

Importance of Materials and Quality

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Materials Training Updates -2020

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Today's Topics

- Code of Federal Regulation
- Independent Assurance Updates
- Construction Quality
- HTCP Updates
- Approved Product List
- Follow up on recent specification changes

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Why Quality Matters & DOT Emphasis on it

1. It impacts the life and maintenance costs of everything we build!
2. Negative trends in non-conformance & non-performance data over the last several years.
3. FHWA has identified this as a top risk for WisDOT and is looking for improvement
 - Good news – we have a start on this! But there is room for more improvement!

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Control of Materials: Standard Spec 106

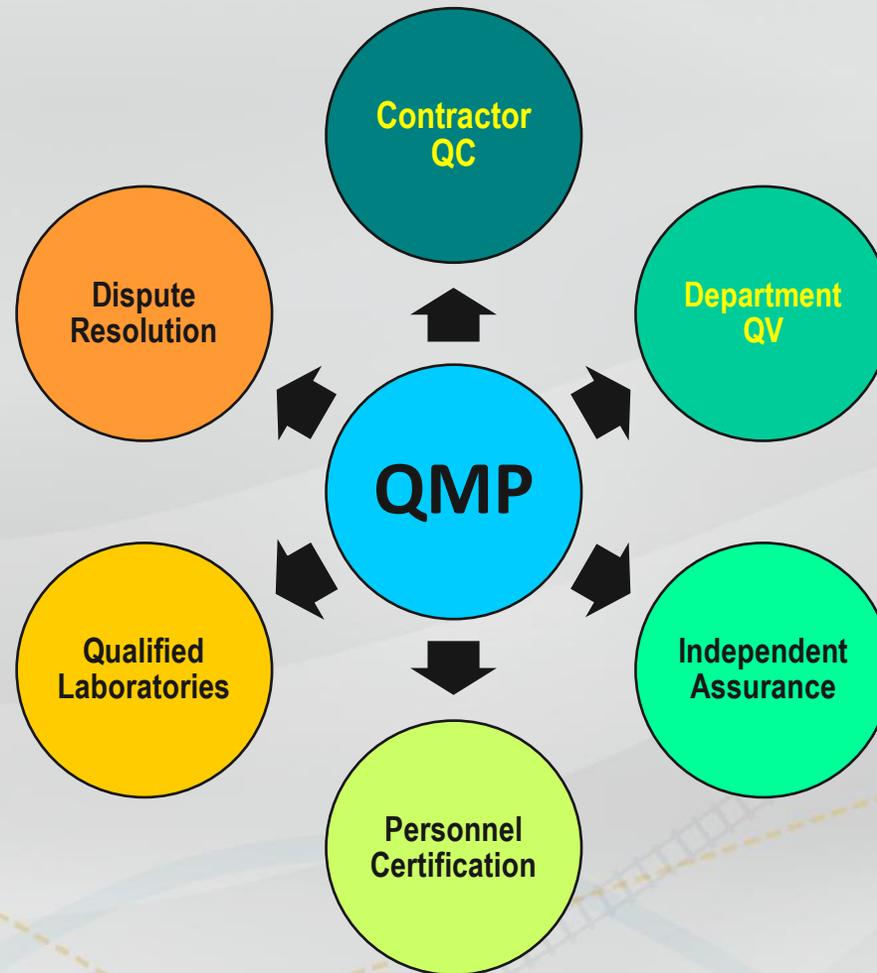
- FHWA Regulations - (23 CFR 637)
- All materials must be approved before incorporated into the work
- Approval based primarily on test results showing the material conforms to specifications
- Testing:
 - Manufacturer performs and certifies
 - Performed by the contractor under the quality management program (QMP)
 - Performed by the department

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Quality Management Program (QMP)

