Building Better Roads Working Group
General Meeting No. 8
Meeting Minutes

LOCATION: Virtual Teams Meeting

DATE OF MEETING: February 9, 2021 (1:30 PM – 3:00 PM)

ATTENDEES: See attached meeting roster

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 Work Group Meeting / Close

1) INTRODUCTIONS/SIGN-IN
Rich Fitterer, Kleinfelder Construction Services
• Rich Fitterer introduced himself and his role as the Building Better Roads (BBR) Facilitator
• Notified participants that this meeting is being recorded
• Reviewed Teams functions and protocols for the meeting today
• Reminded new people to enter name, organization and e-mail address in the chat window

2) PUBLIC COMMENT
Rich Fitterer, Kleinfelder Construction Services
• The meeting was opened for any interested parties to make a public comment
• No public comments provided

3) WELCOME
Bill Morgan, County of San Diego - DPW
It is the two-year anniversary of the Building Better Roads initiative and it is more important than ever to focus on the program goals. Taking a regional approach to solving regional challenges, engaging with stakeholders, and developing best practices. We are all challenged to engage with our communities we work with to make sure that we are making good, data driven, equitable solutions concerning the projects and the programs that are moving forward. This work group
allows engagement on a regional level. We are continuing to raise the bar on what we can deliver and provide to the region. If any local agencies want to become more involved with the working group, please reach out.

4) WORKING GROUP UPDATES
Keith Kezer, County of San Diego – DPW

- A brief history on the Working Groups that started a couple years ago. There were twenty topics that were discussed as being a primary focus. After splitting all the topics, there were four main groups.
- Review of four different subcommittees and what they are currently working on. Each subcommittee has different topics that they focus on.
- Documents are thoroughly vetted before they go out, so the process does take time. These documents require meaningful feedback from the working group, subcommittees and from third parties. After obtaining feedback and finalizing the document, it goes to a graphic designer.
- The primary goal of the subcommittee groups is to put together easy-to-read guidance documents which support local agencies that do not have the resources. There are 20 guidance documents that the Working Group identified as a whole. These documents aim to provide detailed information to readers.
- The document that is completed is titled “Reclaimed Asphalt and Concrete Pavement Storage Time Limits.” This was one of the initial topics of the Working Group. Ultimately, the goal is to get higher level managers and administrators of agencies and programs to have information on different innovations to use.
- The document is set up in a way where it can be understood by less technical folks and one can quickly go through it and identify key information. It is a great mix of technical information with easy-to-read information. All documents will ultimately be uploaded and available on the Building Better Roads website.
- There is a lot of information, references, and specifications included in each document to make sure the engineers can implement the documents without having to do a ton of work.
- The Reclaimed Asphalt Pavement (RAP) subcommittee group is currently working on two other documents; “Use of RAP in Pavement Seals” and “Use of RAP percentage in ACOs in excess of 15% (Greater than 15%, less than 25%)”. Both documents are in the process of a second draft and they will be sent out to the subcommittees for the second round of review.
- The Mix Types subcommittee group is working on two guidance documents. The first document, “Fractionation,” is in its second draft. As RAP is increased in our mixes, the Fractionation document will become more important over time. The second document is “the Need to Standardize Specifications for the Region,” which pertains to a Local Agency Survey conducted to determine current conditions.
- The Alternative Pavements subcommittee group is working on two documents: “Full Depth Reclamation of Existing Road Section” and “Cold-in-Place Recycling”. Both documents are relatively technical in nature.
• For some guidance documents, they are based on new concepts so there are few experts out there to help with research and review of material. If anyone is available to review subcommittee documents, please contact Keith Kezer or Rich Fitterer.

• The Contracting subcommittee group has one document about “Delayed / Flex Start to Contracts.” The defined schedule and start time sometimes limit the number of contractors who can bid on a project. This document aims to give contractors a larger window to get started with construction. This document is in the second draft.

