

VII. NATIONAL DOT SURVEY FINDINGS AND RESULTS

Purpose of Survey

The Iowa Department of Transportation (DOT) is developing engineering guidelines and implementation plans to make use of modern and real-time e-Construction compaction reporting. The solution would incorporate in situ modulus measurements taken during construction into the inspection process and would allow field verification of pavement design values. As part of the Iowa DOT implementation planning process, it was important to collect input from other agencies. A survey tool with questions related to current practice for pavement foundation inspection and interest/activity related to in situ modulus measurement was developed. The survey was also used to determine if other state DOTs had interest in learning more about our study and implementation plans. By identifying interested agencies, the Iowa DOT believes it will be able to build future partnerships to effectively implement the e-Construction technology.

The survey was sent from the Iowa DOT to all 50 state DOT's, the DC DOT, the Puerto Rico DOT, and various positions within AASHTO, TRB, and FHWA.

Method of Survey

The survey, titled "Increasing Pavement Performance through Pavement Foundation Design Modulus Verification and Construction Quality Monitoring" was created using a third-party web application (San Mateo, California, USA, www.surveymonkey.com). A web link was created on October 20, 2020 and distributed via email from the Iowa DOT to the agencies. Responses were collected beginning October 21, 2020 and ending December 4, 2020. Figure 1 shows the 31 state transportation agencies which responded, with North Dakota DOT submitting two responses for a total of 32.

- I am not confident answering this question.
3. Do you think your current construction requirements are adequate to field control the construction quality of your pavement foundation subgrade and aggregate base layers (e.g., fix bad areas)?
- Strongly agree
 - Somewhat agree
 - Somewhat disagree
 - Strongly disagree
 - I am not confident answering this question.
4. Do you have an acceptance requirement based upon the engineering parameters that the pavement design is based upon (e.g., modulus)?
- Yes
 - No
5. What quality acceptance parameters do you require and measure for pavement foundations? (select all that apply)
- Density (relative compaction/density)
 - Moisture content
 - Resilient modulus
 - Light weight deflectometer (LWD) modulus
 - Dynamic cone penetration (DCP) index
 - California Bearing Ratio (CBR)
 - Proof rolling/rutting
 - Observation (e.g., pumping)
 - Falling weight deflectometer (FWD) calculated modulus
 - Modulus of subgrade reaction (k-value)
 - Plate load testing (PLT)
 - [other]
6. Does your construction specification and contract require the correction of problematic areas other than compaction (e.g., stabilization, over excavation and replacement)?
- Yes
 - No
7. Are you interested in more efficient and effective alternatives to acceptance of embankment and pavement foundation layer construction?
- Very Interested

- Somewhat Interested
- Not Interested

8. Do you think it is important to field verify the in-situ engineering properties used in pavement design of the various foundation layers (e.g., modulus)?

- Very Important
- Somewhat Important
- Not Important

9. Are you interested in knowing in real-time during construction if the field outcomes are meeting the design and specification requirements?

- Very Interested
- Somewhat Interested
- Not Interested

10. Would it be helpful to have data reports that both the contractor and agency can use to support field process control during foundation layer construction?

- Very Helpful
- Somewhat Helpful
- Not Helpful

11. Are you interested in using technologies that will allow for greater efficiency and safety by giving the inspection team the ability to virtually monitor or “inspect” the contractor’s results without needing to be physically present on the jobsite?

- Very Interested
- Somewhat Interested
- Not Interested
- Not Confident Answering This Question

12. Would you be interested in learning more about Iowa DOT’s implementation efforts to bring improved engineering solutions to build and test pavement foundation layers?

- Very Interested
- Somewhat Interested
- Not Interested

Summary of Key Findings

Results of the survey are shown and provided in the attached appendices. Appendix VII-A presents the graphical summary results and comments collected for each question. Appendix VII-B details the results and comments by individual respondent. The contact information was removed from this report.

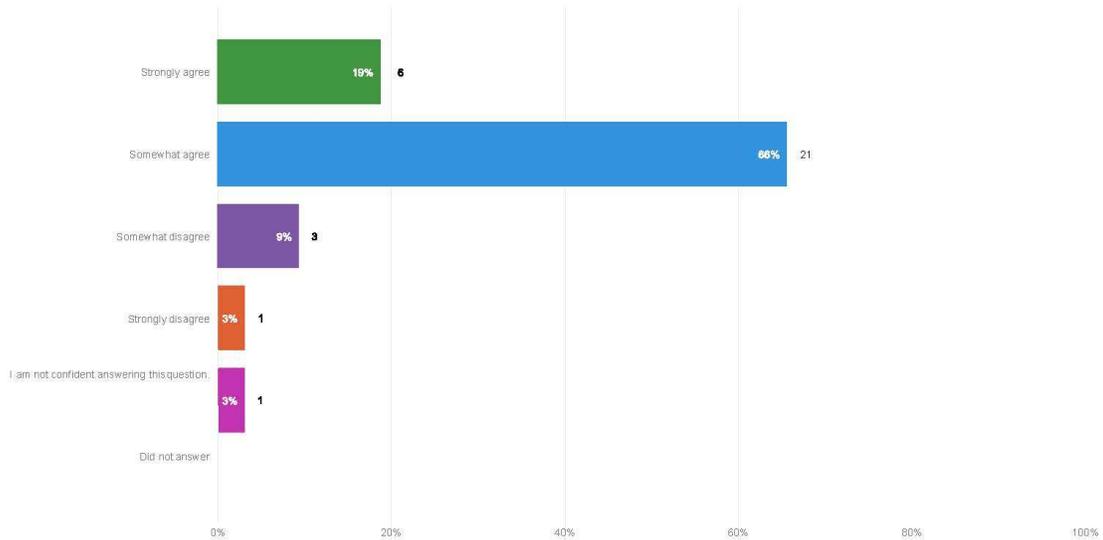
In review of the survey results, it is evident that pavements in most states are meeting design life expectations (Question 1), however two-thirds of respondents agree that pavements are being compromised because of foundation related issues (Question 2). It is assumed that construction requirements are generally adequate to field control the quality of subgrade and base layers (Question 3), and approximately three-fourths of states' construction specifications require the correction of problematic areas using a method other than compaction (Question 6). States have no direct acceptance requirements based upon pavement design engineering parameters (Question 4). Respondents were asked what specific quality acceptance parameters are required and measured for pavement foundations (Question 5). Zero states are measuring modulus of subgrade reaction or resilient modulus, however almost all respondents think it is important to field verify modulus values being used in pavement design (Question 8).

Four questions were presented to respondents to determine their interest in the Iowa DOT's future implementation planning efforts. When asked about their interest in more efficient and effective alternatives to acceptance of embankment and pavement foundation layer construction, all respondents indicated they were very or somewhat interested (Question 7). Additionally, almost all respondents would be interested in knowing in real-time if field outcomes are meeting design requirements and would find data reports useful in supporting field process control during pavement foundation construction (Questions 9 and 10). Most states would be hesitant to adopt technologies to exclusively monitor or inspect the contractor's results virtually (Question 11). When asked if they would be interested in learning more about the DOT's implementation efforts to bring improved engineering solutions to build and test pavement foundation layers, all respondents indicated interest (Question 12).

In brief, there is agreement that pavement foundation issues contribute to compromised pavements, it would be helpful to field verify modulus values used in pavement design although the respondents are not currently measuring these values, and there is interest in the Iowa DOT's future implementation efforts. This survey generated significant response with allowing comments.

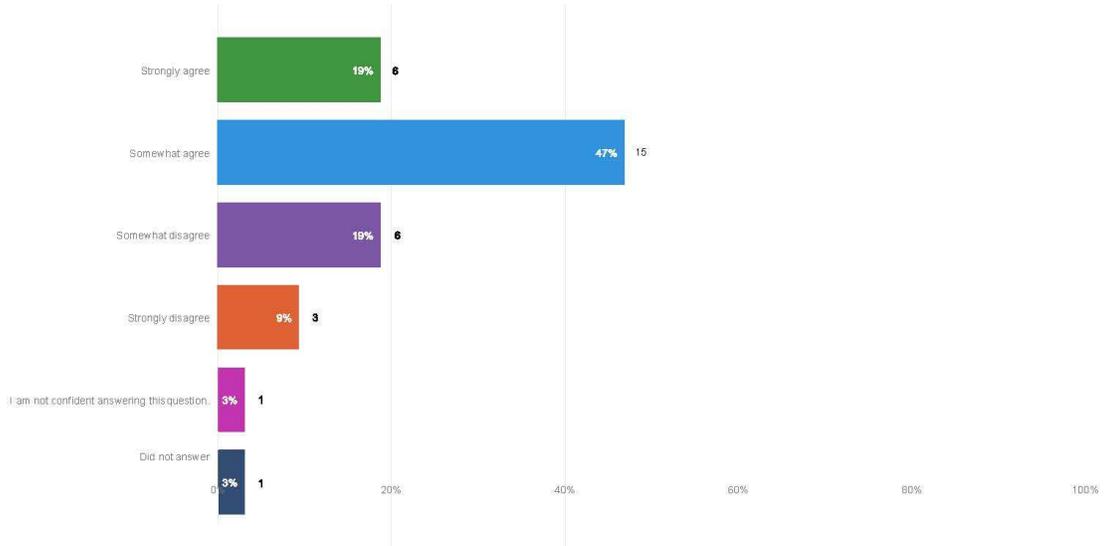
APPENDIX VII-A. Graphical summary results and comments by Question

1. Do your current pavement design and construction requirements consistently result in pavements that meet the design life expectations?



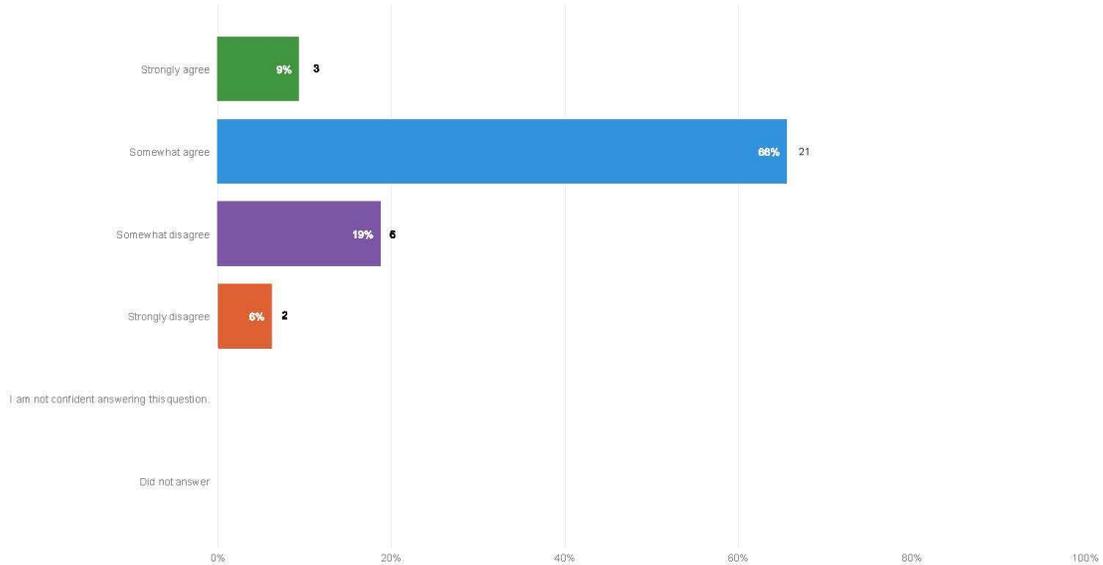
#	Q1 COMMENTS
1	Our main problems that lead to reduced pavement life are poor joint construction, too low of asphalt content in the mix, and use of lesser quality subgrade options.
2	Since calibration was conducted for our ME Design program, I feel the mixes (HMA and PCCP) have both changed as Contractor's have refined their design methods. The HMA mixes are generally drier (less AC), and the Concrete designs don't reach the same flexural strengths as those we calibrated with. We have not completed a comprehensive study to verify this.
3	For full depth pavements the designs seem to be very good. For overlay designs the conversation becomes more complicated as the variability of the existing pavement impacts the predicted design life. Especially in our older PCC pavements that have already had HMA overlays.
4	In the past decade we have begun to observe that pavements in one of our regions are not performing as designed.
5	I would strongly agree for our flexible pavement designs. Concrete and UBCO designs have experienced much more variability. This does not appear to be related to subgrade failures though.
6	Our Interstates have lasted over 50 plus years without any major rehab or reconstruction- Mill and Overlays are done every 15/20 years' Other highways last 25 plus years with preservation treatments 9 Crack sealing , Asphalt rubber Chip sealing. thin overlays (1.5 in)
7	However, of course there are some anomalies in a very small number of construction projects.

2. Have you seen evidence of the performance of your pavements being compromised because of foundation related issues? Performance could be ride related and/or structural failures.



