Aggregate Specifications

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THE shelly COMPANY
A CRH COMPANY
Many customers use ODOT specifications for aggregates

ODOT sets the benchmark for aggregate specs

Let's look at ODOT specifications back to 1971:
Section 703.05 Asphalt Agg Specs 1971 vs 2017

2. Physical properties.

<table>
<thead>
<tr>
<th>Property</th>
<th>1971</th>
<th>2017</th>
</tr>
</thead>
<tbody>
<tr>
<td>Percent of wear, Los Angeles test, maximum (CCS or washed gravel)</td>
<td>40 %</td>
<td></td>
</tr>
<tr>
<td>Unit weight, compacted, minimum pounds (slag)</td>
<td>70 lb/ft³ (1120 kg/m³)</td>
<td></td>
</tr>
<tr>
<td>Loss, sodium sulfate soundness test, maximum:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Asphalt Concrete, 408 and 422</td>
<td>12 %</td>
<td></td>
</tr>
<tr>
<td>421</td>
<td>15 %</td>
<td></td>
</tr>
<tr>
<td>Percent by weight of fractured pieces (one or more faces), minimum</td>
<td>40 %</td>
<td></td>
</tr>
<tr>
<td>Micro-Deval Abrasion Loss test, maximum (for gravel only)</td>
<td>20 % [1]</td>
<td></td>
</tr>
</tbody>
</table>

[1] If the MD value is greater than the specification limit conform to Supplement 1010.
Most of the specifications are the same!

- If it works why change the specifications?
- Quality is the ultimate goal!
- Reduce customer risk for failure!
- Supply is unlimited?????
- What has changed?
Has aggregate production changed—we have a variety of production methods!

GYRATORY  
HSI  
CONE  
JAW  
VSI
CRUSHING/WASHING/SIZING

- THESE ARE ALL METHODS TO IMPROVE OUR AGGREGATE QUALITY-OF COURSE WE HAVE TO HAVE THE \textit{RAW FEED} TO START WITH!
What has changed to help with aggregate shortfalls and still maintain quality?

Asphalt plants have changed from this:

TO
Very accurate blending of aggregates can now be done!
Plants do a better job of mixing and weaker particles may be reduced
So if our new improved production can not provide spec agg what are our options?
QC improvements-provides accurate information

- Better sampling methods
- Trained technicians
Typical QC tests-gradation
New tests & equipment-may provide more end result data
Research looking at end result!

<table>
<thead>
<tr>
<th>Test Name</th>
<th>Cracking Type</th>
<th>Test Standard</th>
<th>Test Configuration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Disk Shaped Compact Tension Test (DCT)</td>
<td>Low temperature cracking and reflection cracking</td>
<td>ASTM D7313 (Monotonic test)</td>
<td><img src="image1.png" alt="Image of DCT" /></td>
</tr>
<tr>
<td>Semi-Circular Bend (SCB)</td>
<td>Low temperature cracking</td>
<td>AASHTO TP505 (Monotonic test)</td>
<td><img src="image2.png" alt="Image of SCB" /></td>
</tr>
<tr>
<td>Semi-Circular Bend (SCB)</td>
<td>Bottom-up and top-down fatigue cracking</td>
<td>LTRC (Monotonic test) LTRC (Monotonic test)</td>
<td><img src="image3.png" alt="Image of SCB" /></td>
</tr>
<tr>
<td>Semi-Circular Bend (SCB)</td>
<td>Bottom-up and top-down fatigue cracking</td>
<td>Illinois Flexibility Index Test (I-FIT) (Monotonic test) Illinois Test Procedure (ITP) 405 AASHTO TP 124-16</td>
<td><img src="image4.png" alt="Image of SCB" /></td>
</tr>
</tbody>
</table>

![Images of test samples](image5.png)
Summary

- If the supply of aggregate is limited we must use all the methods available to produce a quality end result product.
- As sources of aggregates become more limited we need to review specifications and use other methods to accept local aggregates.