# April 29, 2025
# Meeting – HMA Spec & Density Subcommittee

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| **Location:** | Teams Meeting / In-Person (Galena Room @ Truax Madison) |
| **Date:** | 04-29-2025 |
| **Time:** | 10:00AM – 12:00PM |

## Attendance

Albert Kilger
David Hose
Casey Wierzchowski
Allexander Stichman (MCC)
Jake Amundson
Cayley Young
Neal Atanasoff
Jeremy Barron
Jon Wixom
Scott Syron
Erik Lyngdal
Daniel Kopacz
Taylor Christianson
Justin Hoffman
Zach Lemke
Travis Kurey
Deb Schwerman
Joe Kyle
Brian Jandrin

## Agenda Items

1. PWL for SMA
    - This is part of the AWP Spec updates.
    - Albert K.: Presented slides from volumetric and density analysis of SMA projects.
        - For volumetrics used existing acceptance limits as upper and lower acceptance limits (3.2 to 5.8%).
            - Dispute Rate =45.5% of lots
                - May be higher because not using PWL with F&t comparison, so there is no reason to investigate the differences (QV only needs an acceptable test result to verify contractor data)
                - Lower QV sampling rate (1/5,000 vs. 1/3,750) may not fully capture variability to compare with contractor.

- Not using split samples.
- Lab technician familiarity with SMA.
    - May need to ensure best practices are followed.

- QC Average Va = 4.45% (s = 0.66%)
    - PWL = 93.85% (PF = 101.27)
- QV Average Va = 4.47% (s = 0.85%)
    - PWL = 82.14% (PF = 95.20)
- The department believes that the dispute rate will likely decrease when using PWL processes and procedures.
- The department believes that the proposed specification limits will provide fair incentives using current construction practices while also providing additional opportunities for incentives with process improvements.
- Dan K.: The contractors have shown us with normal HMA that they could improve their processes and they did.
    - Albert K.: PWL also provides for incentives whereas the QMP did not for the volumetrics.
- Debbie S.: All the things we learned from PWL don't change when we're not running PWL mix. So, there may not be a big improvement. They are sensitive mixes. We are worried there might be a lot of credits because of how sensitive the mix is, and I don't think we are seeing failures in the field.
    - Dan K.: We have had some significant penalties with SMA over the years. I think the PWL system is a better system than the current system no matter where you set the limits. There will probably still be some projects in the future with disincentives, but overall, it shouldn't be much different.
    - Albert K.: PWL will allow us to better assess our materials and give a fair price adjustment, statistically speaking. To Debbie's point about the variability due to mixture sampling and testing sensitivity, that actually helps the contractor when we compare datasets, as there will be more overlap between the data, increasing the odds of comparison and ultimately using contractor test results for acceptance and pay. Additionally, if we take split samples with the new program, that will even further help us compare results and reduce variability related to sampling and

splitting.

- David H.: We are worried about the increased frequency of testing in the region since we seem to compare better with Jeff. We've had to rely on Jeff to overturn results in the past. We are worried about the region testing out the lot when we weren't comparing well with them.
    - Dan K.: Ultimately, the contractor can dispute the region results and BTS results would be used.
- David H. We currently do split samples during the test strip.
    - Taylor C.: The department only tests 1 of the 3 instead of all 3 like PWL for HMA.
    - Dan K.: We are not currently changing the SMA test strip to match HMA due to workload on the test strip day.
- Taylor C.: Is the QV sample frequency changing.
    - Dan K.: Yes, it will be 1/3,750.
- Joe K.: What does this do to the sample sizes? Already need 70 lbs. for QC and 70 lbs. for QV. Do we need another 140 lbs. for the split samples?
    - Albert K.: Yes, you need the additional 140 lbs. for the 4-part split. Another option is to forego the dispute process entirely and just use the QV results when we don't compare to reduce sample size. This probably isn't an ideal solution for the industry though.
- Debbie S.: What is the timeline for piloting this for SMA?
    - Albert K.: We've discussed possibly change ordering in the PWL sample frequency into SMA projects this year but still use QMP for pay and acceptance so we can run a shadow PWL analysis that wouldn't be used for acceptance or pay.
    - Erik L.: These specs are incorporated into the AWP stuff, so the same stuff for the small quantities applies here. We probably won't pilot these until 2027. We will want specs to be complete by end of 2026, and everything wrapped up by 2028.
    - Debbie S.: How many SMA projects will there be?
        - Dan K.: There will be more in all the regions soon.