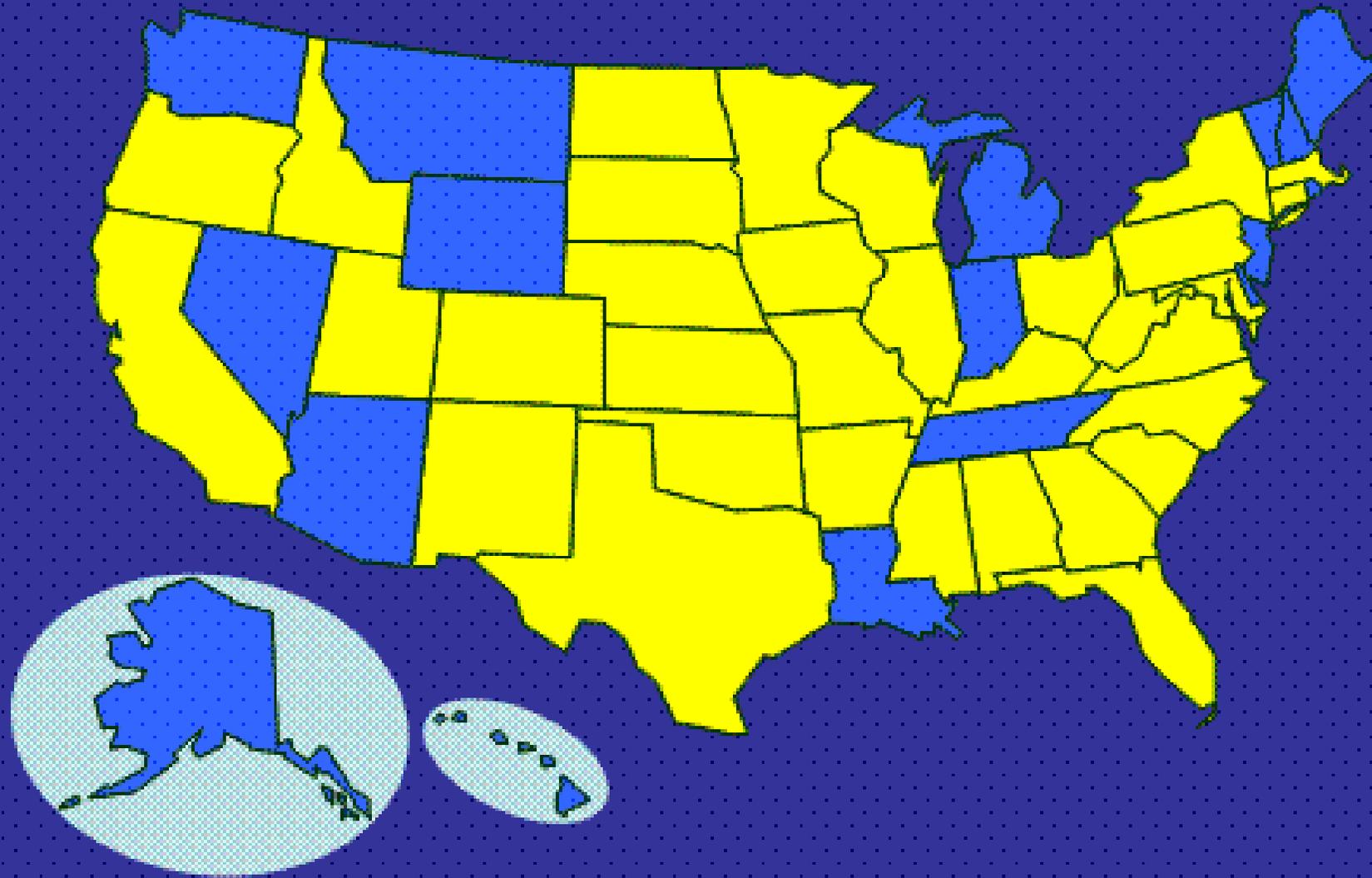
- Under QMP provisions, department will base approval of materials and acceptance of the work on a combination of the following:
 - Contractor Quality Control (QC) testing
 - Department Quality Verification (QV) testing
 - Inspections of the materials production, storage, handling, and construction processes
- Dispute resolution procedures
- Foundation of the QMP concept is to develop partnership so that the exchange of information is commonplace

QMP Core Elements



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33 States Using Contractor Test Results in Acceptance Decision



Independent Assurance Program

Adam Johnson – new program lead!!

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What?

- 23 CFR 637 Part B (Code of Federal Regulations)

“Activities that are an unbiased and independent evaluation of all the sampling and testing procedures used in the acceptance program. Test procedures used in the acceptance program which are performed in the STD’s central laboratory would not be covered by an independent assurance program.”

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How?

- Evaluate sampler & tester procedures.
 - QV & QC
 - Observations
 - Split Samples
 - Proficiency Samples
- Evaluate equipment.
 - Calibration Checks
 - Split Samples
 - Proficiency Samples

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When?

- WisDOT adopted a system basis approach.
- WisDOT and FHWA agreed to a rate of 90%.
 - What does this mean?
 - WisDOT must evaluate 90% of all samplers and testers statewide.

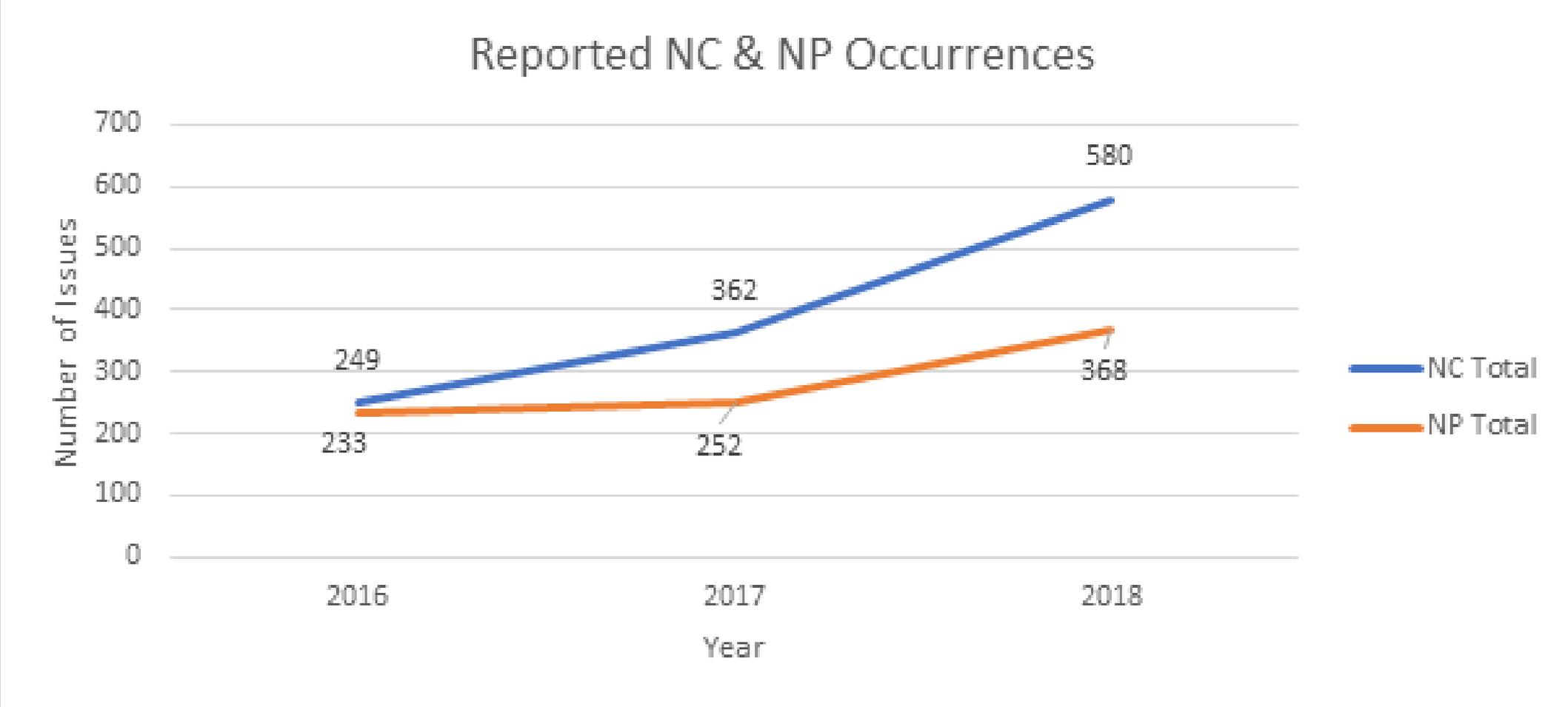
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Project Staff Responsibility