WEBSITE UPDATE
• The new website is live. Some key things that were included are: increased functionality and content, minutes, presentations, trainings, guidance documents, upcoming activities, and a subscribe feature for e-mail updates.
• The About Us page features a small description of the Working Group and what we do.
• The Members page includes all the agencies involved with BBR with logos and links.
• The Subcommittees page includes descriptions and focuses of each subcommittee.
• The Meetings page includes all the Brown Act documents such as meeting minutes, agendas, and presentations.
• The Guidance Documents page includes all the final draft documents.
• Trainings, pilot projects, and upcoming activities are all sections that will soon be added and updated on the website.

NOTATION:
NCHRP Research recently published report 960, which discusses AASHTO practices and tests. There is quality information provided on cold mix asphalt if anyone is interested.

5) INDUSTRY / ORGANIZATION UPDATES

Mike McManus, AGC
Nationwide
• December COVID-19 relief bills nets $10 Billion for State Departments of Transportation.
• AGC America published a survey taken from around the country. Only 35% of contractors plan to add staff in 2021. 44% of contractors surveyed reported they had a project cancellation from an owner in 2020.
• Protecting the Right to Work (PRO) Act has been re-introduced to change labor law.
• Construction prices are on the rise due to the pandemic. Productivity is down due to contractors protecting their workers.

California
• State Water Board starts process of re-issuing the storm Water Construction General Permit. In the preliminary draft, there have been new processes being introduced.
• AB 5 was a new law that reclassified many contractors as employees. Trucking injunction is in place, has appealed to the Ninth Circuit.
• COVID in California, Cal-OSHA is now citing employees for COVID-19 related violations. Starting February 1, Cal-OSHA is enforcing the new ETS and citing employees.

Locally
• Tax Measures or fee increases in San Diego. SANDAG is focusing on a new regional transportation plan.
• There is a strong demand for construction services in our region.

Brandon Milar, Cal APA
Reference uploaded links for Caltrans RSS, Caltrans CPD, and upcoming Greenbook Asphalt Task meeting (also available in the PowerPoint presentation).

• CP2 announces Pavement Preservation Academy Certificate Program. Attendees will receive training related to pavement preservation. If you are interested in signing up, please visit their website.
• Cal-APA Proficiency Sample Program, the report is in draft for RHMA-G.
• Caltrans is looking to incorporate High RAP and RAP & RAS into their specification. They will put out pilot projects.
• John Harvey and Eric Updyke with CCPIC have completed a draft specification for local agencies who would like to use a superpave mix.
• Recycled plastics have been discussed to help improve roads. Plastics in HMA Webinar will provide more information of how plastic can be useful in recycling and using on our roads.

6) KEY SPEAKER – Building Sustainable Pavements

Rich Fitterer introduced Alex Kotrotsios of Pacific Geosource. Alex will be leading the presentation and the Round Table Discussion regarding the use of reinforcement to construct stronger and more cost-effective asphalt services. Alex obtained his BSCE from the University of Nebraska and has over 11 years of experience in engineering, consulting for cities, county, and state, as well as private industry.

Alex thanked everyone for joining the meeting today and for allowing him to present this material. This presentation today is going to be on fiber reinforced asphalt and to build Sustainable pavement using fiber reinforced asphalt.

Alex proceeded to introduce some participants joining for the roundtable discussion. Joe Yaede with Pacific Geosource - Lead Pavement Engineer. Roger Schlierkamp with GMU Geotechnical is the Director of Pavement Engineering. Shaun Pelletier who is the Director of Public Works for the City of Aliso Viejo. James Wagner with the City of Huntington Beach who is a retired Senior Civil Engineer.
Alex began his presentation with a brief video that featured a three-inch slab of asphalt that weighed about nine hundred pounds. Asphalt as we know it has been rock and glue essentially. Unlike Portland cement where we put rebar and wire mesh, which allows for tensile strength, asphalt does not have tensile strength. When we look at these fibers it allows the asphalt to have tensile strength.