- For density, used existing lower limit as the specification limit (93.0%).

- Dispute Rate = 14.1% of lots
  - Dispute rate is low because of gauge correlation efforts.
- QC Average Density = 94.3% (s = 1.39%)
  - PWL = 81.85% (PF = 94.55)
- QV Average Density = 94.0% (s = 1.49%)
  - PWL = 78.17% (PF = 90.66)
- Project PWL = 81.71% (PF = 94.37)
  - Like what we do now. Uses QV data when data doesn't compare with QC for the lot.
- Reasons for non-comparison and lower pay factors:
  - No footprint or F&t testing. So, no corrective actions taken to improve comparison.
  - QV sampling rate is potentially much lower than the contractor (only 10% of sublots test per design).
  - No core dispute testing (also used to recorrelate, if needed).
  - Potential impacts from mixture and gauge variability.
- Debbie S.: If the target is 93% and we are getting 94.5% but the pay factor is only 95%.
  - Albert K.: The reason for this is due to the higher standard deviations.
  - Debbie S.: We would like to look at this more especially if we aren't solving any issues we are seeing the field. The way the gauges read the material might account for the extra variability.
- Presented density results with 92.5% lower limit.
  - QC Average Density = 94.3% (s = 1.39%)
    - PWL = 88.95% (PF = 98.69)
  - QV Average Density = 94.0% (s = 1.49%)
    - PWL = 86.12% (PF = 96.42)
  - Project PWL = 88.95% (PF = 98.51)
  - Casey W.: These numbers are also from a small sample size and not using PWL system. There is good potential here for using PWL on SMA density.
  - Albert K.: We think that doing PWL on mix could improve field densities a little bit in terms of consistency, which could bring that variability down, which could improve your pay factors.
  - Joe K.: This is much more reasonable.

- Erik L.: The relationship between the QC and QV data is excellent. Would like to see the compaction curves for these mixes to see when they lock up. Is there some practical limitation to achieving maximum density that you can get.

- Jake A.: Will longitudinal joint density be added to PWL for SMA?
  - Dan K.: Yes. We will also review the targets.
- **Action Item:** The department will draft up language for a change order to shadow PWL for SMA (testing frequencies and sample splits). Will share the results of the shadow data with industry.

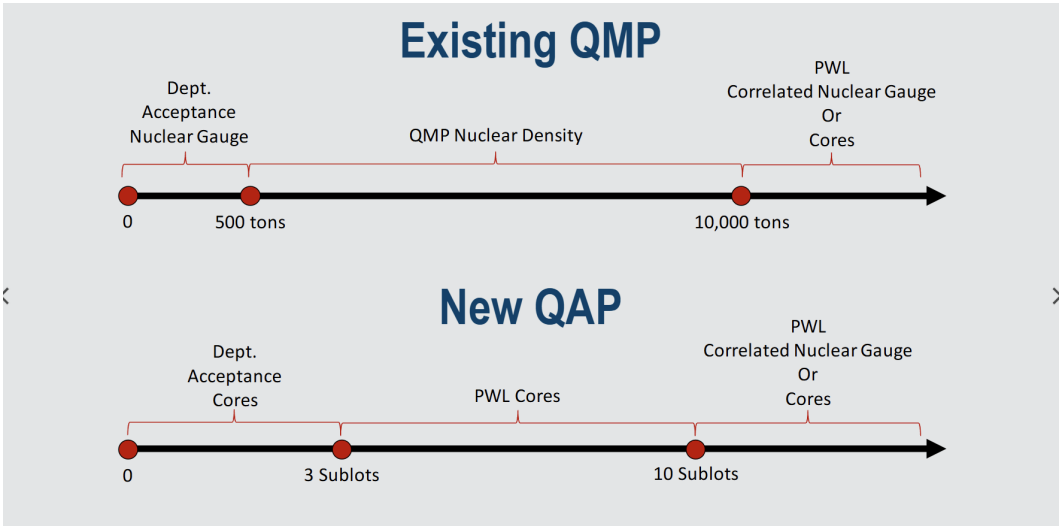
2. Coring on Small Tonnages
   - Debbie S.: We already do a lot with the gauges like sending them to the manufacturer, taking them to the blocks, establishing reference sites, and before they leave establishing where they are. Is it necessary to correlate to cores in the field for these areas? We are still tying the gauge to known densities, and if that's the rule, we are following the rule.
     - Dan K.: We were directed through FHWA that uncorrelated gauges were not to be used in the future.
   - Debbie S.: Additionally, if we move to cores, there are safety concerns and all of the work is added to the end of the day, unless coring the next day. The gauges are established to known densities before we take them out without additional correlation. We thought the gauges were doing better as in reading closer to accurate.
     - Dan K.: You are right that our offsets are getting closer to zero, but we still occasionally see larger. We are still deciding on what quantities are considered small quantities and if those quantities need cores or ordinary compaction for FDM language. For example, small bridge approaches on a rural roadway that is 200 tons on both approaches. Is that something we are going to ask for coring on, or is there another alternative? That's what we are looking to hear from industry if there are alternatives.
     - Casey W.: To summarize, we already do these checks on reference blocks, etc. so those gauges are verified to be working within some parameters. Then the correlation is location specific to the asphalt in the field, so there can be a discrepancy.
     - Erik L.: There are two things, the method of verifying compaction. We've talked about cores and gauges, so we wanted to settle on whether there are any other options. We understand that the risk might not be there for the need for correlated gauges. We don't necessarily have a solution. The second part is what kind of