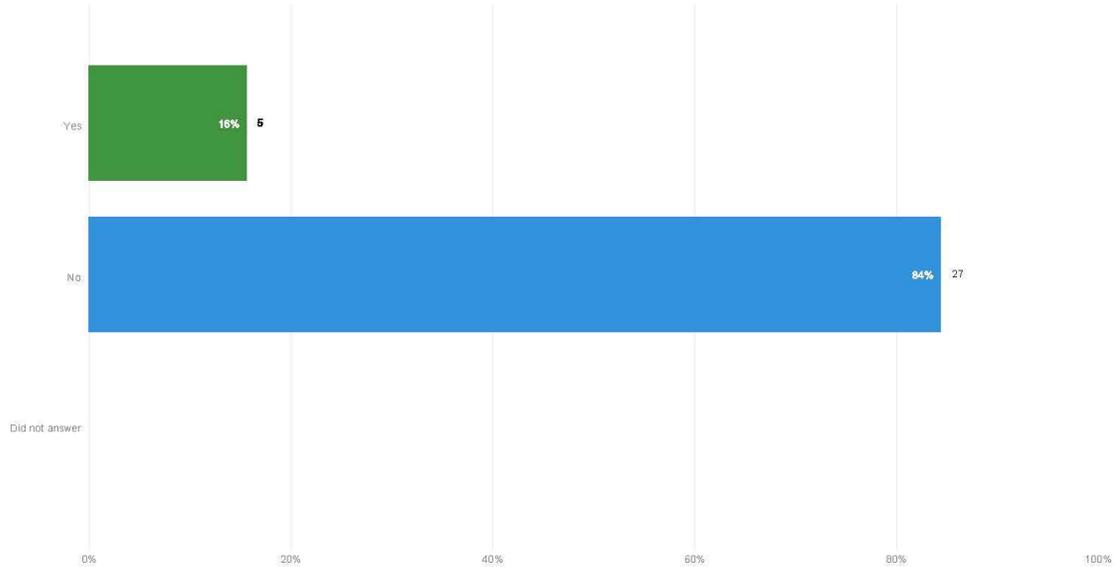
#	Q2 COMMENTS
1	we see some foundation related issues but it is only in areas where we have poor subgrade
2	We are currently promoting use of more subgrade stabilization, but several areas are using less durable materials to stabilize.
3	We have not conducted many new construction projects using our ME Design program, thus, data is limited.
4	Maine has soft, compressible marine soils that are very susceptible to thaw weakening (structural failure). We also have very frost susceptible soils in most of the State that produce significant frost heaves (ride quality issues).
5	There are a couple of occasions that we have has foundation issues that impacted ride, but this is by far the exception.
6	Yes. High plasticity index, organic content and sulfates are problematic if not handled correctly. Weak soils (low modulus) that are not stabilized/handled correctly produce base layers with low stiffness and ultimately short performance life.
7	We are still gathering information on this.
8	We have experienced very few structural failures and they tend to be isolated.
9	At some locations we've had subgrade issues which created surfacing failure.
10	This is limited but we have has some issues.
11	Rural roads can have spot failures due to drainage issues at the location. (lack of adequate drainage or shallow groundwater

3. Do you think your current construction requirements are adequate to field control the construction quality of your pavement foundation subgrade and aggregate base layers (e.g., fix bad areas)?



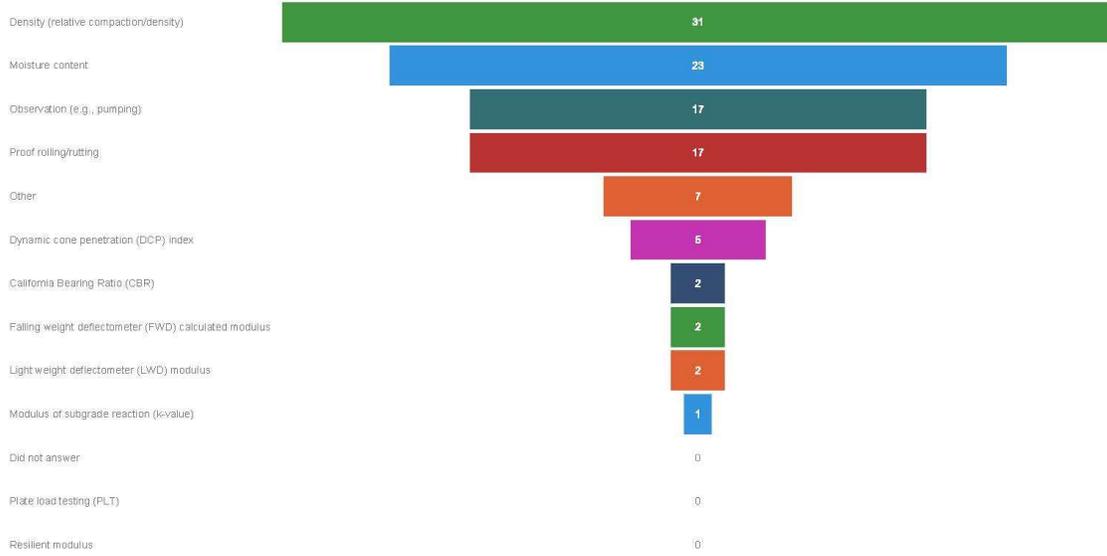
#	Q3 COMMENTS
1	Fixing subgrade issues on a paving project in Vermont is isolated to pavement reclamation projects or full depth reconstruction projects.
2	We have to rely heavily on the inspectors to identify which leads to variable results
3	The requirements are good, but the lack of personnel onsite is the limiting factor.
4	We struggle to have this addressed adequately on projects during construction. Various methods are used, we usually try to stabilize by remove/replacement of the weak soils with geogrid/granular materials, but sometimes Contractors are able to talk Projects into an allowance of a "deep strength fix". Simply put, they put a thicker section of HMA or PCCP in the soft area in an attempt to "bridge" the soft spots.
5	Cost to fix is a major controlling factor unless it is a safety issue.
6	Based on performance results, we tend to have a positive outcome. However our control of soils is predominantly limited to moisture and density control. Our base/granular layers are prescriptive for placement procedures.
7	The current bid build specs have a density requirement. Density does not ensure good soil stiffness. Design build specs have a DCP requirement to confirm soil modulus on flexible pavement jobs. However this is not enforced on rigid since rigid pavements are designed based on a "k" value
8	our requirements are generally adequate, but there is always room for improvement
9	not sure what you mean by fix bad areas?? Which should be done on a location basis for rehabs /reconstructions. For new roads our QA protocols for materials and workmanship are adequately enforced (i.e. taken seriously by the Agency and Contracto0r.
10	Consistency is the issue now and most of the times due to unavailability of NDT equipment that can catch the mistakes early prior to acceptance. For example: gradation of the permeable base, compaction of very course granular base, etc.

4. Do you have an acceptance requirement based upon the engineering parameters that the pavement design is based upon (e.g., modulus)?



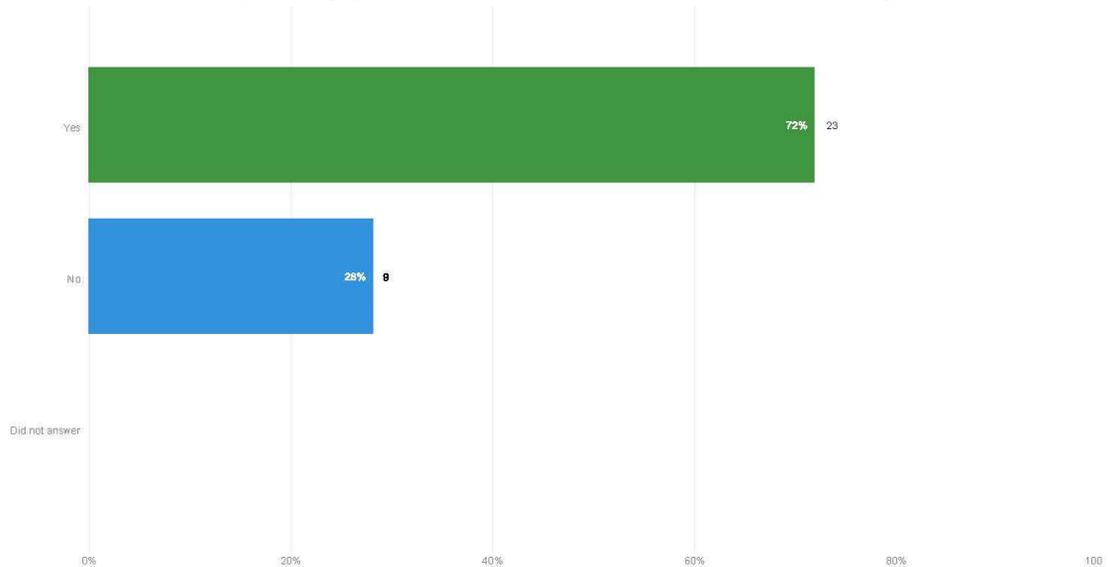
#	Q4 COMMENTS
1	Design is based on modulus. We continue to test for gradation and R-value for acceptance.
2	Used density for unbounded materials, unconfined strength for bounded materials, in some cases indirect tensile strength (ITS)
3	Only for flexible pavements on design build projects. We are currently requiring informational FWD on top of the base before the HMA or CRCP is placed in DB projects. We are establishing target deflections W1/W2 to assess if it is feasible to require FWD to measure foundation quality/uniformity. We are conducting in house research using both FWD and DCP testing as well on different pavement foundations.
4	Aggregate bases are accepted by nuclear density
5	determining pavement design engineering parameters in the field is difficult if not performed directly in the field (DCP, Vane shear devices etc may be OK. However MODUUS Gauges have their own issues with moisture content and aggregate content of the soil. Taking samples back to a lab for modulus testing would be contentious as there are numerous moving parts to this endeavor.
6	We did in several projects only for experimental basis, but not in the standard specification yet.

5. What quality acceptance parameters do you require and measure for pavement foundations?
(select all that apply)



#	Q5 ADDITIONAL PARAMETERS (PLEASE LIST BELOW AND SEPARATE BY A COMMA)
1	gradation
2	Resistance R-value using the Hveem stabilometer.
3	unconfined compressive strength, Indirect tensile strength
4	DCP only for DB jobs. DB jobs also allow intelligent compaction for flexible pavements.
5	Depth checks of chemically stabilized subgrade
6	Proof rolling is performed on aggregate layers and light wt fills behind structures and MSE walls.
7	Sand Equivalent (AASHTO T176)

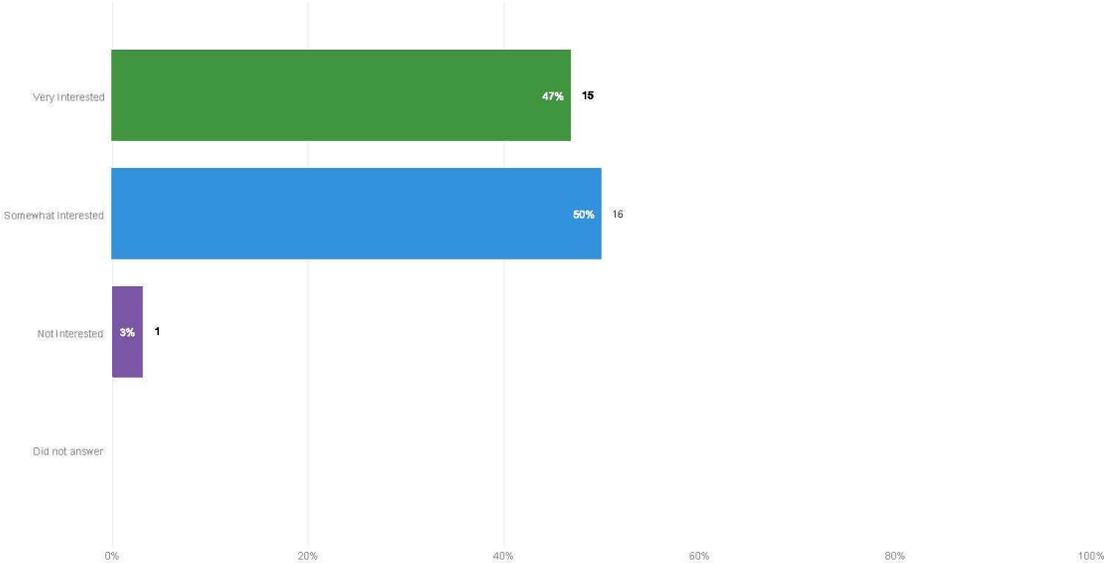
6. Does your construction specification and contract require the correction of problematic areas other than compaction (e.g., stabilization, over excavation and replacement)?