- Communication is crucial...
 - Contact region IA staff if placing any QMP materials, the samplers and testers will need to be evaluated.
 - Critical step in staying compliant.

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Non-Conformance & Non- Performance of QMP



Value of each test

- HMA – Each QC Verifies **\$45,000+** of material
- Concrete Paving – Each QC Test Verifies **\$75,000+** of material
- Concrete Structures – Each QC Test Verifies **\$20,000+** of material
- Base Aggregate – Each QC Test Verifies **\$45,000+** of material
- Over 50% of the cost of construction is materials.
- **EACH TEST HAS SIGNIFICANT VALUE!!**

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Good testing

- Is this the air meter you want testing your concrete?
- This test could be worth \$20,000+



Falsified air test results catch up with quality control manager (2018)

A former concrete quality control manager pleaded guilty to conspiring to commit wire fraud in connection with the U.S. Department of Transportation-funded Dulles Metrorail Project Phase II, an 11.4-mile stretch of the Metropolitan Washington Airports Authority's (MWAA) 26-mile Silver Line extension.

- quality control staff he supervised falsified test records knowing that prime contractor would reject concrete measuring air content outside a required 4.5-7.5 percent range.
- test results showing concrete mixes falling below 4 percent air
- faces a maximum of five years in prison and \$250,000 fine

Concrete Tests Faked Again, Officials Charge

By WILLIAM K. RASHBAUM AUG. 4, 2011



The six defendants accused of falsifying concrete tests in State Supreme Court on Thursday.
Michael Appleton for The New York Times

In 2008, a company hired to test the strength of the concrete used at major public works projects in New York, including the Second Avenue subway and the new Yankee Stadium, falsified results, prosecutors concluded, and

On Thursday, the company they selected, its owner and five employees were arraigned on [charges](#) of doing the very same thing on those two projects and hundreds of others.

In fact, none of the nearly 3,000 test reports that investigators seized from the replacement company, American Standard Testing and Consulting Laboratories, contained legitimate test results, according to one person briefed on the inquiry that led to the charges.

“The volume of fabricated tests is egregious,” the Manhattan district attorney, Cyrus R. Vance Jr., said in announcing the charges. “It was systemic; it was pervasive.”

In addition to Yankee Stadium and the Second Avenue subway, the projects for which test results were allegedly falsified represented a remarkable array of familiar places, both old and new: work on the Lincoln Tunnel, the Jacob K. Javits Convention Center, the Port Authority Bus Terminal, the Metropolitan Transportation Authority’s huge new Fulton Transit Center and East Side Access project, the new air-traffic control tower at La Guardia Airport, a building at Memorial Sloan-Kettering Cancer Center, Weill Medical College, Columbia University and the Intrepid Sea, Air and Space Museum.

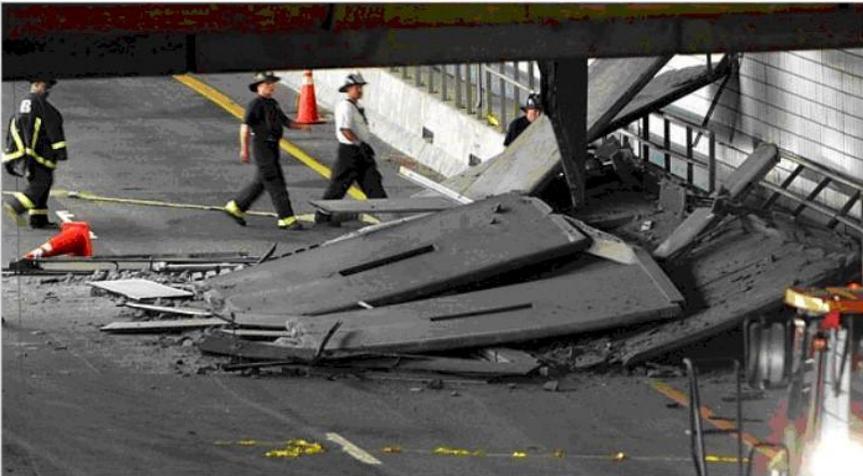
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U.S.

