AGENDA

1) Orientation / Sign-In

2) Public Comments

3) Welcome / Opening Statement

4) Working Group Updates

5) Industry/Organization Updates

6) Key Presentation / Round Table Discussion

7) Next Working Group Meeting / Close
**TEAMS MEETING ETIQUETTE / SIGN-IN**

- Mute Microphone unless presenting
- Turn Camera off unless presenting
- Use Chat window for questions
- Please enter your Name, Company/Agency, E-mail in Chat
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GUIDANCE DOCUMENT DEVELOPMENT

Overview

• Subcommittees

1/ Reclaimed Asphalt Pavement (RAP)
2/ Mix Types
3/ Alternative Pavements
4/ Contracting
Overview

20 Guidance documents identified for development

11 Guidance documents under development

1 Guidance document complete
GUIDANCE DOCUMENT DEVELOPMENT

RECLAIMED ASPHALT AND CONCRETE PAVEMENT | STORAGE TIME LIMITS

ABSTRACT

In this guidance document, we will detail an effective storage time limit for reclaimed asphalt and concrete pavement in order to improve the usability of these materials. The guidance aligns with 12 months of storage under state regulations and provides flexibility to the construction industry.

The guidance document also includes recommendations for the storage of reclaimed asphalt and concrete materials to ensure that they remain suitable for reuse.

THE ISSUE

Material sourcing trends may not align with storage time limits

The construction industry generates millions of tons of recycled concrete and asphalt annually, which is regulated under various state and federal regulations. The guidance recommends shorter time limits for the storage of these materials to improve their usability.

KEY ISSUES

- Demand for using recycled concrete and asphalt materials may vary, necessitating careful storage management.
- Storage of materials may lead to a decrease in material quality, which must be considered when determining reusability.
- Landfills are a significant source of material waste, requiring careful management to reduce their impact on the environment.

San Diego County, Department of Environment, 1215 Pacific Coast Highway, La Jolla, CA 92037, (619) 760-7000, environment.sandiego.gov
# Guidance Document Development

## RAP

<table>
<thead>
<tr>
<th>Guidance Document</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>RAP Storage Time Limits</td>
<td>Complete</td>
</tr>
<tr>
<td>Use of RAP in Pavement Seals</td>
<td>Peer Review Complete. Subcommittee to address comments.</td>
</tr>
<tr>
<td>Use of RAP percentage in ACOs in excess of 15% (Greater than 15%, less than 25%)</td>
<td>Peer Review Complete. Subcommittee to address comments.</td>
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</table>
## Guidance Document Development

### Mix Types

<table>
<thead>
<tr>
<th>Guidance Document</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Evaluate need to require Fractionation for RAP mixes</td>
<td>Ready for Peer Review</td>
</tr>
<tr>
<td>Need to Standardize Specifications for the Region</td>
<td>Local Agency Survey conducted to determine current conditions</td>
</tr>
</tbody>
</table>
# Guidance Document Development

## Alternative Pavements

<table>
<thead>
<tr>
<th>Guidance Document</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Full Depth Reclamation Of Existing Road Section</td>
<td>Seeking BBR members to review this document</td>
</tr>
<tr>
<td>Cold-in-Place Recycling</td>
<td>Seeking BBR members to review this document</td>
</tr>
</tbody>
</table>
# Guidance Document Development

## Contracting

<table>
<thead>
<tr>
<th>Guidance Document</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Delayed/Flex Start to Contracts</td>
<td>Preparing second draft for distribution to subcommittee</td>
</tr>
</tbody>
</table>
WEBSITE UPGRADES

• Increased Functionality and Content
• Minutes, Presentations, Trainings
• Guidance Documents
• Upcoming Activities
• Subscribe for E-mail Updates!
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Mike McManus - AGC

Nationwide
December COVID relief bill nets $10 Billion for State DOTs
- Funding for highways/bridges/transit/ports

Expectations for 2021 (nationwide survey 1300 contractors)
- Only 35% plan to add staff