- Today's infrastructure has many challenges, some of which include ever increasing traffic loads, aging road and highway systems, limited budgets, and aggregate resources that are not infinite.
- Budget is one of the main issues since agencies typically fall behind on road maintenance until the road is in need of a full reconstruct.
- Fiber reinforced asphalt (FRAC) is being introduced as an alternative to build better lasting pavements.
- There are two kinds of aramid fibers on the market, FORTA-FI and ACE XP. Pacific Geosource is familiar with the FORTA-FI fiber and so that is what this presentation will cover.
- The FORTA-FI fiber is a two-part mix that has loose fibers and plastic that helps to disburse the fibers.
- There are three critical factors for complete aramid fiber reinforcement: aramid strength, dispersion and distribution, and micro-fibrillation.
- Due to heat expansion, fiber provides a 3-D reinforcement to the AC section, which includes rutting resistance, cracking resistance, and an enhanced fatigue life.
- In one ton of asphalt, there is 19 million individualized, dispersed, and micro-fibrillated aramid fibers.
- These fibers can be used at any mix plant for HMA.
- Fiber reinforced asphalt can be used in any situation where high tensile strength, increased fracture energy, increased fatigue life, and superior compaction is necessary.
- There is nothing different that needs to be done in the field, this fiber asphalt is placed, raked, and rolled the same as regular asphalt.

QUESTIONS

Q1) Is there a mix design procedure laid out for testing the material as a JMF?
A1) There is a method for checking if the fiber has been dispersed correctly throughout the mix by taking the material after it’s been placed or while it’s being placed, to a lab to be scrubbed down and determine the volumetric dispersal of the fibers. There is a new method coming out that requires more equipment and new procedures with no chemical process. The automatic feeding procedure can be monitored in order to check the rates at which the fiber is being disbursed.

Q2) Is the fiber material still recyclable through conventional recycling processes?
A2) This material is fully recyclable and can be used as RAP in the future. A test for the future would be taking fiber reinforced RAP and conventional RAP and see how each performs.

Q3) Does fiber reinforced asphalt work at reduced temperatures as well?
A3) If the temperature is any lower than 280, the fibers will not properly disperse throughout the mix. There is another fiber out there that is designed for cold mix and RAP.

**FRAC Use – Worldwide**

- FRAC is used in all 50 states and 44 of 50 State DOT’s use it.
- In Southern California, almost 1 million tons of FRAC has been placed since 2012.
- Alex showed a video of crack propagation in lab testing showing a significant difference in FRAC material versus regular AC.
- There have been great results on rutting resistance using FORTA-FI fiber. A study from University of Texas Austin showed a 71% improvement using Hamburg Wheel Tracking.

**Cost/Benefit & Project Examples**

Davenport Road: Aramid Reinforced Asphalt. Los Angeles County District did a side-by-side comparison using FRAC on the North side of the road and conventional asphalt on the South side of the road. This road was constructed in 2017 and there are traverse cracks that end at the Center Line. A third party was hired to inspect the roadway and report on the cracking. They found that there was 74% less cracking in the fiber reinforced lane.

Roger Schlierkamp with GMU Geotechnical explained the Costa Mesa: Paularino Avenue 2014 project using FRAC. The two outermost lanes were looked at in this case, one lane using FRAC and the other lane using conventional AC base. There was a study performed in 2018 and in 2020 to compare the PCI differences using a 100% PCI survey. From interpolation, there seems to be a shallower slope for the FRAC. Visibly, there is a lesser amount of cracking in the FRAC.

Roger also mentioned that FRAC is bid out as an option to allow flexibility in the project budget. If the use of FRAC is within the project budget, it is a popular upgrade with private communities.

**Q1)** Are these mixes using conventional binders or polymer modified binders?
**A1)** Most of these mixes use conventional binders. Roger added that it is mostly Greenbook mixes.

**Q2)** Has there been any studies using conventional binders or polymer modified binders? Does the polymer balance out the fibers?
**A2)** No studies have been done yet, but there is a project coming up with the County of San Diego that uses a polymer modified with fiber reinforcement. If the County is up for it, there can be some tests strips done with polymer and fiber sections.