Collapse of Big Dig Ceiling in Boston Is Tied to Glue

By MATTHEW L. WALD JULY 11, 2007

Correction Appended



A year ago Wednesday, a woman died in the collapse of the ceiling of a Big Dig tunnel in Boston. A report on the collapse was released Tuesday. Michael Dwyer/Associated Press

The supplier in Boston, Powers Fasteners, noted that the fast-set epoxy was not for long-term use but that information was “in the fine print,” said Mr. Magladry, and no one recognized that the material would weaken.

The failure dumped 26 tons of concrete and hardware on the 15-year-old Buick sedan in which Milena Del Valle was riding, and on the surrounding roadway. Her husband, the driver, escaped with minor injuries.

The board tested both formulations of epoxy available from Powers and found that the “standard set” type worked fine, but within 80 days, all the samples using the “fast set” formulation had failed.

Documents released by the board Tuesday show that during the project’s construction, as bolts continued to slip out of the ceiling, various companies involved in the work raised new theories. These included suggestions that nuts had been attached to the bolts with too much force or that ceiling panels were pulling unevenly on the bolts.

Hundreds of cracked construction nuts have been found within Boston's Big Dig tunnel system. And, this isn't the first problem for the highway project that was completed just a few years ago.

Highway Administrator Tom Tinlin disclosed Wednesday more than 100,000 nuts have been inspected. Nearly 900 damaged nuts were found in the Ted Williams Tunnel and 49 nuts need to be replaced in the Turnpike Connector Tunnel and the Interstate 93 tunnel.

InDOT Probes \$71M Crumbling Road Mystery (2015)

Nearly 200 recent road projects across the state could crack and crumble years ahead of schedule because of critical mistakes contractors made mixing asphalt.

State transportation officials are testing samples from \$71 million in pavement projects in state laboratories to uncover flaws in the asphalt mix. They suspect contractors are using insufficient amounts of the sticky petroleum binder that holds asphalt together. Others, however, suggest the state's call to use more recycled asphalt could be the culprit.

"Our concern is did (contractors) include enough binder to make the pavement perform as it was intended," said Robert Tally, INDOT deputy commissioner for materials and construction management.

He emphasized that testing continues and they haven't reached any firm conclusions. But in some cases INDOT has already notified local transportation officials that the lifespan of their new roads could be 30 percent shorter than usual.

For drivers already frustrated with the condition of Indiana's roads, including a month-long shutdown of 33 miles of I-65 due to a broken bridge, the rapidly deteriorating asphalt threatens to make things even worse. The problem threatens to cause roads to fail sooner, putting taxpayers on the hook for even more road construction.



It's not just construction materials.....

- How is Buzz going to get to his rocket?????



And even Target has some issues.....



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The moral of the story

- Everyone has a role in producing a quality final product
 - Isn't that what we all want?
- Communication early and often solves a lot of issues
- It needs to be part of the culture of the firm and employees need to be empowered to address it.



Highway Technician Certification Program

- Materials Coordinator Training Updates
- Revocations
- Assistant Certified Technician (ACT) Program Changes
- AGGTEC – II Sunset

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HTCP - Materials Coordinator Training Updates

- Made certification into one online module MCT vs the two of MCT-D and MCT-C
- LIVE NOW with new content
- Registration/Recertification at \$100 (similar to MCT-C)
- Layered assessment checks into each module
- Exam at the end

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Revocation

- Events Spanning from:
 - Unethical behavior
 - Low quality of work and faulty equipment:
 - Not knowing how to execute proper, testing methods for the specific certification
 - Unacceptable, non-performing equipment
 - IA having to walk technicians through “how to”
 - Non certified tester, performing tests on WisDOT projects

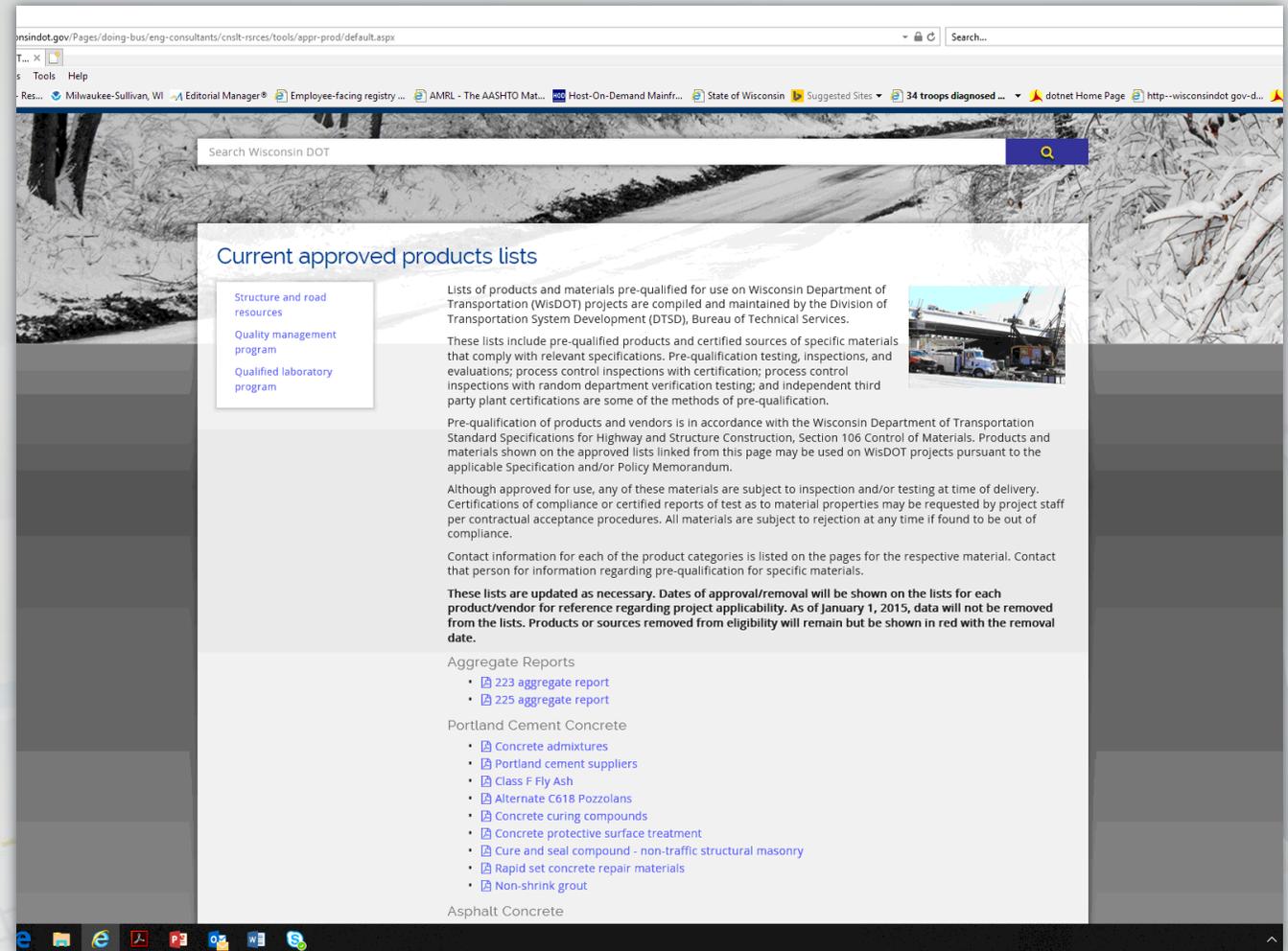
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HTCP ACT Program