#	Q6 IF YOU ANSWERED YES, PLEASE EXPLAIN
1	Treatments are as directed by the owner engineer.
2	Subgrade corrective action is determined on a project by project basis. Strategy (chemical stab., over excavation, Geosynthetics) and quantities are determined by Regional Soils Engineers for design contract documents. Regional Soils Engineers or Technicians perform project inspection and recommend corrective treatments during Construction from the quantities in the contract documents.
3	Unsuitable material must be removed when directed. Embankments that lose stability due to haul vehicles must be repaired.
4	Yes, only on pavement reclaim projects in Vermont. Unsuitable subbase material gets removed and replaced with conventional materials.
5	Yes, over excavation is typical and contact of the soils and foundations unit who typically recommend geotextile, crushed stone and processed aggregate layers to stabilize.
6	surfaces shown to yield under proof rolling will not be tested for compaction until they are shown to be solid. Remedy varies based on situation.
7	If unstable subgrade is encountered, the contractor has the options of remove/replace the material, stabilize the material with subgrade stabilization additives, or use base reinforcement geogrids.
8	We proof roll our subgrades. Soft spots or pumping areas have to be repaired.
9	The MaineDOT Standard Specifications has guidelines on what the options are for correcting certain subgrade conditions during excavation for the pavement construction. Stabilization with geotextiles and over excavate/replace are the most commonly used methods.
10	The specifications do not directly deal with problem areas. We have guidance in our construction manual and problem areas are generally addressed by extra work orders.
11	Currently not standard, but moving towards having an contingency item for soft spot repair when needed. We have done this by special provision a lot

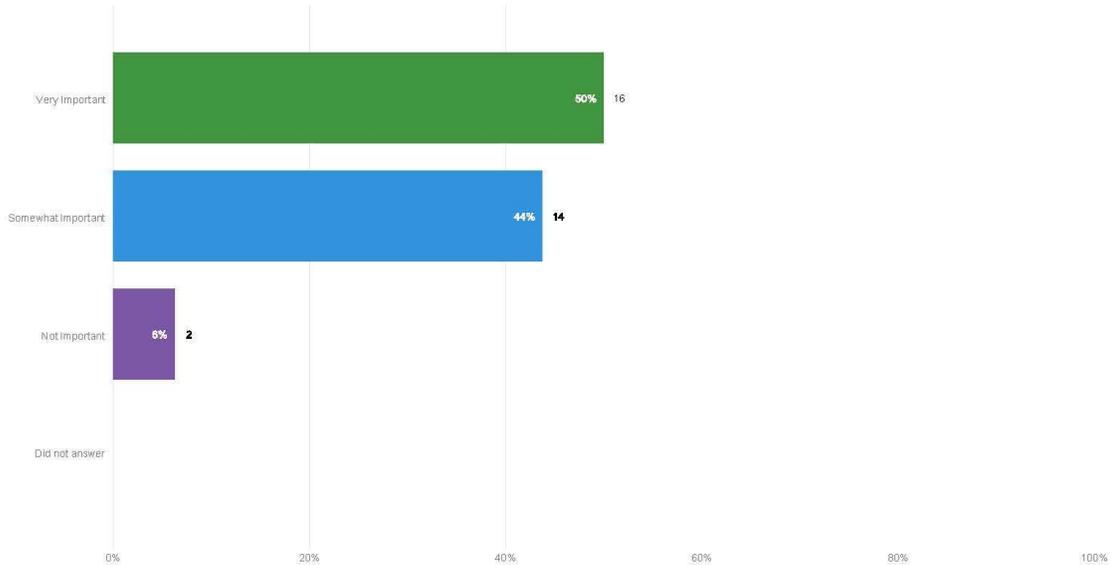
#	Q6 IF YOU ANSWERED YES, PLEASE EXPLAIN-CONTINUED	
12	Replace bounded base materials, i.e. LCB, asphalt bounded base	
13	<p>ODOT uses global chemical stabilization on virtually all of our new or reconstruction projects. High sulfate content soils or very granular soils are the main exceptions and they are rare. Undercuts or replacement are required for areas failing proof rolling for all projects.</p>	
14	<p>we attempt to identify problematic areas during the design process and specify those areas in contract. when an area is not identified, construction personnel with discuss with appropriate designers and a charge order will usually be executed.</p>	
15	peat or weak problematic soils (organic silts) are removed and replaced	
16	<p>Overexcavate area, compact, place subgrade separation geotextile or biaxial geogrid, followed by granular subbase and then remaining structural pavement section.</p>	
17	<p>The contractors either have to achieve what in the spec or remove and replace. In some cases the contractors can propose solution such as stabilization</p>	

7. Are you interested in more efficient and effective alternatives to acceptance of embankment and pavement foundation layer construction?



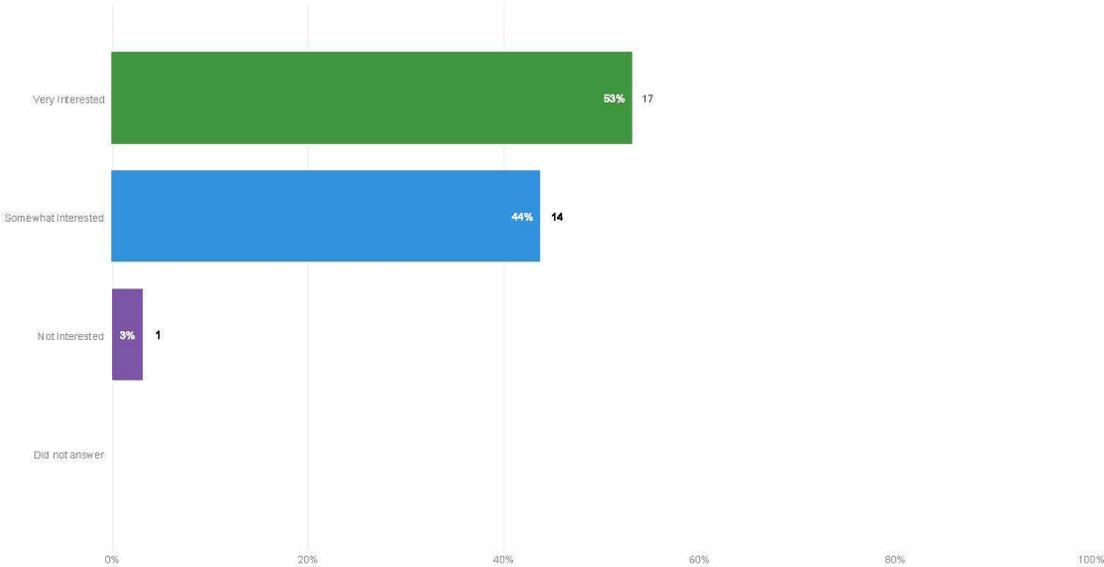
#	Q7 COMMENTS
1	We are looking to move our base specification requirements to align with design parameters.
2	I am interested. Especially for rigid pavements where the design is based on K
3	While I believe our current methodology has been successful, we are always interested in value added improvements.

8. Do you think it is important to field verify the in situ engineering properties used in pavement design of the various foundation layers (e.g. modulus)?



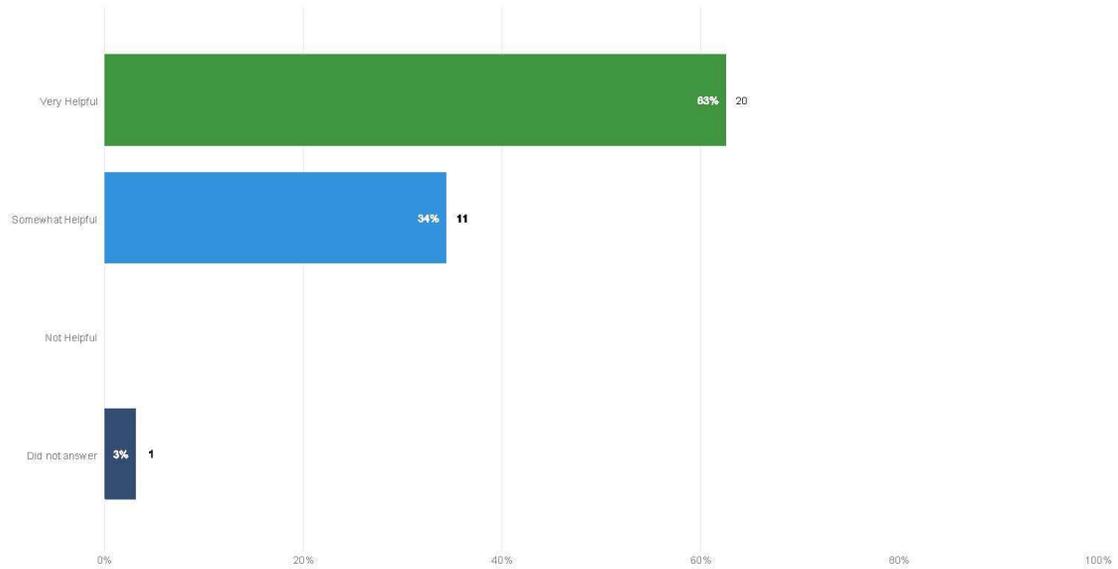
#	Q8 COMMENTS
1	However, at this time it is impossible to check unless the project is very short. It would just be spot checking during construction, so what happens in between is unknown. It could be verified post construction with an FWD analysis, but it is unlikely MaineDOT would correct any subgrades at that time.
2	We have evidence that weak soil produce higher FWD deflections and weaker back-calculated modulus of base layers
3	I think it would be beneficial to move toward this type of approach, however there are obstacles to overcome.
4	I say that because determining modulus in the a) lab is cumbersome and needs a dedicated attention to following SAMPLING and TESTING procedures.. In the field the in situ methods are subject to variability in gradation, moisture temp and ambient conditions, underlying layers etc.

9. Are you interested in knowing in real-time during construction if the field outcomes are meeting the design and specification requirements?



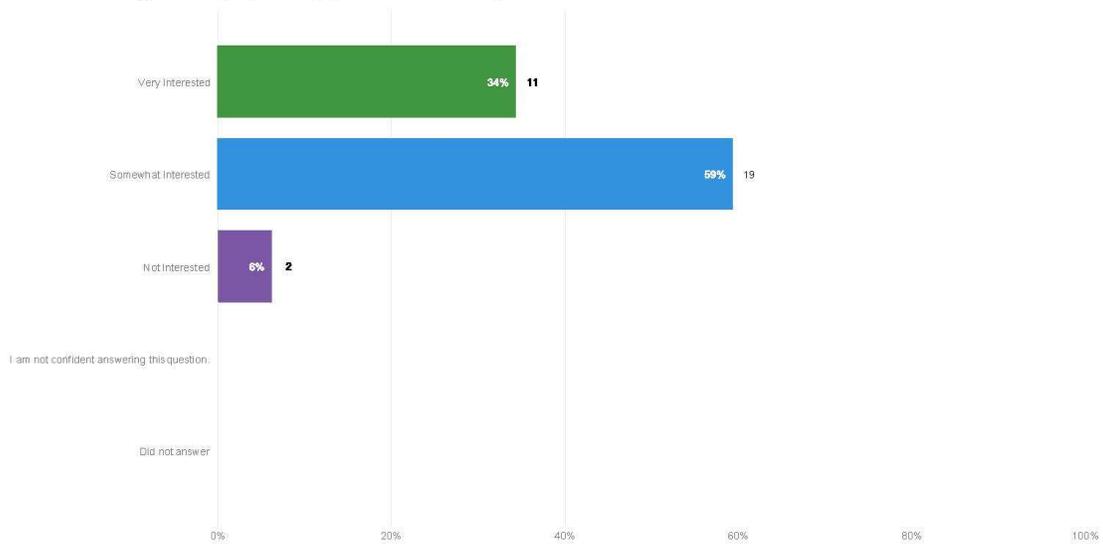
#	Q9 COMMENTS
1	We have experimented with intelligent compaction on several projects with no real benefit noted.
2	This information will increase confidence and more realistic analyses of pavement performance.
3	Technology requirements to implement this with multiple Contractor's and small state agency is problematic.
4	We tried a few projects with intelligent compactions in the past projects.

10. Would it be helpful to have data reports that both the contractor and agency can use to support field process control during foundation layer construction?



