Non-nuclear Asphalt Density Gauge
Where we’re at

• 2011 allowed Non-nuclear density gauges for QA
How did we get here?

- Ageing Fleet of nuclear gauges
- $$$$$$$
How did we get here?

<table>
<thead>
<tr>
<th>Core Number</th>
<th>Core Density</th>
<th>Trans Tech PQI 301</th>
<th>Troxler 4640B</th>
<th>CPN MC3-DRP</th>
<th>Troxler 3440</th>
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</table>
Core Correlations

- PQI 301 - 0.930
- 4640B - 0.881
- MC3 - 0.922
- 3440 – 0.965
Benefits of the electronic gauge

- Lightweight
- Easy to use
- It’s fast
- No need for a nuke badge
- No need for special travel papers
- No need for extra training (nuclear safety training)
- Time from out of the case to testing plantmix is minimal
- Did I mention it’s FAST?
Drawbacks of the electronic gauge

- Needs 5 shots per test spot
- Needs a 6 inch core to correlate as opposed to the usual 4 inch core
Using the PQI electronic density gauge

- Correlation: takes the same number of cores as the nuke, just needs 5 shots per core
Using the PQI electronic density gauge

- Production: Takes the same number of shots for each test site as correlation
5 SHOTS PER TEST SITE??

No worries! At 3 second per shot, you will be done with all 5 shots, even with writing the numbers down, before the nuke will get 1 shot done!
Special considerations when using the electronic gauge

- No need to use sand under the gauge. Just sweep off the loose rocks.
- As it does not use sand, it must be the first gauge to test the site if other gauges are nuclear.
- There cannot be standing water under the foot.
- You should not be touching the gauge while taking the shot.
- For those used to nuclear gauge offsets, PQI offsets will seem huge. Its normal for an offset of over 22.
# Nuclear Gauge Correlation

## Plant Mix Pavement Device Correlation

**Type of Test**
- Nuclear - WAQTC TM-8
- Requires 2 Readings

**Contract Number**
- 7492

**Contract Item Number**
- S405-20A

**Contract Item Description**
- Superpave HMA PAV CLR SP.4

**Gauge Make**
- 3450

**Model**
- 3450

**Serial Number**
- 867

**Test Strip Number**
- 867

**Plant Mix Lift**
- 867

**Density Test Strip**
- 867

**Date**
- 07/27/2011

**Remarks**
- Correlation Factor (Applies only to this gauge and plant mix lift)

## Instructions for Standard Deviation (See WAQTC TM8 or AASHTO TP 68 Procedures)

Standard deviation must be equal to or less than 2.5 pounds per cubic foot. If greater than 2.5 pounds per cubic foot, eliminate the core with the largest difference and repeat the remaining calculated differences in the next column. Continue to evaluate, eliminating the next largest core and repeat the remaining differences in the last column until the standard deviation is equal to or less than 2.5 pounds per cubic foot. Additional cores must be obtained when less than 5 cores are remaining.

<table>
<thead>
<tr>
<th>Core Number</th>
<th>Station/Mileage</th>
<th>Offset</th>
<th>First Reading</th>
<th>Second Reading</th>
<th>Third Reading Required only for AASHTO TP 68</th>
<th>Fourth Reading Required only for AASHTO TP 68</th>
<th>Fifth Reading Required only for AASHTO TP 68</th>
<th>(1) Average Uncorrected Density</th>
<th>(2) Core Built Density (from laboratory testing)</th>
<th>(3) Calculated Differences of Remaining Cores as Necessary</th>
<th>Recalculate Differences of Remaining Cores as Necessary</th>
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**Average**
- 2.0

**Standard Deviation**
- 1.8

**Remarks**
- Correlation Factor (Applies only to this gauge and plant mix lift)

**Correlation Factor**

| Correlation Factor | 2.0 |

**WAXTC Number**
- 23346

**Checked by**
- P. Archibald

**Date**
- 07/28/2011

**WAQTC Number**
- 23346

**Date**
- 07/28/2011
## Electronic Gauge Correlation

### Plant Mix Pavement Device Correlation

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### Instructions for Standard Deviation

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</table>

### Remarks

- Correlation Factor (Applies only to this gauge and plant mix lift): 27.7
- Filler Recording Wet Densities: 21979
-dale Wheeler

- Calculated by: P. Archibald
- Date: 07/28/2011
- WAQTC Number: 20865
The PQI in action