Current Program	Revised Program
3 terms (calendar year) per ACT Certification	1 term* only (calendar year) per ACT Certification. 2 nd term* will only be issued if proof of enrollment in a current two/four-year Civil Technology/Engineering or Building Construction Management program is submitted to HTCP at the time of registration for ACT technician *term = Technician + Employer
Reduced lab exam from 3 year certification lab exam	Making lab exam same as 3 year certification
No exam attempt threshold set for failing exam	If technician fails 1 st attempt, allowing 1 retake. If fail, ACT enrollment is void & must attend a 3 year class. No reimbursement of registration
No signature agreement from instructor and/or mentor to acknowledge understanding of ACT program and responsibility.	Layering signature agreement form for instructor and mentor to sign and submit along with lab exam
No cap on how many registrations a company can have	Layering a 20% company cap for Act registrations based on active 3-year certifications within organization. Note: Smaller companies will be able to register up to 5 ACT registrations, dependent on their 3 year certification portfolio

Approved Products List & Repeal of 23 CFR 635

- FHWA Repeal of Patented and Proprietary Product Requirements
- Use the WisDOT Approved Products List!!



The screenshot displays the WisDOT website's 'Current approved products lists' page. The page features a search bar at the top, a navigation menu, and a main content area with the following sections:

- Structure and road resources**
- Quality management program**
- Qualified laboratory program**

The main text explains that these lists include pre-qualified products and certified sources of specific materials that comply with relevant specifications. It also notes that pre-qualification of products and vendors is in accordance with the Wisconsin Department of Transportation Standard Specifications for Highway and Structure Construction, Section 106 Control of Materials.

Aggregate Reports

- [223 aggregate report](#)
- [225 aggregate report](#)

Portland Cement Concrete

- [Concrete admixtures](#)
- [Portland cement suppliers](#)
- [Class F Fly Ash](#)
- [Alternate C618 Pozzolans](#)
- [Concrete curing compounds](#)
- [Concrete protective surface treatment](#)
- [Cure and seal compound - non-traffic structural masonry](#)
- [Rapid set concrete repair materials](#)
- [Non-shrink grout](#)

Asphalt Concrete

Follow up on recent program changes

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NRRA – Flex Team – dot.state.mn.us/mnroad/nrra/

Browser navigation bar showing the URL <http://www.dot.state.mn.us/mnroad/nrra/structure-teams/flexible/index.html>. The browser title is "NRRA Flexible Team Page". The address bar includes a search field and navigation icons. The taskbar shows several open applications including "DTSD Administrative - Res...", "Milwaukee-Sullivan, WI", "Editorial Manager", "Employee-facing registry...", "AMRL - The AASHTO Mat...", "Host-On-Demand Mainfr...", "State of Wisconsin", "Suggested Sites", "Report: British police...", "dotnet Home Page", "http--wisconsin dot gov-d...", and "dotnet Home Page (2)".

Road Research

- MnROAD Home
- NRRA
- NCAT Partnership
- Research Topics
- Search Reports
- Contacts

Flexible Team

The flexible team is comprised of technical experts in the area of new and rehabilitation of asphalt roadways. Activities include prioritization of short and long term research, development of long term research test sections at MnROAD and providing input to the technology transfer team on what should be marketed.

Team Meetings

Team meetings happen the **first Wednesday of every month, 10-11 a.m.**, (unless the chair reschedules). The link below will work for all the meetings, even if they are rescheduled.

[Join online meeting](#)

There is no conference call bridge for these meetings. Please use the audio and microphone through your computer. If that doesn't work, please access the meeting through the smartphone app.