Protecting the Right to Work (PRO) Act
- Legislation has been re-introduced to change labor law

Construction prices are on the rise during the pandemic
- Productivity is down as contractors take steps to protect workers/community
Mike McManus - AGC

California
State Water Board starts process of re-issuing the Storm Water Construction General Permit
  • Stakeholder presentations of preliminary draft are on-going

AB 5
  • Trucking injunction appealed to Ninth Circuit

Cal-OSHA now citing employees for COVID-19 violations
  • Starting Feb 1, Cal-OSHA is enforcing the new ETS and citing employees
Locally

Tax Measures or fee increases on the horizon – We support funding of infrastructure projects
- SANDAG 2022

Strong demand for construction services in this region
- Infrastructure projects keep on coming
BRANDON MILAR - CALAPA

• The California Asphalt Pavement Association

ASPHALT INDUSTRY UPDATE
• Happy National Pizza Day!!!

• CP2 announces Pavement Preservation Academy Certificate Program

• CalAPA Round-Robin / Proficiency Sample Update – RHMA-G and Hveem Stability

• Caltrans Identifying Projects for High RAP and RAP & RAS field mix evaluations

• Plastics in HMA Webinar on March 3rd
Brandon Milar, P.E.
Director of Technical Services
California Asphalt Pavement Association (CalAPA)
916-791-5044
bmilar@calapa.net
www.calapa.net
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Building Sustainable Pavements

Using Reinforcement to Construct Stronger & More Cost-Effective Asphalt Surfaces

Alex Kotrotsios, P.E.
Project Manager
Building Sustainable Pavements
Using Fiber Reinforced Asphalt to Construct Stronger & More Cost-Effective Asphalt Surfaces

AGENDA

Fiber Reinforced Asphalt (FRAC)
  - What Is Aramid Fiber? / How Does it Work?
  - Implementation
  - Benefits

FRAC Project Examples
  - Value Engineered Examples

Questions
Participants

Joining us today for the round table discussion;

- Joe Yaede – Pacific Geosource - Lead Pavement Engineer
- Roger Schlierkamp – GMU Geotechnical – Director of Pavement Engineering
- Shaun Pelletier – City of Aliso Viejo – Director of Public Works
- James Wagner – City of Huntington Beach – Sr. Civil Engineer (Retired)

Asphalt Can’t Do That, Right?
Today’s Infrastructure Challenges

- Ever-increasing traffic loads
- Aging road & highway systems
- Limited budgets mean owners cannot keep up with maintenance
- Aggregate resources are not infinite – rising material costs

FRAC – Fiber Reinforced Asphalt
Types of FRAC

2 Kind of Aramid Fibers on the Market

- FORTA-FI
- ACE XP

Critical Factors for Complete Aramid Fiber Reinforcement

- Aramid Strength
- Dispersion & Distribution
- Micro-Fibrillation
Aramid Dispersion

3-D Reinforcement

Rutting Resistance

Cracking Resistance
- Thermal
- Top-down
- Reflective
- Bottom-up

Enhanced Fatigue Life

1 lb/ton = 19 Million Individualized, Dispersed, and Micro-Fibrillated Aramid Fibers
Any Mix

Any Plant

/ High Tensile Strength
/ Increased Fracture Energy
/ Increased Fatigue Life
/ Superior Compaction

Profile / Curb and Gutter Restrictions
Increased Traffic Volume, Heavy Loading
Steep Slopes, Reflective Cracking
Environmental / Thermal Cracking
Construction: Placement & Rolling

Construction: Raking
FRAC Use - Worldwide

- Used in all 50 states
- Used by 44 of 50 State DOT’s

FRAC Use – California Agencies

**California Cities:**
- Sacramento
- Santa Rosa
- Ukiah
- Pomona
- Costa Mesa
- Irvine
- Huntington Beach
- Fountain Valley
- Carlsbad
- Laguna Niguel
- Santa Clarita
- Aliso Viejo
- Lake Forest