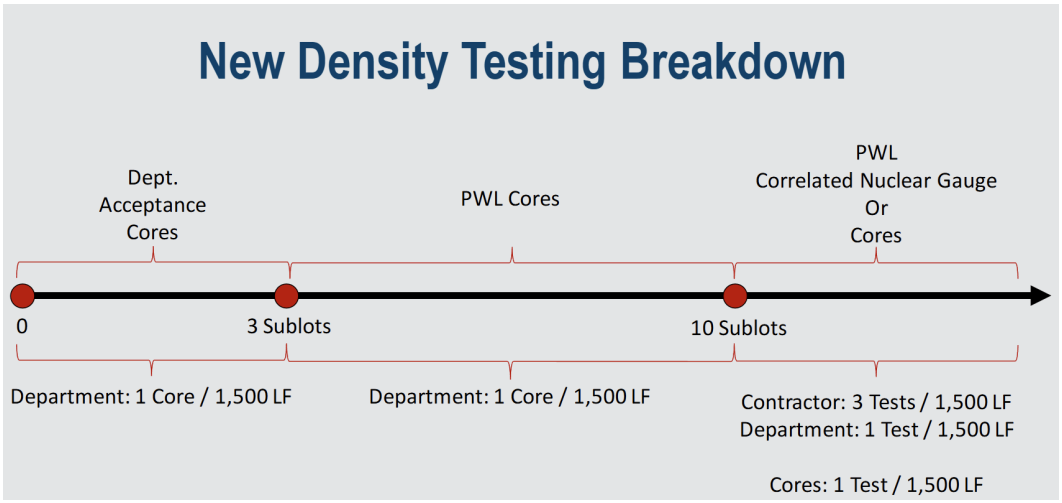
projects, tonnage, linear feet, or other factors should be used to give the designers guidance on specifying how they should accept the material. It sounds like industry wants to continue to use the nuclear gauges.

- Jon W.: Is there a minimum distance or tonnage threshold we can decide on for whether or not the gauge needs to be correlated? Is there a certain quantity on the job that is core only regardless or correlated gauges can be used when we are able?
    - Dan K.: That is what we are saying, correlated gauges can be used if it makes sense to do it. If the test strip area is as long as the project, then it doesn't make sense to do it. There is a certain length where it doesn't make sense to do a correlation because the project is practically done… We would only have only a few more cores to take then the project would be done. We want to develop guidance so that it can be decided before letting how the density will be accepted.
- Jon W.: Are we going to change the distance or tonnage required for the correlation? We can correlate on less than 750 tons.
    - Albert K.: We have developed some changes. For a combined volumetric test strip and correlation strip the correlation is performed within the 750-ton volumetric test strip, as is done today. For a correlation only test strip, we've said the correlation can be done in two density sublots or about 3,000 feet. The point being you would take 5 cores from each sublot to accept those sublots, but then use those cores to develop the correlation. Could we do this in less area? Yes, we can discuss that, but again, if we are taking 10 cores to perform a correlation, there will be grey area for when it makes sense to switch to correlated gauges. Additionally, we are talking about smaller areas where the correlation may not be valid from the mainline due to pavement structure differences, but the area is too small to correlate a gauge within.
        - Jon W.: Can a gauge offset follow a gauge for similar pavements structures?
            - Albert K.: This is one solution we've discussed previously but would need to do some additional research to make sure that that method is acceptably accurate.
            - Dan K.: I think Illinois does something similar to this. This could be a good solution depending on the circumstances.