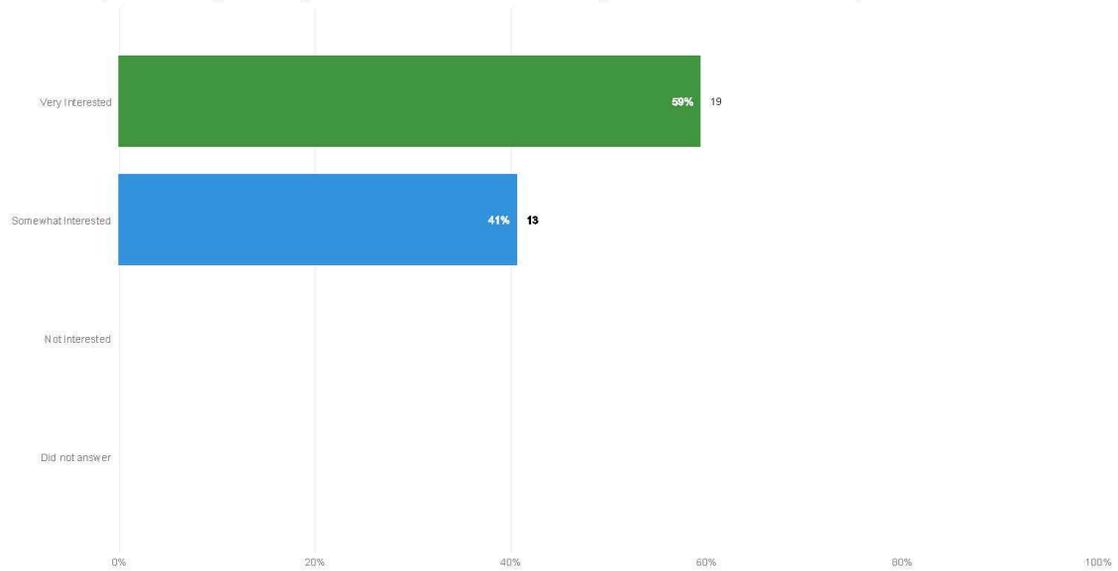
#	Q10 COMMENTS
1	All this hinges on what data, cost, timeliness, manpower required etc.
2	not clear what you mean by this???

11. Are you interested in using technologies that will allow for greater efficiency and safety by giving the inspection team the ability to virtually monitor or “inspect” the contractor’s results without needing to be physically present on the jobsite?



#	Q11 COMMENTS
1	This question is very leading. Who wouldn't be interested in increased efficiency and safety? What is the tradeoff though? Does not being at the jobsite really accomplish this? What else is lost?
2	W have used cameras during construction to oversee workmanship - End dumping which is a nono, equipment on site (adequacy of equipment

12. Would you be interested in learning more about Iowa DOT's implementation efforts to bring improved engineering solutions to build and test pavement foundation layers?



#	Q12 COMMENTS
1	We already implemented some of the inventions from Iowa DOT because Dr. Peter Becker (a former student of Dr. David White) is my engineering staff.

APPENDIX VII-B. Results and Comments by Individual Respondent

Increasing Pavement Performance Through Pavement Foundation Design Modulus-Verification and Construction Quality Monitoring

#1

COMPLETE

Collector: Web Link 1 (Web Link)
 Started: Wednesday, October 21, 2020 1:28:50PM
 Last Modified: Wednesday, October 21, 2020 1:44:00PM
 Time Spent: 00:15:10

Page 1

Q1	Do your current pavement design and construction requirements consistently result in pavements that meet the design life expectations?	Strongly agree, Comments: However, of course there are some anomalies in a very small number of construction projects.
Q2	Have you seen evidence of the performance of your pavements being compromised because of foundation related issues? Performance could be ride related and/or structural failures.	Strongly agree
Q3	Do you think your current construction requirements are adequate to field control the construction quality of your pavement foundation subgrade and aggregate base layers (e.g., fix bad areas)?	Somewhat agree, Comments: Consistency is the issue now and most of the times due to unavailability of NDT equipment that can catch the mistakes early prior to acceptance. For example: gradation of the permeable base, compaction of very coarse granular base, etc.
Q4	Do you have an acceptance requirement based upon the engineering parameters that the pavement design is based upon (e.g., modulus)?	Yes, Comments: We did in several projects only for experimental basis, but not in the standard specification yet.
Q5	What quality acceptance parameters do you require and measure for pavement foundations?(select all that apply)	Density (relative compaction/density), Moisture content, Light weight deflectometer (LWD) modulus, Dynamic cone penetration (DCP) index

B-1

Increasing Pavement Performance Through Pavement Foundation Design Modulus-Verification and Construction Quality Monitoring

Q6

Does your construction specification and contract require the correction of problematic areas other than compaction (e.g., stabilization, over excavation and replacement)?

Yes,
If you answered yes, please explain:
The contractors either have to achieve what in the spec or remove and replace. In some cases the contractors can propose solution such as stabilization

Q7

Are you interested in more efficient and effective alternatives to acceptance of embankment and pavement foundation layer construction?

Very interested

Q8

Do you think it is important to field verify the in situ engineering properties used in pavement design of the various foundation layers (e.g. modulus)?

Very important

Q9

Are you interested in knowing in real-time during construction if the field outcomes are meeting the design and specification requirements?

Very interested,
Comments:
We tried a few projects with intelligent compaction in the past projects.

Q10

Would it be helpful to have data reports that both the contractor and agency can use to support field process control during foundation layer construction?

Very helpful

Q11

Are you interested in using technologies that will allow for greater efficiency and safety by giving the inspection team the ability to virtually monitor or "inspect" the contractor's results without needing to be physically present on the jobsite?

Very interested

Q12

Would you be interested in learning more about Iowa DOT's implementation efforts to bring improved engineering solutions to build and test pavement foundation layers?

Very interested,
Comments:
We already implemented some of the inventions from Iowa DOT because Dr. Peter Becker (a former student of Dr. David White) is my engineering staff.

B-2

Increasing Pavement Performance Through Pavement Foundation Design Modulus-Verification and Construction Quality Monitoring

#2

COMPLETE

Collector: Web Link 1 (Web Link)
 Started: Wednesday, October 21, 2020 5:45:04PM
 Last Modified: Wednesday, October 21, 2020 6:20:53PM
 Time Spent: 00:35:49

Page 1

Q1	Do your current pavement design and construction requirements consistently result in pavements that meet the design life expectations?	Somewhat agree
Q2	Have you seen evidence of the performance of your pavements being compromised because of foundation related issues? Performance could be ride related and/or structural failures.	Strongly disagree
Q3	Do you think your current construction requirements are adequate to field control the construction quality of your pavement foundation subgrade and aggregate base layers (e.g., fix bad areas)?	Somewhat agree
Q4	Do you have an acceptance requirement based upon the engineering parameters that the pavement design is based upon (e.g., modulus)?	No
Q5	What quality acceptance parameters do you require and measure for pavement foundations?(select all that apply)	Density (relative compaction/density)
Q6	Does your construction specification and contract require the correction of problematic areas other than compaction (e.g., stabilization, over excavation and replacement)?	No

B-3

Increasing Pavement Performance Through Pavement Foundation Design Modulus-Verification and Construction Quality Monitoring

Q7

Are you interested in more efficient and effective alternatives to acceptance of embankment and pavement foundation layer construction?

Very interested

Q8

Do you think it is important to field verify the in situ engineering properties used in pavement design of the various foundation layers (e.g. modulus)?

Very important

Q9

Are you interested in knowing in real-time during construction if the field outcomes are meeting the design and specification requirements?

Very interested

Q10

Would it be helpful to have data reports that both the contractor and agency can use to support field process control during foundation layer construction?

Very helpful

Q11

Are you interested in using technologies that will allow for greater efficiency and safety by giving the inspection team the ability to virtually monitor or "inspect" the contractor's results without needing to be physically present on the jobsite?

Somewhat interested

Q12

Would you be interested in learning more about Iowa DOT's implementation efforts to bring improved engineering solutions to build and test pavement foundation layers?

Very interested

B-4

#3

COMPLETE

Collector: Web Link 1 (Web Link)
 Started: Thursday, October 22, 2020 7:53:45 AM
 Last Modified: Thursday, October 22, 2020 8:04:58 AM
 Time Spent: 00:11:10

Page 1

Q1	Somewhat agree
Do your current pavement design and construction requirements consistently result in pavements that meet the design life expectations?	
Q2	Somewhat agree
Have you seen evidence of the performance of your pavements being compromised because of foundation related issues? Performance could be ride related and/or structural failures.	
Q3	Somewhat agree
Do you think your current construction requirements are adequate to field control the construction quality of your pavement foundation subgrade and aggregate base layers (e.g., fix bad areas)?	
Q4	No
Do you have an acceptance requirement based upon the engineering parameters that the pavement design is based upon (e.g., modulus)?	
Q5	Density (relative compaction/density),
What quality acceptance parameters do you require and measure for pavement foundations?(select all that apply)	Additional parameters (please list below and separate by a comma): Sand Equivalent (AASHTO T176)
Q6	Yes,
Does your construction specification and contract require the correction of problematic areas other than compaction (e.g., stabilization, over excavation and replacement)?	If you answered yes, please explain: Overexcavate area, compact, place subgrade separation geotextile or biaxial geogrid, followed by granular subbase and then remaining structural pavement section.

B-5

Q7

Somewhat interested

Are you interested in more efficient and effective alternatives to acceptance of embankment and pavement foundation layer construction?

Q8

Very important

Do you think it is important to field verify the in situ engineering properties used in pavement design of the various foundation layers (e.g. modulus)?

Q9

Somewhat interested,

Comments:
Technology requirements to implement this with multiple Contractor's and small state agency is problematic.

Are you interested in knowing in real-time during construction if the field outcomes are meeting the design and specification requirements?

Q10

Very helpful

Would it be helpful to have data reports that both the contractor and agency can use to support field process control during foundation layer construction?

Q11

Somewhat interested

Are you interested in using technologies that will allow for greater efficiency and safety by giving the inspection team the ability to virtually monitor or "inspect" the contractor's results without needing to be physically present on the jobsite?

Q12

Very interested

Would you be interested in learning more about Iowa DOT's implementation efforts to bring improved engineering solutions to build and test pavement foundation layers?

B-6

#4

COMPLETE

Collector: Web Link 1 (Web Link)
 Started: Thursday, October 22, 2020 7:26:21 AM
 Last Modified: Thursday, October 22, 2020 8:06:06 AM
 Time Spent: 00:39:45

Page 1

Q1	Strongly agree,
Do your current pavement design and construction requirements consistently result in pavements that meet the design life expectations?	Comments: Our Interstates have lasted over 50 plus years without any major rehab or reconstruction- Mill and Overlays are done every 15/20 years! Other highways last 25 plus years with preservation treatments: Crack sealing, Asphalt rubber Chip sealing, thin overlays (1.5 in)
Q2	Somewhat agree,
Have you seen evidence of the performance of your pavements being compromised because of foundation related issues? Performance could be ride related and/or structural failures.	Comments: Rural roads can have spot failures due to drainage issues at the location, (lack of adequate drainage or shallow groundwater)
Q3	Somewhat agree,
Do you think your current construction requirements are adequate to field control the construction quality of your pavement foundation subgrade and aggregate base layers (e.g., fix bad areas)?	Comments: not sure what you mean by fix bad areas?? Which should be done on a location basis for rehab/reconstructions. For new roads our QA protocols for materials and workmanship are adequately enforced (i.e. taken seriously by the Agency and Contractor).
Q4	No,
Do you have an acceptance requirement based upon the engineering parameters that the pavement design is based upon (e.g., modulus)?	Comments: determining pavement design engineering parameters in the field is difficult if not performed directly in the field (DCP, Vane shear devices etc may be OK). However MODULUS Gauges have their own issues with moisture content and aggregate content of the soil. Taking samples back to a lab for modulus testing would be contentious as there are numerous moving parts to this endeavor.

B-7

Q5

Density (relative compaction/density),

What quality acceptance parameters do you require and measure for pavement foundations?(select all that apply)

Moisture content,

Proof rolling/rutting,

Observation (e.g., pumping),

Additional parameters (please list below and separate by a comma):
Proof rolling is performed on aggregate layers and light wt fills behind structures and MBE walls.

Q6

Yes,

If you answered yes, please explain:
peat or weak problematic soils (organic silts) are removed and replaced

Does your construction specification and contract require the correction of problematic areas other than compaction (e.g., stabilization, over excavation and replacement)?

Q7

Somewhat interested

Are you interested in more efficient and effective alternatives to acceptance of embankment and pavement foundation layer construction?

Q8

Not important,

Comments:
I say that because determining modulus in the a) lab is cumbersome and needs a dedicated attention to following SAM PLINQ and TESTING procedures. In the field the in situ methods are subject to variability in gradation, moisture temp and ambient conditions, underlying layers etc.

Do you think it is important to field verify the in situ engineering properties used in pavement design of the various foundation layers (e.g. modulus)?

Q9

Somewhat interested

Are you interested in knowing in real-time during construction if the field outcomes are meeting the design and specification requirements?

Q10

Comments:
not clear what you mean by this???

Would it be helpful to have data reports that both the contractor and agency can use to support field process control during foundation layer construction?