**Q3)** In the fiber comparison photos, was anything changed about the mix design? How was fiber incorporated into the mix? What type of mix design was used? Has there been any studies done for long term impact of the fiber?
**A3)** Nothing was changed with the mix design when adding the fibers. The fibers are introduced in the hot dry violent aggregate mixing. There are negligible volumetric changes to the asphalt. The mix design used was a PG 70-10, and San Diego County uses the Hveem methodology.
Roger added that his Greenbook projects mostly use the Hveem Method and the mix design is designed the same way as if it did not have fibers. There are no corrections for air voids or content because the fibers do not have a significant effect on those properties. The photos on Paularino Avenue are taken six years after the roads were constructed. There is no specific data for long term but there is less raveling, which is related to aging, as well as less cracking in the material.

Jackson Hole Airport in 2009 they completed a 1.5" grind and inlay with an open-graded friction course reinforced with Aramid fibers. At this location, they were having to Mill the runway every 7 years. Temperature swings also have a huge effect on this area. 10 years after using Fiber Reinforced Asphalt, the runway is in great shape and they have only had to do one surface treatment. Some unique challenges of this project include extreme dynamic loading at 7000’ elevation, raveling in OGFC pavement due to snow plowing, and high thermal stresses due to large temperature swings.

NASA constructed a 2” grind and overlay with FRAC on a one-mile strip with a control on one side versus fiber on Kennedy Parkway.

Boeing Facility in Mesa Arizona constructed a driveway in 2009 with FRAC. After 10 years, there is very minimal cracking.

Argosy Road in Huntington Beach is a very industrial area with heavy truck traffic. Due to traffic increase, the area required a thicker AC layer. FRAC was used to avoid raising the crown of the street. By using FRAC, the AC layer was reduced by 2 inches. James Wagner introduced himself as a retired Senior Civil Engineer, majority of his work consisted of preparing plans and specifications for arterial rehab. The City of Huntington Beach spent around $4 million per fiscal year to reconstruct major streets. The beach parking lot was the first instance where the City used FRAC in the redesign. Over the last 6 years, there has been 14 arterial projects that have used FRAC. James mentioned that he has seen great results after using FRAC. Any cost savings are used in the next fiscal year projects.

Shaun Pelletier discussed the City of Aliso Viejo FRAC use over the last 4 years. The City has been using FRAC as additional insurance to help mitigate reflective cracking. The City has a 5-year slurry seal schedule, and they are hoping to make it longer with the use of FRAC in certain areas. Shaun added that the use of FRAC causes a slight increase in cost upfront but does not impact the schedule and it generally stays within budget.

Pine Township did a network evaluation of 93 streets. 42 streets were conventional asphalt, 51 were FRAC, and 3 were side-by-side comparisons. By compiling the data collected, the engineer found that there was a 6-year design life increase with using FRAC. There is also 63% less load related distress and 50% less temperature and weather-related distress. Looking at a life cycle cost analysis, there is 30% overall savings using FRAC. The savings equates to $0.25 per SY per year.
Q1) What pavement design was used to reduce the pavement layer by 2 inches?
A1) Joe Yaede stated that Arizona State has been a pioneer in the research of Fiber Reinforced Asphalt. ASU has put together documentation that has optimized the FRAC use. The Caltrans equivalency number is used in calculations to figure out the use of FRAC.
Q2) It looks like there is a 20% increase in gravel factor, is Caltrans using this in their highway design manual?
A2) Caltrans is not using this in their manual. FRAC is still a new technology and the parameters are still being developed.

7) NEXT WORKING GROUP MEETING / CLOSING

Rich Fitterer, Kleinfelder Construction Services
- Rich thanked Alex and all the presenters for speaking on this technology.
- Next working group meeting will be early June, a save the date will be sent out soon. The Building Better Roads website link will also be sent out.
- Our collaboration, communication, and collaborative problem solving and educational outreach between industry, organizations, and agencies can help increase the quality and sustainability of our regions roadways.
- If there are any questions, please contact Rich Fitterer.

<Meeting Adjourned>