“A YEAR WITH..." DA Ve

DYNAMIC ANGLE VALIDATION
Approved Gyratory Compactors

Pine AFGC125X
Pine AFG1
Brovold
Rainhart
Troxler 4140
Troxler 4141
Interlaken
IPC ServoPac
Are they all the same?

2001
Are they all the same?

2002

NO!!!
Maryland SHA
Round Robin

SGC Set to 1.25 degrees Externally
12.5mm Mixture / 6 Replicates
Maryland SHA
Round Robin

SGC Set to 1.25 degrees Externally
12.5mm Mixture / 6 Replicates

Histogram

Average Bulk Specific Gravity, Gmb

2.51  2.52  2.53  2.54  2.55  2.56  2.57  2.58
Maryland SHA
Round Robin

SGC Set to 1.25 degrees Externally
12.5mm Mixture / 6 Replicates

Average Bulk Specific Gravity, $G_{mb}$

<table>
<thead>
<tr>
<th>SGC Model (Number of Units)</th>
<th>Average Bulk Specific Gravity, $G_{mb}$</th>
</tr>
</thead>
<tbody>
<tr>
<td>B (2)</td>
<td>2.555</td>
</tr>
<tr>
<td>IL (1)</td>
<td>2.560</td>
</tr>
<tr>
<td>G1 (3)</td>
<td>2.550</td>
</tr>
<tr>
<td>125 (14)</td>
<td>2.560</td>
</tr>
<tr>
<td>S-Pac (1)</td>
<td>2.560</td>
</tr>
<tr>
<td>4140 (22)</td>
<td>2.550</td>
</tr>
<tr>
<td>4141 (2)</td>
<td>2.560</td>
</tr>
</tbody>
</table>
Maryland SHA
Round Robin

SGC Set to 1.25 degrees Externally
12.5mm Mixture / 6 Replicates
Maine DOT

Since going to internal angle set by DAV

In 2002

- Out of over 2000 bulk splits (DOT/Contractor)
- 1.5% dispute rate
- 0.5% overturned
Maryland SHA
Round Robin - Original

SGC Set to 1.25 degrees Externally
12.5mm Mixture / 6 Replicates
Maryland SHA
Round Robin - DAV

SGC Set to 1.16+0.02 degrees using DAV
12.5mm Mixture / 6 Replicates

Histogram

Average Bulk Specific Gravity, Gmb
LESSONS LEARNED WITH DAV

- Gyratory Compactor
  - Bearings - excessive wear
  - Brake - not functioning properly; does not maintain the same starting point
  - Ram head - excessive wear
  - Column - lack of grease
  - Machine - not maintained; stops during compaction; worn parts need replaced
LESSONS LEARNED WITH DAV

- Molds
  - Out of round
  - Excessive wear
  - Lack of maintenance
LESSONS LEARNED WITH DAV

- Mix
  - Different mix sizes change internal angle

- Some compactors do not compare; reason is unknown
Refinement of AASHTO T 312-01
Additional Issues

Implementation Issues:
- Cost(s)
- Maintenance
- Specifications

Mixture stiffness versus internal angle

Mold Wear

Round-robin (inter-laboratory) study
Gyratory Compactor

- Must be serviced and Internal Angle set at 1.16

Molds must be checked for:

- Out of round
- Excessive wear
Questions...