B-8

Increasing Pavement Performance Through Pavement Foundation Design Modulus-Verification and Construction Quality Monitoring

Q11	Are you interested in using technologies that will allow for greater efficiency and safety by giving the inspection team the ability to virtually monitor or inspect the contractor's results without needing to be physically present on the jobsite?	Somewhat interested, Comments: We have used cameras during construction to oversee workmanship - End dumping which is a nono, equipment on site (adequacy of equipment
Q12	Would you be interested in learning more about Iowa DOT's implementation efforts to bring improved engineering solutions to build and test pavement foundation layers?	Somewhat interested

B-9

Increasing Pavement Performance Through Pavement Foundation Design Modulus-Verification and Construction Quality Monitoring

#5

COMPLETE

Collector: Web Link 1 (Web Link)
Started: Thursday, October 22, 2020 8:27:16AM
Last Modified: Thursday, October 22, 2020 8:33:25AM
Time Spent: 00:06:08

Page 1

Q1	Do your current pavement design and construction requirements consistently result in pavements that meet the design life expectations?	Strongly agree
Q2	Have you seen evidence of the performance of your pavements being compromised because of foundation related issues? Performance could be ride related and/or structural failures.	Somewhat agree, Comments: This is limited but we have some issues.
Q3	Do you think your current construction requirements are adequate to field control the construction quality of your pavement foundation subgrade and aggregate base layers (e.g., fix bad areas)?	Somewhat agree, Comments: Our requirements are generally adequate, but there is always room for improvement.
Q4	Do you have an acceptance requirement based upon the engineering parameters that the pavement design is based upon (e.g., modulus)?	No
Q5	What quality acceptance parameters do you require and measure for pavement foundations?(select all that apply)	Density (relative compaction/density), Moisture content, Proof rolling/gritting, Observation (e.g., pumping)

B-10

Increasing Pavement Performance Through Pavement Foundation Design Modulus-Verification and Construction Quality Monitoring

Q6	Does your construction specification and contract require the correction of problematic areas other than compaction (e.g., stabilization, over excavation and replacement)?	Yes, If you answered yes, please explain: we attempt to identify problematic areas during the design process and specify those areas in contract. when an area is not identified, construction personnel will discuss with appropriate designers and a change order will usually be executed.
Q7	Are you interested in more efficient and effective alternatives to acceptance of embankment and pavement foundation layer construction?	Very interested
Q8	Do you think it's important to field verify the in situ engineering properties used in pavement design of the various foundation layers (e.g. modulus)?	Somewhat important, Comments: I think it would be beneficial to move toward this type of approach, however there are obstacles to overcome.
Q9	Are you interested in knowing in real-time during construction if the field outcomes are meeting the design and specification requirements?	Very interested
Q10	Would it be helpful to have data reports that both the contractor and agency can use to support field process control during foundation layer construction?	Very helpful
Q11	Are you interested in using technologies that will allow for greater efficiency and safety by giving the inspection team the ability to virtually monitor or inspect the contractor's results without needing to be physically present on the jobsite?	Very interested
Q12	Would you be interested in learning more about Iowa DOT's implementation efforts to bring improved engineering solutions to build and test pavement foundation layers?	Very interested

B-11

Increasing Pavement Performance Through Pavement Foundation Design Modulus-Verification and Construction Quality Monitoring

#6

COMPLETE

Collector: Web Link 1 (Web Link)
Started: Thursday, October 22, 2020 10:09:25AM
Last Modified: Thursday, October 22, 2020 10:16:10AM
Time Spent: 00:06:44

Page 1

Q1	Do your current pavement design and construction requirements consistently result in pavements that meet the design life expectations?	Somewhat agree
Q2	Have you seen evidence of the performance of your pavements being compromised because of foundation related issues? Performance could be ride related and/or structural failures.	Somewhat agree, Comments: At some locations we've had subgrade issues which created surfacing failure.
Q3	Do you think your current construction requirements are adequate to field control the construction quality of your pavement foundation subgrade and aggregate base layers (e.g., fix bad areas)?	Somewhat agree
Q4	Do you have an acceptance requirement based upon the engineering parameters that the pavement design is based upon (e.g., modulus)?	Yes
Q5	What quality acceptance parameters do you require and measure for pavement foundations?(select all that apply)	Density (relative compaction/density), Moisture content
Q6	Does your construction specification and contract require the correction of problematic areas other than compaction (e.g., stabilization, over excavation and replacement)?	Yes

B-12

Increasing Pavement Performance Through Pavement Foundation Design Modulus-Verification and Construction Quality Monitoring

Q7	Somewhat interested
Are you interested in more efficient and effective alternatives to acceptance of embankment and pavement foundation layer construction?	
Q8	Somewhat important
Do you think it is important to field verify the in situ engineering properties used in pavement design of the various foundation layers (e.g. modulus)?	
Q9	Somewhat interested
Are you interested in knowing in real-time during construction if the field outcomes are meeting the design and specification requirements?	
Q10	Very helpful
Would it be helpful to have data reports that both the contractor and agency can use to support field process control during foundation layer construction?	
Q11	Very interested
Are you interested in using technologies that will allow for greater efficiency and safety by giving the inspection team the ability to virtually monitor or inspect the contractor's results without needing to be physically present on the jobsite?	
Q12	Somewhat interested
Would you be interested in learning more about Iowa DOT's implementation efforts to bring improved engineering solutions to build and test pavement foundation layers?	

B-13

Increasing Pavement Performance Through Pavement Foundation Design Modulus-Verification and Construction Quality Monitoring

#7

COMPLETE

Collector: Web Link 1 (Web Link)
 Started: Thursday, October 22, 2020 5:15:15 AM
 Last Modified: Thursday, October 22, 2020 10:26:50 AM
 Time Spent: 05:11:34

Page 1

Q1	Somewhat agree, Comments: I would strongly agree for our flexible pavement designs. Concrete and UBCC designs have experienced much more variability. This does not appear to be related to subgrade failures though.
Do your current pavement design and construction requirements consistently result in pavements that meet the design life expectations?	
Q2	Strongly disagree, Comments: We have experienced very few structural failures and they tend to be isolated.
Have you seen evidence of the performance of your pavements being compromised because of foundation related issues? Performance could be ride related and/or structural failures.	
Q3	Strongly agree
Do you think your current construction requirements are adequate to field control the construction quality of your pavement foundation subgrade and aggregate base layers (e.g., fix bad areas)?	
Q4	No
Do you have an acceptance requirement based upon the engineering parameters that the pavement design is based upon (e.g., modulus)?	
Q5	Density (relative compaction/density), Moisture content, Proof rolling/rolling, Observation (e.g., pumping). Additional parameters (please list below and separate by a comma): Depth checks of chemically stabilized subgrade
What quality acceptance parameters do you require and measure for pavement foundations?(select all that apply)	

B-14

Increasing Pavement Performance Through Pavement Foundation Design Modulus-Verification and Construction Quality Monitoring

Q6	Yes, If you answered yes, please explain: ODOT uses global chemical stabilization on virtually all of our new or reconstruction projects. High sulfate content soils or very granular soils are the main exceptions and they are rare. Undercuts or replacement are required for areas failing proof rolling for all projects.
Does your construction specification and contract require the correction of problematic areas other than compaction (e.g., stabilization, over excavation and replacement)?	
Q7	Somewhat interested, Comments: While I believe our current methodology has been successful, we are always interested in value added improvements.
Are you interested in more efficient and effective alternatives to acceptance of embankment and pavement foundation layer construction?	
Q8	Somewhat important
Do you think it is important to field verify the in situ engineering properties used in pavement design of the various foundation layers (e.g. modulus)?	
Q9	Somewhat interested
Are you interested in knowing in real-time during construction if the field outcomes are meeting the design and specification requirements?	
Q10	Somewhat helpful, Comments: All this hinges on what data, cost, timeliness, manpower required etc.
Would it be helpful to have data reports that both the contractor and agency can use to support field process control during foundation layer construction?	
Q11	Somewhat interested, Comments: This question is very leading. Who wouldn't be interested in increased efficiency and safety? What is the tradeoff though? Does not being at the jobsite really accomplish this? What else is lost?
Are you interested in using technologies that will allow for greater efficiency and safety by giving the inspection team the ability to virtually monitor or inspect the contractor's results without needing to be physically present on the jobsite?	
Q12	Somewhat interested
Would you be interested in learning more about Iowa DOT's implementation efforts to bring improved engineering solutions to build and test pavement foundation layers?	

B-15

Increasing Pavement Performance Through Pavement Foundation Design Modulus-Verification and Construction Quality Monitoring

#8

COMPLETE

Collector: Web Link 1 (Web Link)
 Started: Thursday, October 22, 2020 11:11:52 AM
 Last Modified: Thursday, October 22, 2020 11:29:26 AM
 Time Spent: 00:13:34

Page 1

Q1	Somewhat disagree, Comments: In the past decade we have begun to observe that pavements in one of our regions are not performing as designed.
Do your current pavement design and construction requirements consistently result in pavements that meet the design life expectations?	
Q2	I am not confident answering this question, Comments: We are still gathering information on this.
Have you seen evidence of the performance of your pavements being compromised because of foundation related issues? Performance could be ride related and/or structural failures.	
Q3	Somewhat agree
Do you think your current construction requirements are adequate to field control the construction quality of your pavement foundation subgrade and aggregate base layers (e.g., fix bad areas)?	
Q4	No, Comments: Aggregate bases are accepted by nuclear density upon (e.g., modulus)?
Do you have an acceptance requirement based upon the engineering parameters that the pavement design is based upon (e.g., modulus)?	
Q5	Density (relative compaction/density), Moisture content
What quality acceptance parameters do you require and measure for pavement foundations?(select all that apply)	
Q6	No
Does your construction specification and contract require the correction of problematic areas other than compaction (e.g., stabilization, over excavation and replacement)?	

B-16

Q7	Somewhat interested
Are you interested in more efficient and effective alternatives to acceptance of embankment and pavement foundation layer construction?	
Q8	Somewhat important
Do you think it is important to field verify the in situ engineering properties used in pavement design of the various foundation layers (e.g. modulus)?	
Q9	Not interested
Are you interested in knowing in real-time during construction if the field outcomes are meeting the design and specification requirements?	
Q10	Somewhat helpful
Would it be helpful to have data reports that both the contractor and agency can use to support field process control during foundation layer construction?	
Q11	Somewhat interested
Are you interested in using technologies that will allow for greater efficiency and safety by giving the inspection team the ability to virtually monitor or inspect the contractor's results without needing to be physically present on the jobsite?	
Q12	Very interested
Would you be interested in learning more about Iowa DOT's implementation efforts to bring improved engineering solutions to build and test pavement foundation layers?	

B-17

#9

COMPLETE

Collector: Web Link 1 (Web Link)
 Started: Friday, October 23, 2020 8:45:53 AM
 Last Modified: Friday, October 23, 2020 8:49:33 AM
 Time Spent: 00:03:38

Page 1

Q1	Somewhat agree
Do your current pavement design and construction requirements consistently result in pavements that meet the design life expectations?	
Q2	Somewhat agree
Have you seen evidence of the performance of your pavements being compromised because of foundation related issues? Performance could be ride related and/or structural failures.	
Q3	Somewhat disagree
Do you think your current construction requirements are adequate to field control the construction quality of your pavement foundation subgrade and aggregate base layers (e.g., fix bad areas)?	
Q4	No
Do you have an acceptance requirement based upon the engineering parameters that the pavement design is based upon (e.g., modulus)?	
Q5	Dynamic cone penetration (DCP) index, Falling weight deflectometer (FWD) calculated modulus, California Bearing Ratio (CBR)
What quality acceptance parameters do you require and measure for pavement foundations?(select all that apply)	
Q6	No
Does your construction specification and contract require the correction of problematic areas other than compaction (e.g., stabilization, over excavation and replacement)?	

B-18

Q7	Somewhat interested
Are you interested in more efficient and effective alternatives to acceptance of embankment and pavement foundation layer construction?	
Q8	Very important
Do you think it is important to field verify the in situ engineering properties used in pavement design of the various foundation layers (e.g. modulus)?	
Q9	Somewhat interested
Are you interested in knowing in real-time during construction if the field outcomes are meeting the design and specification requirements?	
Q10	Somewhat helpful
Would it be helpful to have data reports that both the contractor and agency can use to support field process control during foundation layer construction?	
Q11	Very interested
Are you interested in using technologies that will allow for greater efficiency and safety by giving the inspection team the ability to virtually monitor or inspect the contractor's results without needing to be physically present on the jobsite?	
Q12	Very interested
Would you be interested in learning more about Iowa DOT's implementation efforts to bring improved engineering solutions to build and test pavement foundation layers?	

B-19

#10

COMPLETE

Collector: Web Link 1 (Web Link)
 Started: Friday, October 23, 2020 8:58:31 AM
 Last Modified: Friday, October 23, 2020 9:17:53 AM
 Time Spent: 00:19:21

Page 1

Q1	Somewhat agree
Do your current pavement design and construction requirements consistently result in pavements that meet the design life expectations?	
Q2	Strongly agree, Comments: Yes. High plasticity index, organic content and sulfates are problematic if not handled correctly. Weak soils (low modulus) that are not stabilized/handled correctly produce base layers with low stiffness and ultimately short performance life.
Have you seen evidence of the performance of your pavements being compromised because of foundation related issues? Performance could be ride related and/or structural failures.	
Q3	Somewhat agree, Comments: The current bid build specs have a density requirement. Density does not ensure good soil stiffness. Design build specs have a DCP requirement to confirm soil modulus on flexible pavement jobs. However this is not enforced on rigid since rigid pavements are designed based on a "k" value.
Do you think your current construction requirements are adequate to field control the construction quality of your pavement foundation subgrade and aggregate base layers (e.g., fix bad areas)?	
Q4	Yes, Comments: Only for flexible pavements on design build projects. We are currently requiring informational FWD on top of the base before the HMA or CRCP is placed in DB projects. We are establishing target deflections WIMW2 to assess if it is feasible to require FWD to measure foundation quality/uniformity. We are conducting in house research using both FWD and DCP testing as well on different pavement foundations.
Do you have an acceptance requirement based upon the engineering parameters that the pavement design is based upon (e.g., modulus)?	

