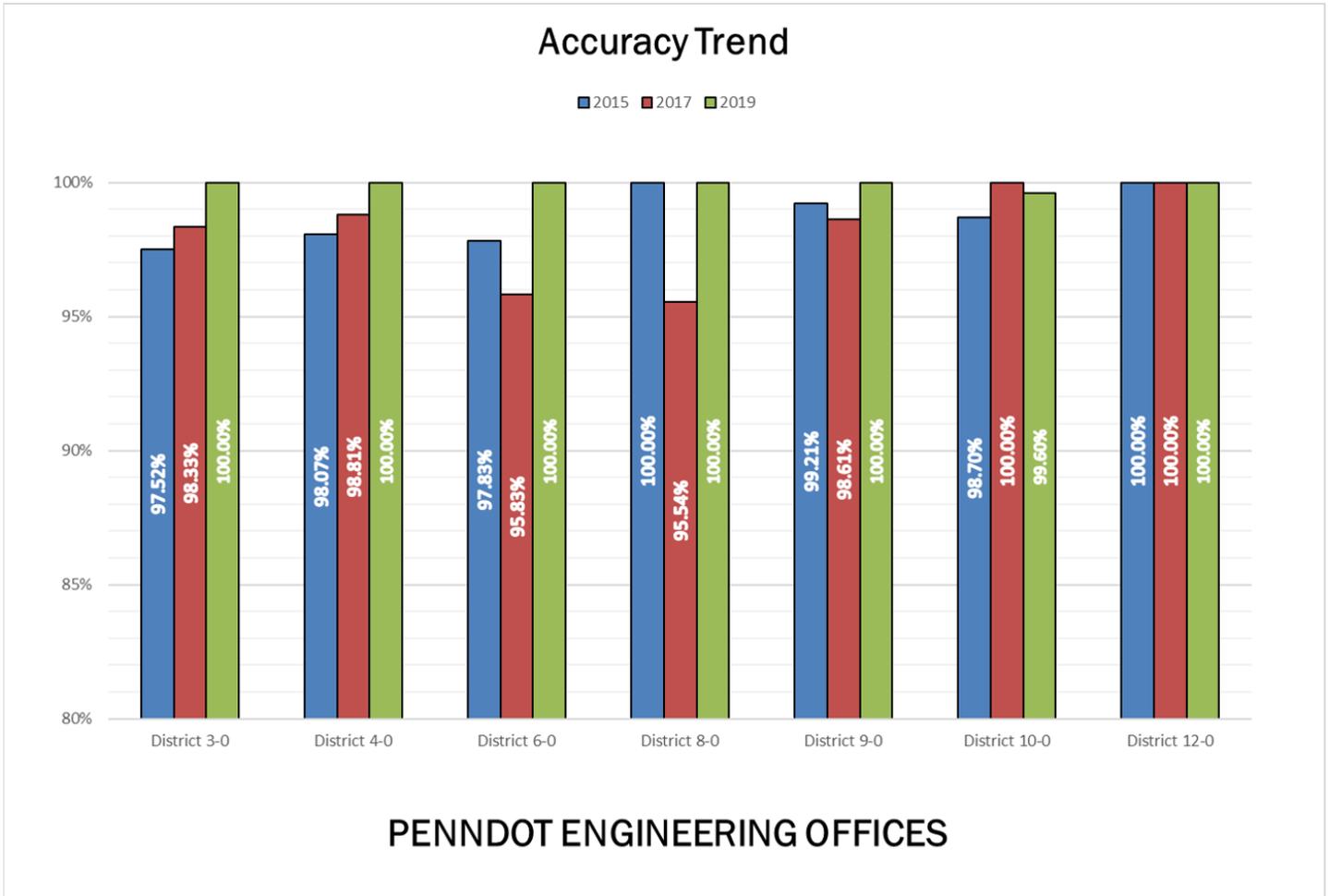
AGENCY SUMMARY

The following chart shows the accuracy trend for each Metropolitan Planning Organization (MPO) over the past three reviews.



PENNDOT DISTRICT OFFICE SUMMARY

The following chart shows the accuracy trend for each PennDOT District Office over the past three reviews.