Quick Links

- [Our Partners](#)
- [Structure and Teams](#)
- [Meetings](#)
- [Newsletter](#)
- [Research Pays Off](#)
- [Join NRRA](#)
- [NRRA Pavement Workshop](#)

NRRA Flexible Team Efforts

2017 Synthesis

- [Longitudinal Joint Construction Performance](#) - Complete
- [Tack Coats](#) - Complete

2017 Projects

- [Developing Best Practices for Rehabilitation of Concrete with Hot Mix Asphalt \(HMA\) Overlays related to Density and Reflective Cracking](#)
- [Cold Central Plant Recycling \(CCPR\)](#)

2019 Synthesis

- [Mix Rejuvenator Synthesis \(Phase I\)](#)

2019 Projects

- [Mix Rejuvenator Test Sections \(Phase II\)](#)
- [An Innovative Practical Approach to Assessing Bitumen Compatibility as a Means of Material Specification](#)

[HMA Performance Testing \(doc\)](#)

Members

- [Member List](#)
- [Email the team](#)

General Questions

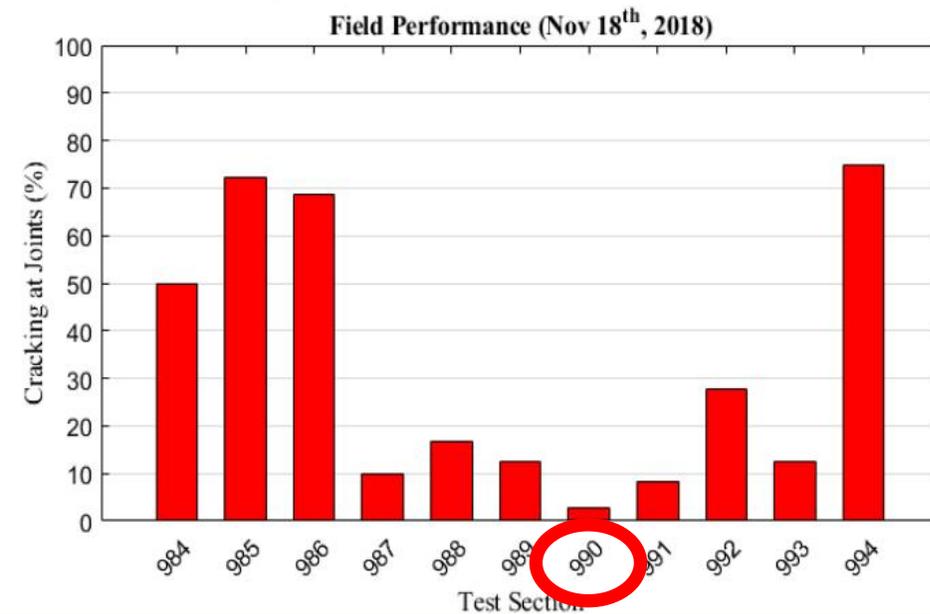
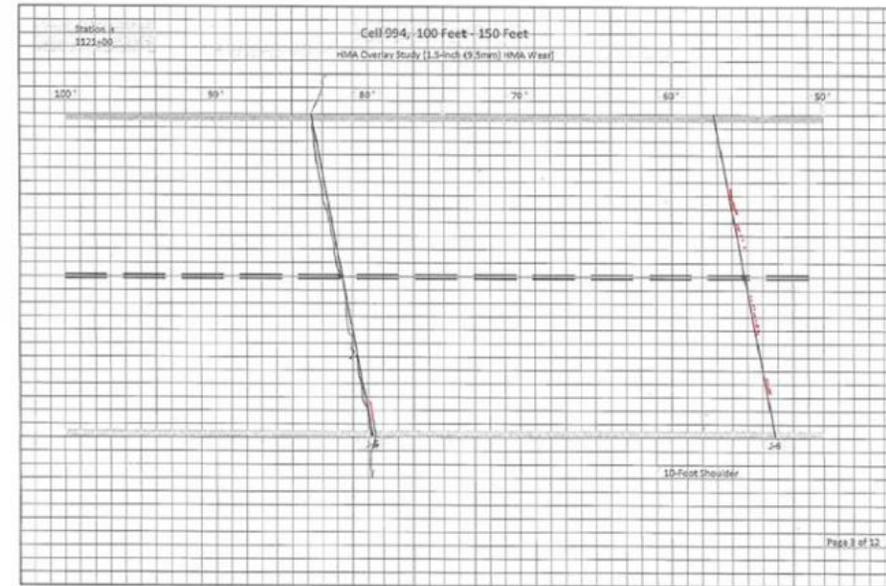
Daniel Oesch - Chair
Missouri DOT
daniel.oesch@modot.mo.gov

Team Pages

- [Executive Committee](#)
- [Flexible](#)
- [Rigid](#)