B-20

Q5	Density (relative compaction/density), Moisture content, Dynamic cone penetration (DCP) index, Proof rolling/rutting, Additional parameters (please list below and separate by a comma): DCP only for DB jobs. DB jobs also allow intelligent compaction for flexible pavements.
What quality acceptance parameters do you require and measure for pavement foundations?(select all that apply)	
Q6	Yes
Does your construction specification and contract require the correction of problematic areas other than compaction (e.g., stabilization, over excavation and replacement)?	
Q7	Very interested, Comments: I am interested. Especially for rigid pavements where the design is based on K.
Are you interested in more efficient and effective alternatives to acceptance of embankment and pavement foundation layer construction?	
Q8	Very important, Comments: We have evidence that weak soil produce higher FWD deflectors and weaker back-calculated modulus of base layers
Do you think it is important to field verify the in situ engineering properties used in pavement design of the various foundation layers (e.g. modulus)?	
Q9	Very interested
Are you interested in knowing in real-time during construction if the field outcomes are meeting the design and specification requirements?	
Q10	Very helpful
Would it be helpful to have data reports that both the contractor and agency can use to support field process control during foundation layer construction?	
Q11	Very interested
Are you interested in using technologies that will allow for greater efficiency and safety by giving the inspection team the ability to virtually monitor or inspect the contractor's results without needing to be physically present on the jobsite?	

B-21

Q12	Very interested
Would you be interested in learning more about Iowa DOT's implementation efforts to bring improved engineering solutions to build and test pavement foundation layers?	

B-22

#11

COMPLETE

Collector: Web Link 1 (Web Link)
Started: Tuesday, October 27, 2020 10:22:12 AM
Last Modified: Tuesday, October 27, 2020 10:37:36 AM
Time Spent: 00:15:25

Page 1

Q1	Somewhat agree
Do your current pavement design and construction requirements consistently result in pavements that meet the design life expectations?	
Q2	Strongly agree
Have you seen evidence of the performance of your pavements being compromised because of foundation related issues? Performance could be ride related and/or structural failures.	
Q3	Somewhat agree
Do you think your current construction requirements are adequate to field control the construction quality of your pavement foundation subgrade and aggregate base layers (e.g., fix bad areas)?	
Q4	No, Comments: Used density for unbounded materials, unconfined strength for bounded materials, in some cases indirect tensile strength (ITS)
Do you have an acceptance requirement based upon the engineering parameters that the pavement design is based upon (e.g., modulus)?	
Q5	Density (relative compaction/density), Moisture content, Additional parameters (please list below and separate by a comma): unconfined compressive strength, Indirect tensile strength
What quality acceptance parameters do you require and measure for pavement foundations?(select all that apply)	

B-23

Q6	Yes, If you answered yes, please explain: Replace bounded base materials, i.e. LCB, asphalt bounded base
Does your construction specification and contract require the correction of problematic areas other than compaction (e.g., stabilization, over excavation and replacement)?	
Q7	Very interested, Comments: We are looking to move our base specification requirements to align with design parameters.
Are you interested in more efficient and effective alternatives to acceptance of embankment and pavement foundation layer construction?	
Q8	Very important
Do you think it is important to field verify the in situ engineering properties used in pavement design of the various foundation layers (e.g. modulus)?	
Q9	Very interested, Comments: This information will increase confidence and more realistic analyses of pavement performance.
Are you interested in knowing in real-time during construction if the field outcomes are meeting the design and specification requirements?	
Q10	Very helpful
Would it be helpful to have data reports that both the contractor and agency can use to support field process control during foundation layer construction?	
Q11	Very interested
Are you interested in using technologies that will allow for greater efficiency and safety by giving the inspection team the ability to virtually monitor or inspect the contractor's results without needing to be physically present on the jobsite?	
Q12	Very interested
Would you be interested in learning more about Iowa DOT's implementation efforts to bring improved engineering solutions to build and test pavement foundation layers?	

B-24

#12

COMPLETE

Collector: Web Link 1 (Web Link)
 Started: Tuesday, October 27, 2020 1:57:39PM
 Last Modified: Tuesday, October 27, 2020 2:01:15PM
 Time Spent: 00:03:35

Page 1

Q1	Strongly agree
Do your current pavement design and construction requirements consistently result in pavements that meet the design life expectations?	
Q2	Somewhat disagree
Have you seen evidence of the performance of your pavements being compromised because of foundation related issues? Performance could be ride related and/or structural failures.	
Q3	Somewhat agree
Do you think your current construction requirements are adequate to field control the construction quality of your pavement foundation subgrade and aggregate base layers (e.g., fix bad areas)?	
Q4	No
Do you have an acceptance requirement based upon the engineering parameters that the pavement design is based upon (e.g., modulus)?	
Q5	Density (relative compaction/density), Moisture content, Proof rolling/rutting, Observation (e.g., pumping)
What quality acceptance parameters do you require and measure for pavement foundations?(select all that apply)	
Q6	Yes.
Does your construction specification and contract require the correction of problematic areas other than compaction (e.g., stabilization, over excavation and replacement)?	
If you answered yes, please explain: Currently not standard, but moving towards having an contingency item for soft spot repair when needed. We have done this by special provision a lot	

B-25

Q7

Somewhat interested

Are you interested in more efficient and effective alternatives to acceptance of embankment and pavement foundation layer construction?

Q8

Not important

Do you think it is important to field verify the in situ engineering properties used in pavement design of the various foundation layers (e.g. modulus)?

Q9

Somewhat interested

Are you interested in knowing in real-time during construction if the field outcomes are meeting the design and specification requirements?

Q10

Very helpful

Would it be helpful to have data reports that both the contractor and agency can use to support field process control during foundation layer construction?

Q11

Somewhat interested

Are you interested in using technologies that will allow for greater efficiency and safety by giving the inspection team the ability to virtually monitor or "inspect" the contractor's results without needing to be physically present on the jobsite?

Q12

Somewhat interested

Would you be interested in learning more about Iowa DOT's implementation efforts to bring improved engineering solutions to build and test pavement foundation layers?

B-26

#13

COMPLETE

Collector: Web Link 1 (Web Link)
 Started: Wednesday, October 28, 2020 7:22:27AM
 Last Modified: Wednesday, October 28, 2020 8:09:17AM
 Time Spent: 00:46:50

Page 1

Q1	Somewhat agree, Comments: For full depth pavements the designs seem to be very good. For overlay designs the conversation becomes more complicated as the variability of the existing pavement impacts the predicted design life. Especially in our older PCC pavements that have already had HMA overlays.
Do your current pavement design and construction requirements consistently result in pavements that meet the design life expectations?	
Q2	Somewhat disagree, Comments: There are a couple of occasions that we have had foundation issues that impacted ride, but this is by far the exception.
Have you seen evidence of the performance of your pavements being compromised because of foundation related issues? Performance could be ride related and/or structural failures.	
Q3	Somewhat agree, Comments: Based on performance results, we tend to have a positive outcome. However our control of soils is predominantly limited to moisture and density control. Our base/granular layers are prescriptive for placement procedures.
Do you think your current construction requirements are adequate to field control the construction quality of your pavement foundation subgrade and aggregate base layers (e.g., fix bad areas)?	
Q4	No
Do you have an acceptance requirement based upon the engineering parameters that the pavement design is based upon (e.g., modulus)?	
Q5	Density (relative compaction/density), Moisture content
What quality acceptance parameters do you require and measure for pavement foundations?(select all that apply)	

B-27

Q6

No.

Does your construction specification and contract require the correction of problematic areas other than compaction (e.g., stabilization, over excavation and replacement)?

If you answered yes, please explain:
The specifications do not directly deal with problem areas. We have guidance in our construction manual and problem areas are generally addressed by extra work orders.

Q7

Very interested

Are you interested in more efficient and effective alternatives to acceptance of embankment and pavement foundation layer construction?

Q8

Somewhat important

Do you think it is important to field verify the in situ engineering properties used in pavement design of the various foundation layers (e.g. modulus)?

Q9

Very interested

Are you interested in knowing in real-time during construction if the field outcomes are meeting the design and specification requirements?

Q10

Very helpful

Would it be helpful to have data reports that both the contractor and agency can use to support field process control during foundation layer construction?

Q11

Somewhat interested

Are you interested in using technologies that will allow for greater efficiency and safety by giving the inspection team the ability to virtually monitor or "inspect" the contractor's results without needing to be physically present on the jobsite?

Q12

Somewhat interested

Would you be interested in learning more about Iowa DOT's implementation efforts to bring improved engineering solutions to build and test pavement foundation layers?

B-28

#14

COMPLETE

Collector: Web Link 1 (Web Link)
 Started: Wednesday, October 28, 2020 1:06:47 PM
 Last Modified: Wednesday, October 28, 2020 1:16:20 PM
 Time Spent: 00:09:32

Page 1

Q1	Somewhat agree
Do your current pavement design and construction requirements consistently result in pavements that meet the design life expectations?	
Q2	Somewhat agree
Have you seen evidence of the performance of your pavements being compromised because of foundation related issues? Performance could be ride related and/or structural failures.	
Q3	Somewhat agree
Do you think your current construction requirements are adequate to field control the construction quality of your pavement foundation subgrade and aggregate base layers (e.g., fix bad areas)?	
Q4	No
Do you have an acceptance requirement based upon the engineering parameters that the pavement design is based upon (e.g., modulus)?	
Q5	Density (relative compaction/density), Moisture content, Observation (e.g., pumping)
What quality acceptance parameters do you require and measure for pavement foundations?(select all that apply)	
Q6	Yes
Does your construction specification and contract require the correction of problematic areas other than compaction (e.g., stabilization, over excavation and replacement)?	

B-29

Q7	Very interested
Are you interested in more efficient and effective alternatives to acceptance of embankment and pavement foundation layer construction?	
Q8	Very important
Do you think it is important to field verify the in situ engineering properties used in pavement design of the various foundation layers (e.g. modulus)?	
Q9	Very interested
Are you interested in knowing in real-time during construction if the field outcomes are meeting the design and specification requirements?	
Q10	Very helpful
Would it be helpful to have data reports that both the contractor and agency can use to support field process control during foundation layer construction?	
Q11	Somewhat interested
Are you interested in using technologies that will allow for greater efficiency and safety by giving the inspection team the ability to virtually monitor or "inspect" the contractor's results without needing to be physically present on the jobsite?	
Q12	Very interested
Would you be interested in learning more about Iowa DOT's implementation efforts to bring improved engineering solutions to build and test pavement foundation layers?	

B-30

#15

COMPLETE

Collector: Web Link 1 (Web Link)
 Started: Friday, October 30, 2020 7:14:06 AM
 Last Modified: Friday, October 30, 2020 8:49:15 AM
 Time Spent: 01:35:09

Page 1

Q1	Strongly agree
Do your current pavement design and construction requirements consistently result in pavements that meet the design life expectations?	
Q2	Somewhat agree, Comments: Maine has soft, compressible marine soils that are very susceptible to thaw weakening (structural failure). We also have very frost susceptible soils in most of the State that produce significant frost heaves (ride quality issues).
Have you seen evidence of the performance of your pavements being compromised because of foundation related issues? Performance could be ride related and/or structural failures.	
Q3	Somewhat agree, Comments: Cost to fix is a major controlling factor unless it is a safety issue.
Do you think your current construction requirements are adequate to field control the construction quality of your pavement foundation subgrade and aggregate base layers (e.g., fix bad areas)?	
Q4	No
Do you have an acceptance requirement based upon the engineering parameters that the pavement design is based upon (e.g., modulus)?	
Q5	Density (relative compaction/density), Proof rolling/rutting, Observation (e.g., pumping)
What quality acceptance parameters do you require and measure for pavement foundations?(select all that apply)	

B-31

Q6	Yes, If you answered yes, please explain: The MaineDOT Standard Specifications has guidelines on what the options are for correcting certain subgrade conditions during excavation for the pavement construction. Stabilization with geotextiles and over excavate/replace are the most commonly used methods.
Does your construction specification and contract require the correction of problematic areas other than compaction (e.g., stabilization, over excavation and replacement)?	
Q7	Very interested
Are you interested in more efficient and effective alternatives to acceptance of embankment and pavement foundation layer construction?	
Q8	Very important, Comments: However, at this time it is impossible to check unless the project is very short. It would just be spot checking during construction, so what happens in between is unknown. It could be verified post construction with an FWD analysis, but it is unlikely MaineDOT would correct any subgrades at that time.
Do you think it is important to field verify the in situ engineering properties used in pavement design of the various foundation layers (e.g. modulus)?	
Q9	Very interested
Are you interested in knowing in real-time during construction if the field outcomes are meeting the design and specification requirements?	
Q10	Very helpful
Would it be helpful to have data reports that both the contractor and agency can use to support field process control during foundation layer construction?	
Q11	Not interested
Are you interested in using technologies that will allow for greater efficiency and safety by giving the inspection team the ability to virtually monitor or "inspect" the contractor's results without needing to be physically present on the jobsite?	
Q12	Very interested
Would you be interested in learning more about Iowa DOT's implementation efforts to bring improved engineering solutions to build and test pavement foundation layers?	