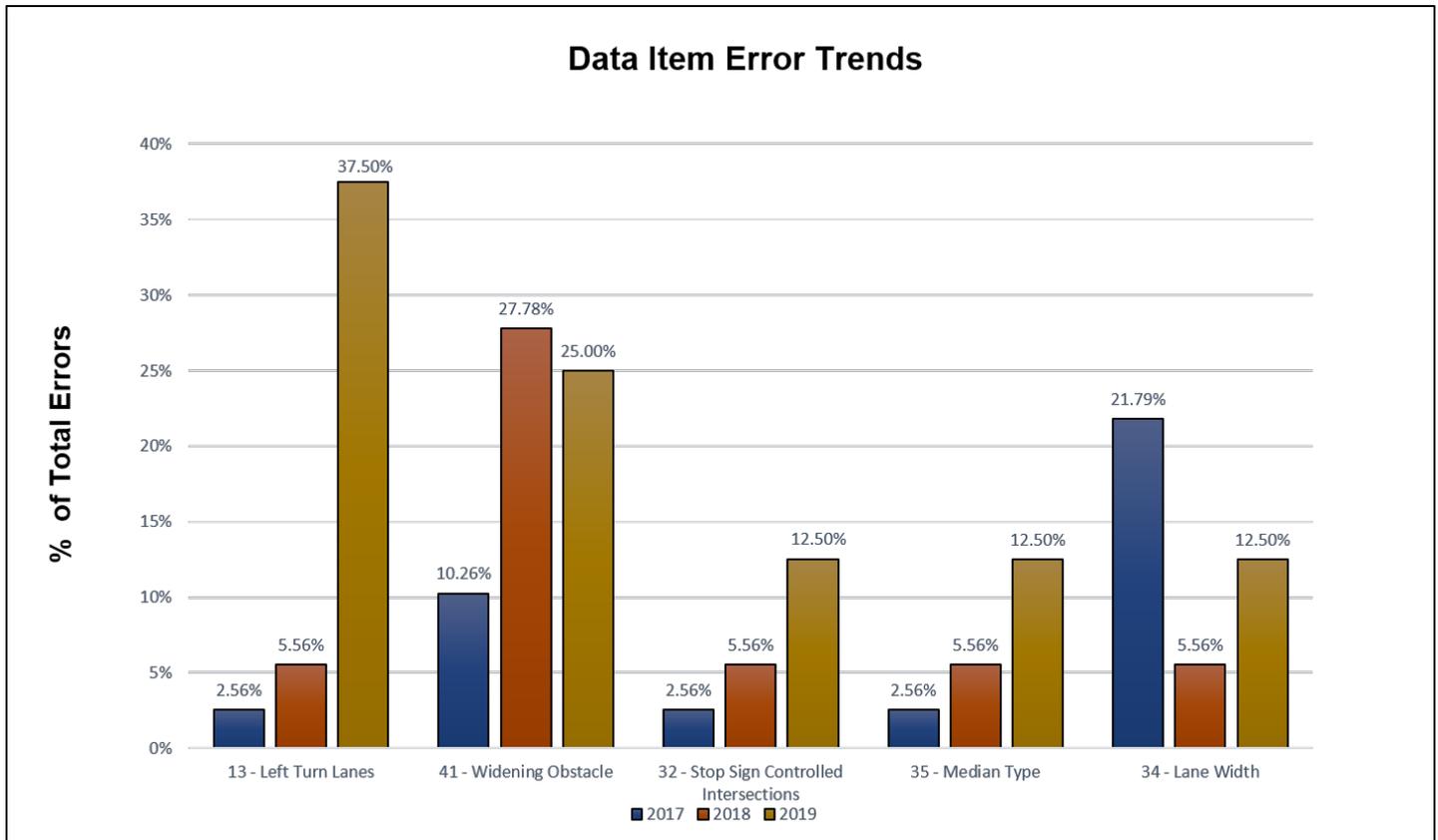


DATA ITEM ERROR SUMMARY

The following chart shows the five highest reported errors in 2019. Of the data items reviewed, Left Turn Lanes with a reported error rate of 37.50%, Widening Obstacle with a reported error rate of 25.00%, Stop Sign Controlled Intersections and Lane Width both with a reported error rate of 12.50% were most often reported in error.

Variations in Lane Width measurements are often caused by the repositioning of the outer paint line or striping and differing interpretations of the break between the travel lane and the shoulder. Left Turn Lane errors are caused by the signage and striping issues. The cause of errors for the Stop Sign Controlled Intersections could be attributed to changing segment lengths over the years. The Widening Obstacle items are very subjective and subject to differing interpretations.