- Debbie S.: What are your thoughts on ordinary compaction and which projects would that be acceptable on? For example, the bridge approaches to not have any testing at all, we would rather have something, even if it's within one percent.
    - Albert K.: We agree that in that situation something is always better than nothing.
- Joe K.: One of the sticking points is intersections on a project, such as a PWL project for the mainline. We've got shoulders and intersections to do, and our gauge correlation doesn't follow to the intersection or shoulders even though it is the same material on the surface of the shoulder and intersection. Also, how much risk does the state assume if we just go with ordinary compaction in areas where we've got underlying base course or millings?
    - Albert K.: This could work well on projects with lifts thicker than about 2 inches where the influence of the underlying layer is minimal.
    - Joe K.: If we are putting down a 1.25" layer, what is the risk? You've already created the structure under that layer.
    - Brian J.: We currently have a 50-foot offset rule that can be waived, right? I.e.: if a side road is less than 50 feet you can waive that density and make it work. [In reference to minimum distance rules for gauge].
    - Dan K.: I think the ease of using a gauge has led us to test more often than if we were just using cores. I think we can look at the frequency of core testing because it's more in depth, rather than a one-to-one swap with the gauge frequency.
    - Joe K.: The 50-foot option used to say "shall be waived" now it says "may be waived" which gives us some concern that we might be required to test something that's 10 feet wide and I can't even get a roller on it.
        - Brain J.: They'd have to maintain the proper offsets as well from the traverse construction joint.
        - Albert K.: The reason we changed that language was because we didn't want to exclude the possibility of testing on such a wide range of scenarios. So, we wanted the option if we thought testing the area was important.
- Debbie S.: If we are just looking to accept the material and not pay an incentive, why wouldn't the uncorrelated gauges be ok, then it comes down to department risk knowing the gauges aren't 100% accurate. It seems like we are changing the spec for reasons other than the quality.

- Albert K.: We might be able to use uncorrelated gauges with no incentives on department acceptance quantities.
- Dan K.: If we did use uncorrelated gauges, we would have an option where the department can take a core if they find a need. We may also revisit the testing frequency for cores, it may not need to be a 1:1 swap with the gauges since the testing is much more involved.
  - Albert K.: One example for when we might want to take a core is if the uncorrelated gauges are more than 1-1.5 PCF apart between QC and QV.
- Dan K. Reviewed some of the gauge offsets and some of them are more than +/-2.0%, but a majority are within 1%.
  - **Action Item:** Department will review these projects for causes of higher gauge offsets.




- Neal A.: There are certain areas such as a ramp that flares out into two lanes and inside and outside shoulder and possibly a turn lane that don't

fit the sublot definition. You could end up over testing these types of areas.

- Albert K.: We will call out those elements in the mixture use tables so the methods of acceptance will be known. A lot of these non-mainline locations are accepted by department testing, so maybe it will be ok to use an uncorrelated gauge with department acceptance if in those situations we have the option to take a core for reassurance.
  - Dan K.: Coring could be requested within a day or two, and that could be the compromise to allowing the uncorrelated gauges. That way a core rig doesn't have to be on site the whole time.
    - Jon W.: That is fair.

- Dan K.: Is industry aware of any states that use uncorrelated gauges for small quantity acceptance or are they just doing ordinary compaction, or a method spec with cores?
  - Jon W.: In Illinois they changed to QC/QA 1 core per day. They don't use gauges and take just 1 core. Some municipalities do growth curves.
  - Zach L.: For airports we take 1 core every 400-600 tons.
- Taylor C.: Once we start mixing gauges and cores makes it tougher on project staff because they need a core witness and someone to operate the gauge. One or the other streamlines the operations.
  - Jon W.: Agreed. Is the coring process changing at all, where the department witnesses the core being tested, or is it QC/QV cores.
    - Dan K.: Process stays the same as it is today. Regions aren't fully equipped to do this testing yet.
- Erik L.: We are going to pilot the AWP spec on maybe 5 to 10 projects total for the 2026 construction year. Whatever this group comes up with would have to be incorporated into those pilot specifications. We are going to go forward with the pilots with what we currently have. That doesn't mean all of those pilot projects will be HMA, maybe a total of 3 projects. Going in to 2027 the pilot specs will expand to more projects. Then full rollout in 2028.
- **Action Item:** Department will review proposed solutions if they are acceptable.