B-32

#16

COMPLETE

Collector: Web Link 1 (Web Link)
 Started: Monday, November 02, 2020 8:06:11 AM
 Last Modified: Monday, November 02, 2020 8:13:44 AM
 Time Spent: 00:07:32

Page 1

Q1	Somewhat disagree. Comments: Since calibration was conducted for our ME Design program, I feel the mixes (HMA and PCCP) have both changed as Contractor's have refined their design methods. The HMA mixes are generally drier (less AC), and the Concrete designs don't reach the same flexural strengths as those we calibrated with. We have not completed a comprehensive study to verify this.
Q2	Somewhat agree. Comments: We have not conducted many new construction projects using our ME Design program, thus, data is limited.
Q3	Strongly disagree. Comments: We struggle to have this addressed adequately on projects during construction. Various methods are used, we usually try to stabilize by removal/replacement of the weak soils with geogrid/granular materials, but sometimes Contractors are able to talk Projects into an allowance of a "deep strength bit". Simply put, they put a thicker section of HMA or PCCP in the soft area in an attempt to "bridge" the soft spots.
Q4	No. Comments: Design is based on modulus. We continue to test for gradation and R-value for acceptance.

B-33

Q5

What quality acceptance parameters do you require and measure for pavement foundations?(select all that apply)

Density (relative compaction/density),

Moisture content,
Proof rolling/rutting,

Observation (e.g., pumping),

Additional parameters (please list below and separate by a comma):
Resistance R-value using the Hveem stabilometer.

Q6

Does your construction specification and contract require the correction of problematic areas other than compaction (e.g., stabilization, over excavation and replacement)?

Yes,

If you answered yes, please explain.
We proof roll our subgrades. Soft spots or pumping areas have to be repaired.

Q7

Are you interested in more efficient and effective alternatives to acceptance of embankment and pavement foundation layer construction?

Very interested

Q8

Do you think it is important to field verify the in situ engineering properties used in pavement design of the various foundation layers (e.g. modulus)?

Very important

Q9

Are you interested in knowing in real-time during construction if the field outcomes are meeting the design and specification requirements?

Very interested

Q10

Would it be helpful to have data reports that both the contractor and agency can use to support field process control during foundation layer construction?

Somewhat helpful

Q11

Are you interested in using technologies that will allow for greater efficiency and safety by giving the inspection team the ability to virtually monitor or "inspect" the contractor's results without needing to be physically present on the jobsite?

Somewhat interested

B-34

Q12

Would you be interested in learning more about Iowa DOT's implementation efforts to bring improved engineering solutions to build and test pavement foundation layers?

Somewhat interested

#17

COMPLETE

Collector: Web Link 1 (Web Link)
 Started: Tuesday, November 03, 2020 11:29:46 AM
 Last Modified: Tuesday, November 03, 2020 11:36:16 AM
 Time Spent: 00:06:32

Page 1

Q1	Somewhat agree
Do your current pavement design and construction requirements consistently result in pavements that meet the design life expectations?	
Q2	Somewhat agree
Have you seen evidence of the performance of your pavements being compromised because of foundation related issues? Performance could be ride related and/or structural failures.	
Q3	Somewhat agree
Do you think your current construction requirements are adequate to field control the construction quality of your pavement foundation subgrade and aggregate base layers (e.g., fix bad areas)?	
Q4	No
Do you have an acceptance requirement based upon the engineering parameters that the pavement design is based upon (e.g., modulus)?	
Q5	Density (relative compaction/density), Moisture content, Proof rolling/rutting, Observation (e.g., pumping)
What quality acceptance parameters do you require and measure for pavement foundations?(select all that apply)	

B-35

B-36

Increasing Pavement Performance Through Pavement Foundation Design Modulus-Verification and Construction Quality Monitoring

Q6	Does your construction specification and contract require the correction of problematic areas other than compaction (e.g., stabilization, over excavation and replacement)?	Yes. If you answered yes, please explain: If unstable subgrade is encountered, the contractor has the options of remove/replace the material, stabilize the material with subgrade stabilization additives, or use base reinforcement geogrids.
Q7	Are you interested in more efficient and effective alternatives to acceptance of embankment and pavement foundation layer construction?	Somewhat interested
Q8	Do you think it is important to field verify the in situ engineering properties used in pavement design of the various foundation layers (e.g. modulus)?	Very important
Q9	Are you interested in knowing in real-time during construction if the field outcomes are meeting the design and specification requirements?	Somewhat interested
Q10	Would it be helpful to have data reports that both the contractor and agency can use to support field process control during foundation layer construction?	Somewhat helpful
Q11	Are you interested in using technologies that will allow for greater efficiency and safety by giving the inspection team the ability to virtually monitor or "inspect" the contractor's results without needing to be physically present on the jobsite?	Somewhat interested
Q12	Would you be interested in learning more about Iowa DOT's implementation efforts to bring improved engineering solutions to build and test pavement foundation layers?	Somewhat interested

B-37

Increasing Pavement Performance Through Pavement Foundation Design Modulus-Verification and Construction Quality Monitoring

#18

COMPLETE

Collector: Web Link 1 (Web Link)
Started: Thursday, November 05, 2020 6:17:09 AM
Last Modified: Thursday, November 05, 2020 6:21:10 AM
Time Spent: 00:04:01

Page 1

Q1	Do your current pavement design and construction requirements consistently result in pavements that meet the design life expectations?	Somewhat agree
Q2	Have you seen evidence of the performance of your pavements being compromised because of foundation related issues? Performance could be ride related and/or structural failures.	Somewhat agree
Q3	Do you think your current construction requirements are adequate to field control the construction quality of your pavement foundation subgrade and aggregate base layers (e.g., fix bad areas)?	Strongly disagree
Q4	Do you have an acceptance requirement based upon the engineering parameters that the pavement design is based upon (e.g., modulus)?	No
Q5	What quality acceptance parameters do you require and measure for pavement foundations?(select all that apply)	Density (relative compaction/density), Moisture content, Proof rolling/gritting
Q6	Does your construction specification and contract require the correction of problematic areas other than compaction (e.g., stabilization, over excavation and replacement)?	Yes

B-38

Increasing Pavement Performance Through Pavement Foundation Design Modulus-Verification and Construction Quality Monitoring

Q7	Are you interested in more efficient and effective alternatives to acceptance of embankment and pavement foundation layer construction?	Very interested
Q8	Do you think it is important to field verify the in situ engineering properties used in pavement design of the various foundation layers (e.g. modulus)?	Somewhat important
Q9	Are you interested in knowing in real-time during construction if the field outcomes are meeting the design and specification requirements?	Very interested
Q10	Would it be helpful to have data reports that both the contractor and agency can use to support field process control during foundation layer construction?	Very helpful
Q11	Are you interested in using technologies that will allow for greater efficiency and safety by giving the inspection team the ability to virtually monitor or "inspect" the contractor's results without needing to be physically present on the jobsite?	Very interested
Q12	Would you be interested in learning more about Iowa DOT's implementation efforts to bring improved engineering solutions to build and test pavement foundation layers?	Very interested

B-39

Increasing Pavement Performance Through Pavement Foundation Design Modulus-Verification and Construction Quality Monitoring

#19

COMPLETE

Collector: Web Link 1 (Web Link)
Started: Thursday, November 05, 2020 7:20:28 AM
Last Modified: Thursday, November 05, 2020 7:28:14 AM
Time Spent: 00:07:45

Page 1

Q1	Do your current pavement design and construction requirements consistently result in pavements that meet the design life expectations?	Somewhat agree, Comments: Our main problems that lead to reduced pavement life are poor joint construction, too low of asphalt content in the mix, and use of lesser quality subgrade options.
Q2	Have you seen evidence of the performance of your pavements being compromised because of foundation related issues? Performance could be ride related and/or structural failures.	Strongly agree, Comments: We are currently promoting use of more subgrade stabilization, but several areas are using less durable materials to stabilize.
Q3	Do you think your current construction requirements are adequate to field control the construction quality of your pavement foundation subgrade and aggregate base layers (e.g., fix bad areas)?	Somewhat agree, Comments: The requirements are good, but the lack of personnel onsite is the limiting factor.
Q4	Do you have an acceptance requirement based upon the engineering parameters that the pavement design is based upon (e.g., modulus)?	No
Q5	What quality acceptance parameters do you require and measure for pavement foundations?(select all that apply)	Density (relative compaction/density), Moisture content, Observation (e.g., pumping), California Bearing Ratio (CBR)
Q6	Does your construction specification and contract require the correction of problematic areas other than compaction (e.g., stabilization, over excavation and replacement)?	No

B-40

Q7	Very interested
Are you interested in more efficient and effective alternatives to acceptance of embankment and pavement foundation layer construction?	
Q8	Very important
Do you think it is important to field verify the in situ engineering properties used in pavement design of the various foundation layers (e.g. modulus)?	
Q9	Very interested, Comments: We have experimented with intelligent compaction on several projects with no real benefit noted.
Are you interested in knowing in real-time during construction if the field outcomes are meeting the design and specification requirements?	
Q10	Very helpful
Would it be helpful to have data reports that both the contractor and agency can use to support field process control during foundation layer construction?	
Q11	Very interested
Are you interested in using technologies that will allow for greater efficiency and safety by giving the inspection team the ability to virtually monitor or "inspect" the contractor's results without needing to be physically present on the jobsite?	
Q12	Very interested
Would you be interested in learning more about Iowa DOT's implementation efforts to bring improved engineering solutions to build and test pavement foundation layers?	

B-41

#20

COMPLETE

Collector: Web Link 1 (Web Link)
Started: Thursday, November 05, 2020 7:37:03 AM
Last Modified: Thursday, November 05, 2020 7:40:34 AM
Time Spent: 00:03:30

Page 1

Q1	I am not confident answering this question
Do your current pavement design and construction requirements consistently result in pavements that meet the design life expectations?	
Q2	Somewhat disagree
Have you seen evidence of the performance of your pavements being compromised because of foundation related issues? Performance could be ride related and/or structural failures.	
Q3	Somewhat disagree
Do you think your current construction requirements are adequate to field control the construction quality of your pavement foundation subgrade and aggregate base layers (e.g., fix bad areas)?	
Q4	No
Do you have an acceptance requirement based upon the engineering parameters that the pavement design is based upon (e.g., modulus)?	
Q5	Density (relative compaction/density), Proof rolling/rutting
What quality acceptance parameters do you require and measure for pavement foundations?(select all that apply)	
Q6	Yes, If you answered yes, please explain: surfaces shown to yield under proof rolling will not be tested for compaction until they are shown to be solid. Remedy varies based on situation.
Does your construction specification and contract require the correction of problematic areas other than compaction (e.g., stabilization, over excavation and replacement)?	

B-42

Q7	Somewhat interested
Are you interested in more efficient and effective alternatives to acceptance of embankment and pavement foundation layer construction?	
Q8	Somewhat important
Do you think it is important to field verify the in situ engineering properties used in pavement design of the various foundation layers (e.g. modulus)?	
Q9	Somewhat interested
Are you interested in knowing in real-time during construction if the field outcomes are meeting the design and specification requirements?	
Q10	Somewhat helpful
Would it be helpful to have data reports that both the contractor and agency can use to support field process control during foundation layer construction?	
Q11	Not interested
Are you interested in using technologies that will allow for greater efficiency and safety by giving the inspection team the ability to virtually monitor or "inspect" the contractor's results without needing to be physically present on the jobsite?	
Q12	Somewhat interested
Would you be interested in learning more about Iowa DOT's implementation efforts to bring improved engineering solutions to build and test pavement foundation layers?	