**Westlake Village**
**Agoura Hills**
**Ridgecrest**
**San Juan Capistrano**
**Mission Viejo**
**Escondido**
**Colton**
**Jurupa Valley**
**Monrovia**
**Anaheim**
**Garden Grove**
**San Diego**

**California Counties:**
- Los Angeles County
- Ventura County
- San Diego County
- Stanislaus County
- Riverside County

**Ports:**
- Port of Los Angeles
- Port of Long Beach
Other Notable Users

Walmart
National Center for Asphalt Technology at Auburn University
COSTCO WHOLESALE
FHWA
THE IRVINE COMPANY

Lab Testing – Crack Propagation

FRA
FRAC
CONTROL

Crack Length  Time

Loading Rate: 0.9mm/min. Test Temp 21C
Rutting Resistance – Hamburg Wheel Tracking

FRAC: 71% Improvement

Results from University of Texas Austin

Notable Testing Locations

Cost/Benefit & Project Examples
Davenport Road: Aramid Reinforced

- Los Angeles County District 5 Trial Project
- 2” C2-PG-70-10 Overlay
- North Side – Aramid
- South Side – No Aramid
- Constructed November 2017
- Dozens of traverse cracks witnessed ending at the CL butting up to the reinforced side.
Davenport Road: Aramid Reinforced

Table 2 shows the amount (measured in Linear Feet) and Severity (Low, Medium, High) of Longitudinal & Transverse cracking that were found at each sample location, per lane.

<table>
<thead>
<tr>
<th>Inspection Number</th>
<th>Distress</th>
<th>Severity</th>
<th>Control BB (LF)</th>
<th>Control WB (LF)</th>
<th>FRAC BB (LF)</th>
<th>FRAC WB (LF)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Long &amp; Trans. Cracking</td>
<td>Low</td>
<td>57</td>
<td>38</td>
<td>11</td>
<td>17</td>
</tr>
<tr>
<td>2</td>
<td>Long &amp; Trans. Cracking</td>
<td>Low</td>
<td>25</td>
<td>13</td>
<td>8</td>
<td>8</td>
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<tr>
<td>3</td>
<td>Long &amp; Trans. Cracking</td>
<td>Low</td>
<td>157</td>
<td>39</td>
<td>8</td>
<td>8</td>
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<tr>
<td>4</td>
<td>Long &amp; Trans. Cracking</td>
<td>Low</td>
<td>17</td>
<td>21</td>
<td>8</td>
<td>8</td>
</tr>
<tr>
<td>5</td>
<td>Long &amp; Trans. Cracking</td>
<td>Low</td>
<td>89</td>
<td>8</td>
<td>8</td>
<td>8</td>
</tr>
<tr>
<td>6</td>
<td>Long &amp; Trans. Cracking</td>
<td>N/A</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>7</td>
<td>Long &amp; Trans. Cracking</td>
<td>N/A</td>
<td>0</td>
<td>0</td>
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<td>0</td>
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<tr>
<td>8</td>
<td>Long &amp; Trans. Cracking</td>
<td>Low</td>
<td>24</td>
<td>5</td>
<td>39</td>
<td>39</td>
</tr>
<tr>
<td>9</td>
<td>Long &amp; Trans. Cracking</td>
<td>Low</td>
<td>15</td>
<td>15</td>
<td>39</td>
<td>39</td>
</tr>
<tr>
<td>10</td>
<td>Long &amp; Trans. Cracking</td>
<td>Low</td>
<td>39</td>
<td>39</td>
<td>39</td>
<td>39</td>
</tr>
<tr>
<td>11</td>
<td>Long &amp; Trans. Cracking</td>
<td>Low</td>
<td>111</td>
<td>17</td>
<td>11</td>
<td>17</td>
</tr>
</tbody>
</table>

\[\Sigma = 534 \text{ LF} \quad \Sigma = 141 \text{ LF}\]