The BPR provided a web link to the FHWA's HPMS Field Manual (December 2016) to all PennDOT District Offices and MPOs to assist them with collecting HPMS data. The PennDOT HPMS Data Collection Guide's latest update was in September 2017 and a web link is available. Both the FHWA HPMS Field Manual and the PennDOT HPMS Data Collection Guide include photos and graphic representations of the various situations encountered in the field and explain the data items in detail.



CONCLUSIONS & RECOMMENDATIONS

HPMS Field Program

Through the review of the field findings, the following conclusions and recommendations can be made:

Berks County Planning Agency: The quality of the data is outstanding. Keep up the great work.

Blair County Planning Commission: The quality of the data is outstanding. Keep up the great work.

Cambria County Planning Commission: The quality of the data is outstanding. Keep up the great work.

Delaware Valley Regional Planning Commission: The quality of the data is outstanding. Keep up the great work.

Luzerne County Planning Commission: The quality of the data is outstanding. Keep up the great work.

Lycoming County Planning Commission: A 100% accuracy rate is outstanding. Keep up the great work.

PennDOT District Office 3-0: A 100% accuracy rate is outstanding. Keep up the great work.

PennDOT District Office 4-0: A 100% accuracy rate is outstanding. Keep up the great work.

PennDOT District Office 6-0: A 100% accuracy rate is outstanding. Keep up the great work.

PennDOT District Office 8-0: A 100% accuracy rate is outstanding. Keep up the great work.

PennDOT District Office 9-0: A 100% accuracy rate is outstanding. Keep up the great work.

PennDOT District Office 10-0: The quality of the data is outstanding. Keep up the great work.

PennDOT District Office 12-0: A 100% accuracy rate is outstanding. Keep up the great work.

It should be noted that each quality review is held with the appropriate agency's HPMS staff present, therefore each quality review also serves as onsite training for our HPMS partners. Since the PennDOT District Offices are responsible for RMS data, the appropriate PennDOT District Office RMS coordinator is invited to each MPO quality review. Data reporting inadequacies are addressed immediately as conditions are found during the field view. Additional training is provided by the Bureau of Planning and Research on request.

PROPOSED 2020 ACTION ITEMS

HPMS Training: An annual statewide HPMS workshop was held in September 2019. These types of meetings and workshops are an effective way to provide attendees with new information and discuss HPMS data coding problems.

2020 Action Item: *The statewide HPMS workshop will be held on July 28th & 29th 2020. The focus of this conference will be the data items that are consistently troublesome during the quality reviews. Any changes and updates from FHWA pertaining to HPMS data items will also be discussed. The workshop has been moved from September to July to provide more time to complete the samples since it's been determined many use the workshop as a refresher before going into the field.*

Quality Reviews: The HPMS Quality Review serves as a measuring tool for assessing the quality of the HPMS data submitted to the FHWA and reported in the Department's highway statistics report. It is used to ensure continuity and consistency of the field observations regardless of who is doing the review, the location of the review and the time of the review. The HPMS Quality Assurance field reviews include the participation of our data providers.

2020 Action Item: *Fifteen Quality Reviews will be conducted in 2020. Each review will be conducted by the Transportation Planning Division's HPMS staff and the appropriate PennDOT District Office and/or MPO representative. The following Agencies and PennDOT District Offices will be scheduled for a review in 2020.*

Adams County Planning Commission
Centre County Planning Agency
Erie County Department of Planning
Lackawanna County Department of Planning and Economic Development
Lancaster County Planning Commission
Lebanon County Planning Department
Lehigh Valley Planning Commission
Mercer County Regional Planning Commission
Southwestern Pennsylvania Commission
Tri-County Regional Planning Commission
York County Planning Commission
PennDOT District Office 1-0
PennDOT District Office 2-0
PennDOT District Office 5-0
PennDOT District Office 11-0

Use of PennDOT SharePoint website: In 2019 the HPMS yearly sample packets were posted to the PennDOT SharePoint website for distribution to the MPO's and PennDOT District Offices. This enabled the Department to provide the packets faster and eliminate postage and printing costs.

2020 Action Item: *Continue the use of SharePoint for the distribution of HPMS yearly sample packets. The MPO's and PennDOT District Offices will be notified via email when the 2020*

packets are completed and posted on SharePoint. Also, posted on SharePoint are technical manuals and information pertinent to data collection and coding.



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