ASTM Precision Testing for Non-Nuclear and Nuclear Asphalt Density Gauges
ASTM Precision Testing

Goal:

Determine Precision Statement for ASTM D7113
(Established as a new standard w/o a precision statement)

Review Current Precision Statement for ASTM D2950
(Precision statement was developed from a collection of projects)
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D7113 – Standard Test Method for Density of Bituminous Paving Mixtures
In Place by the Electromagnetic Surface Contact Methods
D2950 – Standard Test Method for Density of Bituminous Concrete In Place by Nuclear Methods
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What did we do?

‘Piggy Backed’ on an existing project with Trans Tech, Schenectady, NY
Made all measurements in one day
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Existing Project:
Four 100ft strips of different types of pavement
Pavements were fine-to-coarse – 9.5mm, 12.5mm, 19mm, and 37.5mm
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**Existing Project:**

Four 100ft strips of different types of pavement; each strip divided into zones

<table>
<thead>
<tr>
<th>Zone 8</th>
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<th>Zone 3</th>
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- 100’ – 90’: Measure HMA w/ gauges at 6 core sites. Cut 6 cores from 2 locations.
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- 50’ – 40’: Measure HMA w/ gauges at 6 core sites. Cut 6 cores from 2 locations.
- 40’ - 30’: Measure HMA w/ gauges at 6 core sites. Cut 6 cores from 2 locations.
- 30’ – 0’: Measure HMA w/ gauges at 6 core sites. Cut 6 cores from 2 locations.
- No Testing: No Testing.
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How did we do it?
Followed ASTM E691 to develop a test plan
Initiated an ASTM Interlaboratory Study – ILS (ILS 95)
For both nuclear and non-nuclear devices, manufacturers furnished the gauges and gauges operators
Each operator had a data-collection form. Gauge readings were entered into a spreadsheet
Data analysis was calculated to determine a precision statement

Sounds easy enough?
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We had:
Ten non-nuclear gauges

-and-

Seven nuclear gauges

(nuclear gauges had to be 30ft apart)
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Time Line:
June 2006 ASTM Mtg, Trans Tech offered to host testing, task group formed
June’06-Aug’06 develop the ILS plan
Sept 9, 2006 day of testing
Oct’06-Spring’07 analyze data, determine precision statement
Ballot precision statement
Oops, major problem!!
## ASTM Precision Testing

### Existing Project:
Four 100ft strips of different types of pavement; each strip divided into zones – **Each zone had a different compactive effort!!**

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Time Line - continued:
Pull back the ballot
Enlist more help with data analysis
Dr Ray Pavlovich
Precision statements approved by re-ballot
Spring 2008
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An American National Standard
Designation: E 691 – 99

Standard Practice for Conducting an Interlaboratory Study to Determine the Precision of a Test Method

Read this standard—several times!
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What could we have done better?
As part of another project we saved a ton of money; but it caused some rushed decisions.
E-691 Item 13 calls for a Pilot Run.
Multi-testing Days would have been nice.
Statistical Guru should be in on plan from the beginning.
Thank You