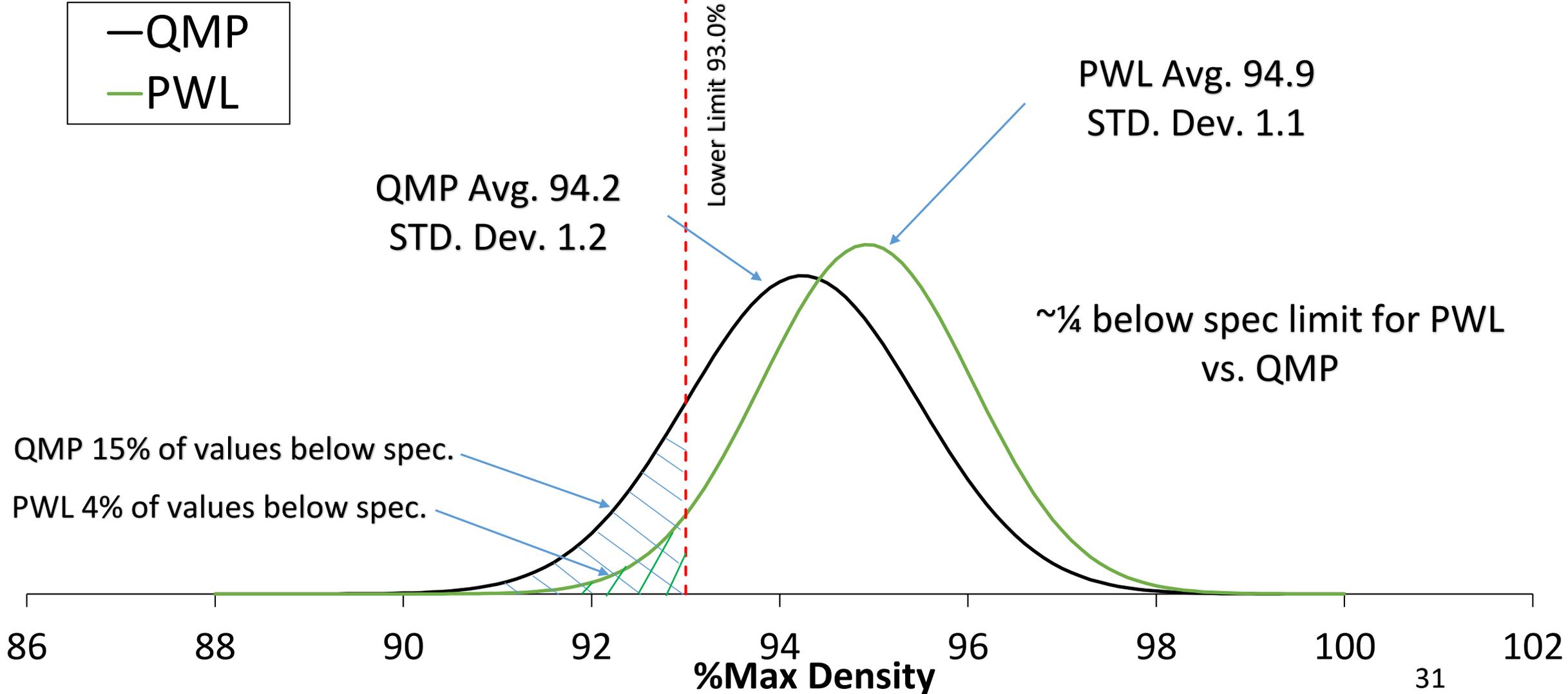
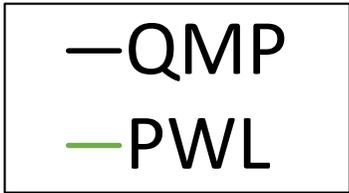
Field Performance – Distress Survey Data

- Convert distress survey maps to digitized reflective cracking data (**percent cracking at joints**)
- After 1 year of placement, cells with **less than 10% cracking at joints** include:
 - **Cell 990** (1.5", 9.5 mm (3% AV) and 2.25" HMA, 19mm)
 - **Cell 991** (1.75", 9.5 mm (AASHTO M323 #8) and 2.25" HMA, 19mm)
 - **Cell 987** (1.5" HMA, 9.5 mm and 2.5" HMA, 19mm)