B-43

#21

COMPLETE

Collector: Web Link 1 (Web Link)
Started: Thursday, November 05, 2020 8:28:54 AM
Last Modified: Thursday, November 05, 2020 8:33:00 AM
Time Spent: 00:04:05

Page 1

Q1	Somewhat agree
Do your current pavement design and construction requirements consistently result in pavements that meet the design life expectations?	
Q2	Somewhat disagree
Have you seen evidence of the performance of your pavements being compromised because of foundation related issues? Performance could be ride related and/or structural failures.	
Q3	Somewhat agree
Do you think your current construction requirements are adequate to field control the construction quality of your pavement foundation subgrade and aggregate base layers (e.g., fix bad areas)?	
Q4	Yes
Do you have an acceptance requirement based upon the engineering parameters that the pavement design is based upon (e.g., modulus)?	
Q5	Density (relative compaction/density), Moisture content
What quality acceptance parameters do you require and measure for pavement foundations?(select all that apply)	
Q6	Yes
Does your construction specification and contract require the correction of problematic areas other than compaction (e.g., stabilization, over excavation and replacement)?	

B-44

Q7	Very interested
Are you interested in more efficient and effective alternatives to acceptance of embankment and pavement foundation layer construction?	
Q8	Very important
Do you think it is important to field verify the in situ engineering properties used in pavement design of the various foundation layers (e.g. modulus)?	
Q9	Very interested
Are you interested in knowing in real-time during construction if the field outcomes are meeting the design and specification requirements?	
Q10	Very helpful
Would it be helpful to have data reports that both the contractor and agency can use to support field process control during foundation layer construction?	
Q11	Very interested
Are you interested in using technologies that will allow for greater efficiency and safety by giving the inspection team the ability to virtually monitor or "inspect" the contractor's results without needing to be physically present on the jobsite?	
Q12	Very interested
Would you be interested in learning more about Iowa DOT's implementation efforts to bring improved engineering solutions to build and test pavement foundation layers?	

B-45

#22

COMPLETE

Collector: Web Link 1 (Web Link)
Started: Thursday, November 05, 2020 9:02:36 AM
Last Modified: Thursday, November 05, 2020 9:08:23 AM
Time Spent: 00:05:44

Page 1

Q1	Somewhat agree
Do your current pavement design and construction requirements consistently result in pavements that meet the design life expectations?	
Q2	Strongly agree
Have you seen evidence of the performance of your pavements being compromised because of foundation related issues? Performance could be ride related and/or structural failures.	
Q3	Somewhat agree
Do you think your current construction requirements are adequate to field control the construction quality of your pavement foundation subgrade and aggregate base layers (e.g., fix bad areas)?	
Q4	No
Do you have an acceptance requirement based upon the engineering parameters that the pavement design is based upon (e.g., modulus)?	
Q5	Density (relative compaction/density), Moisture content, Light weight deflectometer (LWD) modulus, Dynamic cone penetration (DCP) index, Proof rolling/rutting, Observation (e.g., pumping)
What quality acceptance parameters do you require and measure for pavement foundations?(select all that apply)	

B-46

Q6	No
Does your construction specification and contract require the correction of problematic areas other than compaction (e.g., stabilization, over excavation and replacement)?	
Q7	Somewhat interested
Are you interested in more efficient and effective alternatives to acceptance of embankment and pavement foundation layer construction?	
Q8	Somewhat important
Do you think it is important to field verify the in situ engineering properties used in pavement design of the various foundation layers (e.g. modulus)?	
Q9	Somewhat interested
Are you interested in knowing in real-time during construction if the field outcomes are meeting the design and specification requirements?	
Q10	Somewhat helpful
Would it be helpful to have data reports that both the contractor and agency can use to support field process control during foundation layer construction?	
Q11	Somewhat interested
Are you interested in using technologies that will allow for greater efficiency and safety by giving the inspection team the ability to virtually monitor or "inspect" the contractor's results without needing to be physically present on the jobsite?	
Q12	Somewhat interested
Would you be interested in learning more about Iowa DOT's implementation efforts to bring improved engineering solutions to build and test pavement foundation layers?	

B-47

#23

COMPLETE

Collector: Web Link 1 (Web Link)
Started: Thursday, November 05, 2020 9:10:26 AM
Last Modified: Thursday, November 05, 2020 9:21:39 AM
Time Spent: 00:11:13

Page 1

Q1	Strongly disagree
Do your current pavement design and construction requirements consistently result in pavements that meet the design life expectations?	
Q2	Comments: we see some foundation related issues but it is only in areas where we have poor subgrade
Have you seen evidence of the performance of your pavements being compromised because of foundation related issues? Performance could be ride related and/or structural failures.	
Q3	Strongly agree
Do you think your current construction requirements are adequate to field control the construction quality of your pavement foundation subgrade and aggregate base layers (e.g., fix bad areas)?	
Q4	No
Do you have an acceptance requirement based upon the engineering parameters that the pavement design is based upon (e.g., modulus)?	
Q5	Density (relative compaction/density), Moisture content, Proof rolling/rutting, Observation (e.g., pumping), Additional parameters (please list below and separate by a comma): gradation
What quality acceptance parameters do you require and measure for pavement foundations?(select all that apply)	

B-48

Q6	Yes
Does your construction specification and contract require the correction of problematic areas other than compaction (e.g., stabilization, over excavation and replacement)?	
Q7	Not interested
Are you interested in more efficient and effective alternatives to acceptance of embankment and pavement foundation layer construction?	
Q8	Somewhat important
Do you think it is important to field verify the in situ engineering properties used in pavement design of the various foundation layers (e.g. modulus)?	
Q9	Somewhat interested
Are you interested in knowing in real-time during construction if the field outcomes are meeting the design and specification requirements?	
Q10	Very helpful
Would it be helpful to have data reports that both the contractor and agency can use to support field process control during foundation layer construction?	
Q11	Somewhat interested
Are you interested in using technologies that will allow for greater efficiency and safety by giving the inspection team the ability to virtually monitor or "inspect" the contractor's results without needing to be physically present on the jobsite?	
Q12	Somewhat interested
Would you be interested in learning more about Iowa DOT's implementation efforts to bring improved engineering solutions to build and test pavement foundation layers?	

B-49

#24

COMPLETE

Collector: Web Link 1 (Web Link)
Started: Thursday, November 05, 2020 2:27:25 PM
Last Modified: Thursday, November 05, 2020 2:31:50 PM
Time Spent: 00:04:24

Page 1

Q1	Somewhat agree
Do your current pavement design and construction requirements consistently result in pavements that meet the design life expectations?	
Q2	Somewhat disagree
Have you seen evidence of the performance of your pavements being compromised because of foundation related issues? Performance could be ride related and/or structural failures.	
Q3	Somewhat disagree
Do you think your current construction requirements are adequate to field control the construction quality of your pavement foundation subgrade and aggregate base layers (e.g., fix bad areas)?	
Q4	No
Do you have an acceptance requirement based upon the engineering parameters that the pavement design is based upon (e.g., modulus)?	
Q5	Density (relative compaction/density), Moisture content, Proof rolling/rutting, Observation (e.g., pumping)
What quality acceptance parameters do you require and measure for pavement foundations?(select all that apply)	
Q6	Yes
Does your construction specification and contract require the correction of problematic areas other than compaction (e.g., stabilization, over excavation and replacement)?	

B-50

Q7	Somewhat interested
Are you interested in more efficient and effective alternatives to acceptance of embankment and pavement foundation layer construction?	
Q8	Somewhat important
Do you think it is important to field verify the in situ engineering properties used in pavement design of the various foundation layers (e.g. modulus)?	
Q9	Very interested
Are you interested in knowing in real-time during construction if the field outcomes are meeting the design and specification requirements?	
Q10	Somewhat helpful
Would it be helpful to have data reports that both the contractor and agency can use to support field process control during foundation layer construction?	
Q11	Somewhat interested
Are you interested in using technologies that will allow for greater efficiency and safety by giving the inspection team the ability to virtually monitor or "inspect" the contractor's results without needing to be physically present on the jobsite?	
Q12	Very interested
Would you be interested in learning more about Iowa DOT's implementation efforts to bring improved engineering solutions to build and test pavement foundation layers?	

B-51

#25

COMPLETE

Collector: Web Link 1 (Web Link)
Started: Thursday, November 05, 2020 2:46:46 PM
Last Modified: Thursday, November 05, 2020 2:53:11 PM
Time Spent: 00:06:22

Page 1

Q1	Somewhat agree
Do your current pavement design and construction requirements consistently result in pavements that meet the design life expectations?	
Q2	Somewhat agree
Have you seen evidence of the performance of your pavements being compromised because of foundation related issues? Performance could be ride related and/or structural failures.	
Q3	Somewhat disagree, Comments: We have to rely heavily on the inspectors to identify which leads to variable results
Do you think your current construction requirements are adequate to field control the construction quality of your pavement foundation subgrade and aggregate base layers (e.g., fix bad areas)?	
Q4	No
Do you have an acceptance requirement based upon the engineering parameters that the pavement design is based upon (e.g., modulus)?	
Q5	Density (relative compaction/density), Observation (e.g., pumping)
What quality acceptance parameters do you require and measure for pavement foundations?(select all that apply)	
Q6	Yes, If you answered yes, please explain: Yes, over excavation is typical and contact of the soils and foundations unit who typically recommend geotextile, crushed stone and processed aggregate layers to stabilize.
Does your construction specification and contract require the correction of problematic areas other than compaction (e.g., stabilization, over excavation and replacement)?	

B-52

Q7	Somewhat interested
Are you interested in more efficient and effective alternatives to acceptance of embankment and pavement foundation layer construction?	
Q8	Somewhat important
Do you think it is important to field verify the in situ engineering properties used in pavement design of the various foundation layers (e.g. modulus)?	
Q9	Somewhat interested
Are you interested in knowing in real-time during construction if the field outcomes are meeting the design and specification requirements?	
Q10	Somewhat helpful
Would it be helpful to have data reports that both the contractor and agency can use to support field process control during foundation layer construction?	
Q11	Somewhat interested
Are you interested in using technologies that will allow for greater efficiency and safety by giving the inspection team the ability to virtually monitor or inspect the contractor's results without needing to be physically present on the jobsite?	
Q12	Very interested
Would you be interested in learning more about Iowa DOT's implementation efforts to bring improved engineering solutions to build and test pavement foundation layers?	

B-53

Q7	Very interested
Are you interested in more efficient and effective alternatives to acceptance of embankment and pavement foundation layer construction?	
Q8	Very important
Do you think it is important to field verify the in situ engineering properties used in pavement design of the various foundation layers (e.g. modulus)?	
Q9	Very interested
Are you interested in knowing in real-time during construction if the field outcomes are meeting the design and specification requirements?	
Q10	Very helpful
Would it be helpful to have data reports that both the contractor and agency can use to support field process control during foundation layer construction?	
Q11	Very interested
Are you interested in using technologies that will allow for greater efficiency and safety by giving the inspection team the ability to virtually monitor or inspect the contractor's results without needing to be physically present on the jobsite?	
Q12	Very interested
Would you be interested in learning more about Iowa DOT's implementation efforts to bring improved engineering solutions to build and test pavement foundation layers?	

B-55

#26

COMPLETE

Collector: Web Link 1 (Web Link)
Started: Thursday, November 05, 2020 3:07:36 PM
Last Modified: Thursday, November 05, 2020 3:09:16 PM
Time Spent: 00:01:34

Page 1

Q1	Somewhat agree
Do your current pavement design and construction requirements consistently result in pavements that meet the design life expectations?	
Q2	Somewhat disagree
Have you seen evidence of the performance of your pavements being compromised because of foundation related issues? Performance could be ride related and/or structural failures.	
Q3	Somewhat agree
Do you think your current construction requirements are adequate to field control the construction quality of your pavement foundation subgrade and aggregate base layers (e.g., fix bad areas)?	
Q4	No
Do you have an acceptance requirement based upon the engineering parameters that the pavement design is based upon (e.g., modulus)?	
Q5	Density (relative compaction/density), Moisture content, Proof rolling/gritting, Observation (e.g., pumping)
What quality acceptance parameters do you require and measure for pavement foundations?(select all that apply)	
Q6	No
Does your construction specification and contract require the correction of problematic areas other than compaction (e.g., stabilization, over excavation and replacement)?	

B-54

#27

COMPLETE

Collector: Web Link 1 (Web Link)
Started: Thursday, November 05, 2020 4:00:41 PM
Last Modified: Thursday, November 05, 2020 4:11:26 PM
Time Spent: 00:10:45

Page 1

Q1	Somewhat agree
Do your current pavement design and construction requirements consistently result in pavements that meet the design life expectations?	
Q2	Strongly agree
Have you seen evidence of the performance of your pavements being compromised because of foundation related issues? Performance could be ride related and/or structural failures.	
Q3	Somewhat disagree
Do you think your current construction requirements are adequate to field control the construction quality of your pavement foundation subgrade and aggregate base layers (e.g., fix bad areas)?	
Q4	No
Do you have an acceptance requirement based upon the engineering parameters that the pavement design is based upon (e.g., modulus)?	
Q5	Density (relative compaction/density)
What quality acceptance parameters do you require and measure for pavement foundations?(select all that apply)	
Q6	No
Does your construction specification and contract require the correction of problematic areas other than compaction (e.g., stabilization, over excavation and replacement)?	

B-56