74% Less Cracking in the Reinforced West Bound Lane

Costa Mesa: Paularino Avenue 2014

- Repaved in 2014
- Full Reconstruct of road
  - FR: 8” AC Base w/FRAC
  - FR: 2” Rubberized Cap
  - CAC: 8” AC Base
  - CAC: 2” Rubberized Cap
- 2018 and 2020 PCI surveys
Paularino Avenue PCI 2018 & 2020

- **Total Crack Lengths**
  - FR: 821 LF
  - CAC: 2510 LF

- 67% Less Cracking on Reinforced Side
Other Projects

• Bid out as an option, allows **flexibility**
• Popular upgrade with **private communities**
  • Irvine Company
  • Private HOAs
    • Crystal Cove, Newport Coast Master, Pelican Hill, Emerald Bay, Ocean Ranch

• **Agencies**
  • Aliso Viejo
  • Mission Viejo

Jackson Hole Airport, WY (2009)

• 1.5" Open-Graded Friction Course (OGFC)
• Reinforced with Aramid fibers

• 10 years later, pavement still looks great
Jackson Hole Airport, WY (2009)

Unique challenges:

- Extreme dynamic loading on runway at 7000’ elevation
- Raveling in OGFC pavement due to snow plowing
- High thermal stresses due to large temp swings
- 7 years old when overlay was required

NASA: Reinforced Asphalt

- 2” Grind & Overlay w/FRAC
- 1 Mile Strip with a Control Vs. Fiber on Kennedy Parkway
- Constructed in June 2019
NASA: Fiber Reinforced Asphalt

FIBERS STRENGTHEN MILL AND FILL OUTSIDE KENNEDY SPACE CENTER

Boeing Facility, Mesa, AZ

2009

2016: 7 Years of Service, 0 Cracks
Boeing After 10 Years

March 2019

Value Engineered: Argosy Road (Huntington Beach)

- Industrial area, heavy truck traffic
- Traffic increase required thicker AC layer
- FRAC used to avoid raising the crown of the street
Value Engineered: Argosy Road (Huntington Beach)

**Existing Section**
- 4 in. AC
- 10 in. AB
- Subgrade
- 163,600 SF

**Conventional Design**
- 9 in. AC
- 7 in. AB
- Subgrade
- AC Cost @ $74/ton in place
- 8800 tons

**FRAC Design**
- 7 in. FRAC
- 7 in. AB
- Subgrade
- FRAC Cost @ $86/ton in place
- 6800 tons

$66,400 material savings

Huntington Beach FRAC Use

- November 2014
- October 2018
City of Aliso Viejo FRAC Use

- City has used FRAC for the last 4 years
- Utilized to extend the lifetime of AC overlays
- Have been using FRAC as additional insurance to help mitigate reflective cracking

| 3 | 2” Asphalt Concrete (C2-PG 64-16) with Fibers | TON  | 2,400 |

Pine Township: Network Evaluation

93 Streets Evaluated:
- 51 - FRAC (2011-2016)
- 3 - Side-by-side Comparisons

- 63% Less Load Related Distress
  - Alligator Cracking, Edge Cracking, Reflective Cracking
- 50% Less Temperature & Weather-Related Distress
  - Block Cracking, Weathering

Deterioration Curve Comparison

Critical PCI +6 Yrs
Pine Township: Network Evaluation

Life Cycle Cost Analysis
HMA 10-yrs to Resurfacing
FRAC 16-yrs to Resurfacing (based on Pine Township Data Analysis)

Costs: HMA: $80/ton, FRAC $92/ton
Overlay Thickness = 2” (1 ton ≈ 9.2 SY)

Savings $0.25 per SY per Year

Asphalt Can’t Do That, Right?
Any Project
Any Mix

Questions?

Alex Kotrotsios, PE
949-610-2627
alex@pacificgeosource.com
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MEETING ADJOURNED

THANK YOU FOR ATTENDING!