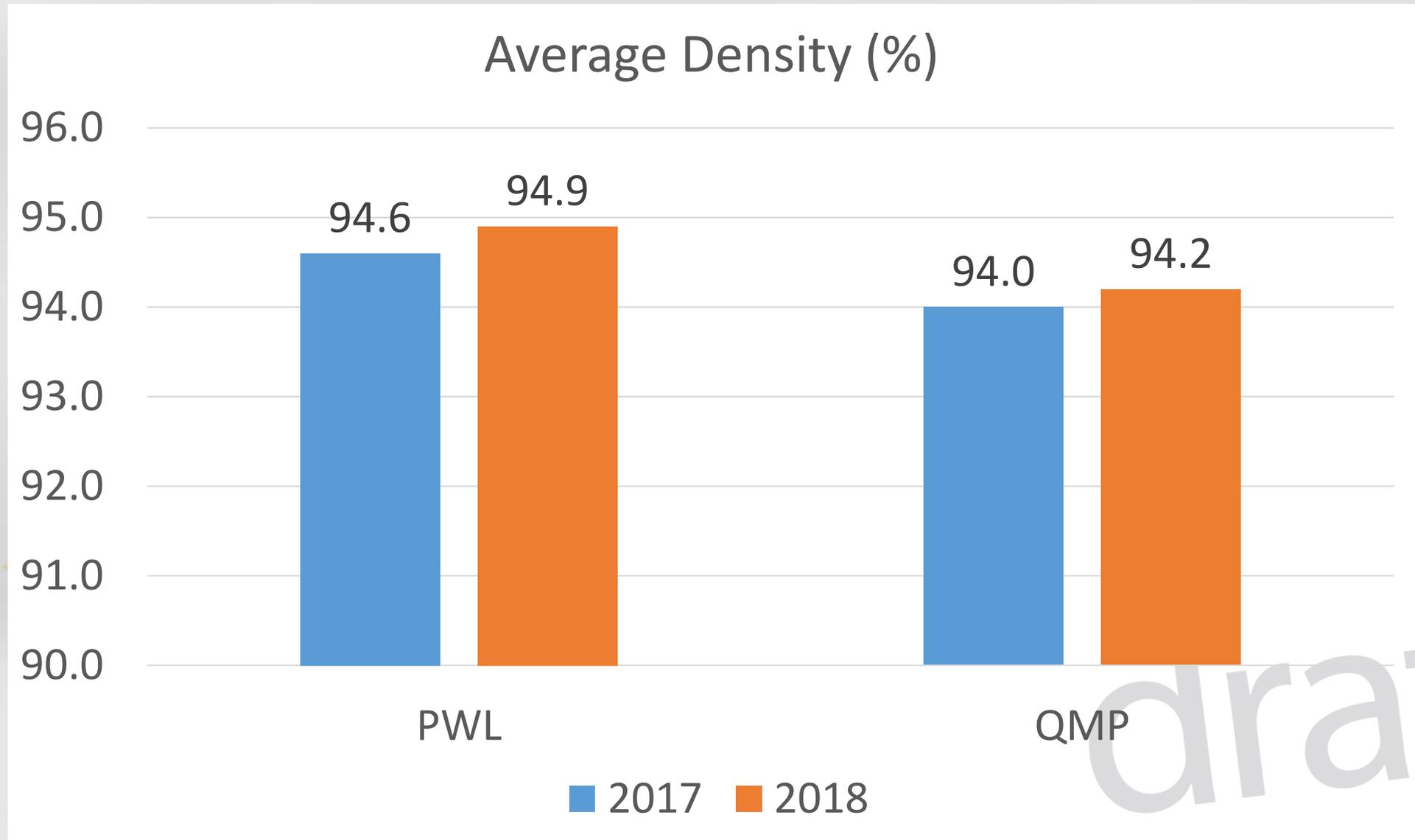


PWL vs QMP

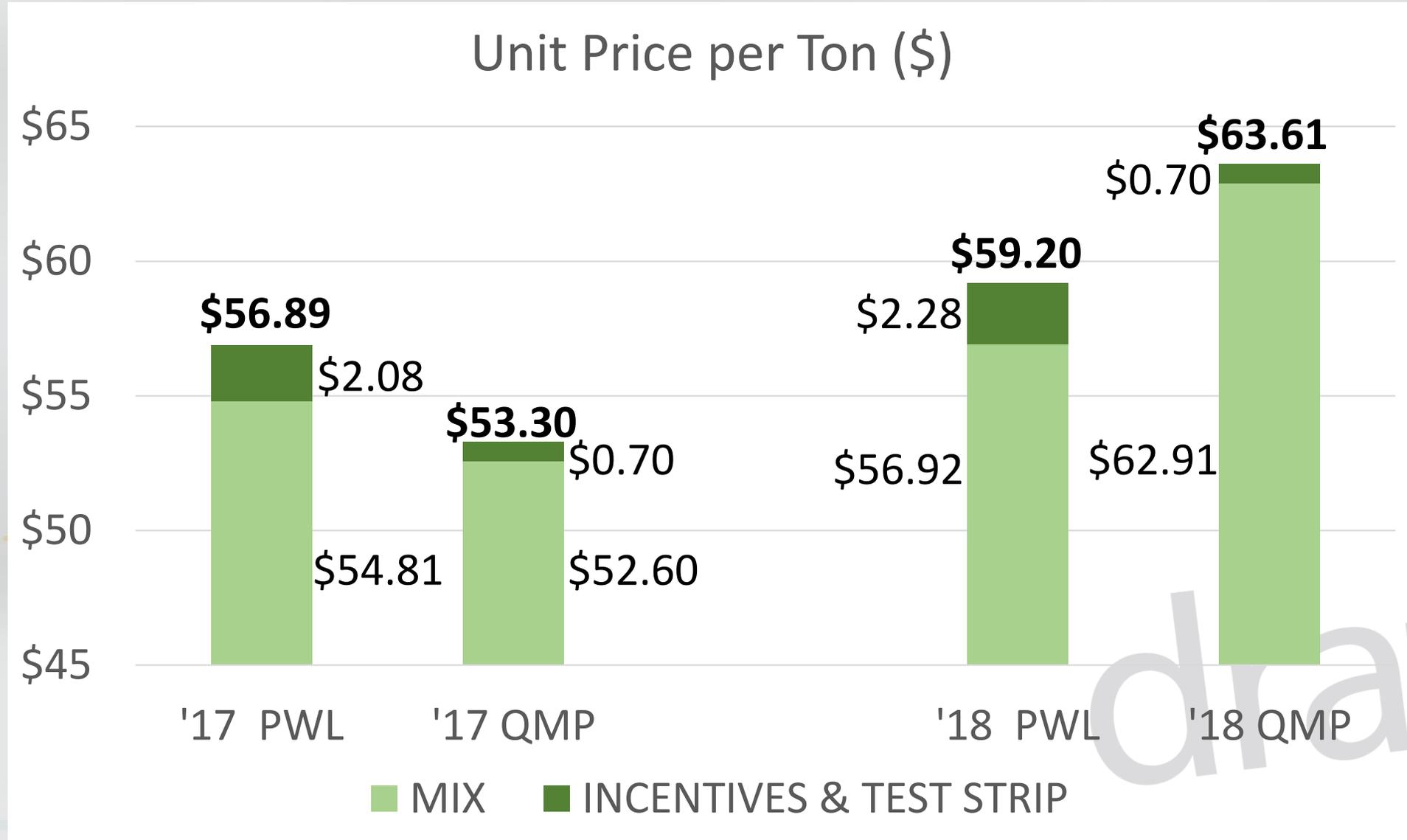
2018 Density Data



PWL – Density Improvements



Return On Investment



Questions

Contact:

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