Asphalt Institute is a trade association for liquid asphalt producers, suppliers and affiliated businesses. Asphalt Institute was formed in 1919.
Topics for Today

• What is Superpave?
  • History/Purpose
  • PG binder grading system
  • P 401 Superpave mixtures

• Selecting a PG binder for an airfield project
  • Should you be concerned with binder quality?

• Selecting P 401 mix for an airfield project
  • What is the difference between standard P 401 and P-401 Superpave (using a Superpave Gyratory Compactor)?
  • Should you be concerned with selecting Superpave mixes
Purpose of SHRP Research?
What is Superpave

As a result of SHRP research, the term “Superpave” was chosen to describe a new approach which includes:

- PG binder grading system
  - Replace viscosity grading system (AC-10, AC-20, etc.)
  - Grade selection based on specific climate, loading and traffic speed
- Improved aggregate properties and measured characteristics
- Different approach to laboratory compaction – Superpave Gyratory Compactor (SGC)
  - Superior to Marshall compaction
  - Select design gyrations (compactive effort) to reflect traffic conditions
    - Ndes levels: 50, 75
    - Volumetric Analysis
Asphalt Mixture - Binder Selection

• Superpave grading system and selection is based primarily on the climate in which the binder is to serve

PG 64-22

Performance Grade

Meets all specs up to this temperature (°C)
(based on 7-day average max pavement temp)

Meets all specs down to this temp (based on 1-day min pavement temp)
• Grades represent temperatures at which HMA binder physical properties are satisfied
  • Temperatures change, parameters are constant for all grades
• 6°C increments for high and low temperatures
• Common grades: PG 64-22, PG 76-22
PG Grade for Airfield Pavements

• Determine appropriate grade for climate
  • LTPPBind software, local DOT

• Consider traffic, location, depth within pavement
  • P-401, section 401-2.3

<table>
<thead>
<tr>
<th>Aircraft Gross Weight</th>
<th>High Temp. Adjustment to Binder Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>≤ 12,500 lbs (5670 kg)</td>
<td>--</td>
</tr>
<tr>
<td>&lt; 100,000 lbs (45360 kg)</td>
<td>1 Grade</td>
</tr>
<tr>
<td>≥ 100,000 lbs (45360 kg)</td>
<td>2 Grades</td>
</tr>
</tbody>
</table>
Example: Binder Selection for Albuquerque International

- Climatic grade for Albuquerque
  - PG 64-22 @ 98% reliability
- Aircraft Gross Weight 12,500 – 100,000 lbs.
  - PG 70-22
- AGW > 100,000 lbs.
  - PG 76-22
Discuss: the truth behind claims binder suppliers adding “recycled engine oil” to the asphalt binder?

Some agencies concerned about reports and banned the use of “REOB” in asphalt binders

AI conducted a two year study and wrote a report to summarize the findings

- REOB is “Re-refined Engine Oil Bottoms” that goes through vacuum tower refining process (not recycled engine oil)
- REOB has been used since the 1980s as a blending agent to soften binders
- Due to high RAP and RAS use in recent years, a softer binder is often required. Use of REOB increased to meet demand
- Suppliers report typical dosages used is 4-8%

Because RAP is not allowed or limited in airfield mixes, binders containing significant % of REOB is not likely
Re-Refined Engine Oil Bottoms (REOB)
(Agencies)

Vacuum Tower Asphalt Extenders (VTAE)
(Producers, binder suppliers)
P 401 Superpave Mixes

• Comparison between P-401 and P 401 Superpave in FAA specifications
  • Same binder PG grade
  • Same aggregate gradation
  • Same aggregate criteria
  • Same volumetrics (VMA)
  • Only difference is the type of compactor used
  • Same binder content?
    • Study by FAA concluded that there was not a significant difference in binder content when comparing 75 blow Marshall P 401 mixes and P 401 Superpave mixes at 75 SGC gyrations
Summary

• PG Binders
  • Industry and state highway agencies have switched to PG grading system completely nationwide (Don’t specify AC 20!)
  • Proper selection of PG binder grade for airfield projects is very important (follow guidance in P 401 spec.)
  • No reason for concern about supplied binder quality

• P 401 Superpave
  • FAA allows selection of either standard P 401 (Marshall) or P 401 Superpave
  • Only difference between these two choices is the equipment used for specimen compaction
  • FAA studies have shown there is no significant difference in binder content (comparing 75 blow Marshall and 75 gyration SGC)
  • No reason for concern about reduced performance with P 401 Superpave mixes
Airport Pavement Technical Workshop

November 13-15, 2018  Boston MA
Thank you!