

RAP ETG Meeting
July 9-10, 2007
Charleston, SC

Members present:

Gerry Huber, Chair, Heritage Research
Ron Sines, P.J. Keating
Dave Lippert, IL DOT
Don Brock, Astec
Dave Newcomb, NAPA
Cecil Jones, NCDOT
Andrea Kvasnak, NCAT
Randy West, NCAT
Andy Mergenmeier, FHWA
John D'Angelo, FHWA
Tim Aschenbrenner, CO DOT
Jim Musselman, FDOT
Becky McDaniel, Purdue
Dean Mauer, PN DOT

Monday July 9, 2007

Group went to Banks construction
Reid Banks gave a presentation on changing to a RAP fractionating process at Banks Construction
Don Brock discussed his project in Chattanooga, TN with foamed asphalt using 50% RAP
After presentation the group toured the lab and plant
Several RAP stockpiles were seen

Tuesday July 10, 2007

- ❖ Group introduced themselves
- ❖ Reviewed minutes from last meeting
- ❖ Gerry Huber reviewed goals
 - Review current state of the art
 - Make recommendations for research
 - Identify who uses RAP and how we can increase RAP usage
- ❖ Floor opened up for additional thoughts on the point of the group
- ❖ At last meeting it was discussed that a goal of 25% RAP usage in every state
 - Does this still seem like a good goal for the group

- ❖ Possible mission:
 - Information and strategies to increase the use of RAP in the US

- The information side is to synthesize what we know about the use of RAP and to identify research needs in areas where we need to know more
- ❖ Huber posed the question is it our role to conduct interventions for states not using RAP
- ❖ Newcomb said California and Missouri have been resistant
- ❖ Brock commented on anything that is Green will help the RAP cause. If it helps the environment there is often much support
- ❖ Need to have some sort of specifications to tell people how to use more RAP successfully
- ❖ Cecil sees taking something to AASHTO as a good route
- ❖ D'Angelo commented that NCHRP is coming out with a design process for high content RAP. Perhaps our group could be a source of information for researchers who will be working on NCHRP project. D'Angelo will recommend that it is stated in the problem statement that the researchers interact with this task group
- ❖ West sees that a key part of our existence is to encourage reluctant states to use more RAP
- ❖ Brock thinks some have concerns above 30-35% RAP. The missing thing is that people want some directions, not a lot of excess information. Perhaps we need to identify when we need to screen it. Is it 20%, most likely with Superpave mixes
- ❖ West says that there is a specification within the Superpave system. Do we need to revise it? What we have yet to synthesize is good performance information. We either need to say that there needs to be research on this or come up with it within the groups
- ❖ Newcomb perhaps some laboratory testing, then accelerated (such as at NCAT test track), and then long term performance
- ❖ Musselman said that Florida has monitored performance but trying to identify causes of distresses is difficult because there are so many variables
- ❖ If we could take to basic tests, use a beam fatigue test and compare RAP an original mixes. One problem with past research is that aging has not been done. What needs to be done is the material needs to be aged prior to testing in beam fatigue apparatus. Most likely we will see that the two mixes will yield similar results. It won't predict the performance, but it will let us know if there really is a difference between the mixes.
- ❖ Achenbrener commented that we need laboratory performance and long term performance
- ❖ D'Angelo doesn't think we should wait. We should get the ball rolling. WRI has 11 million dollars for research. One thing they are looking at is fatigue. We should encourage them to include RAP.
- ❖ D'Angelo will be at WRI next week and could talk it over with WRI
- ❖ Brock said you need a decent amount of mixing time. Some testing should be conducted to compare between plants and lab
- ❖ D'Angelo thinks this would be ideal for NCAT
- ❖ NAPA RAP document discussed by Newcomb
 - Document is more for people who are not at increased levels of RAP and need some guidance.

- Biggest problem was defining at which percentage binder testing is needed. Practices among states is not real consistent. Basically used Mcdaniel's recommendations.
 - Performance is one thing that is lacking and really wanted to get for document
- ❖ The document has been circulated to AASHTO
- ❖ AASHTO sent back comments and those comments are reflected in document
- ❖ This would be a good document for intervention team to leave behind
- ❖ We still need a short list of what needs to be done to interest them in reading in document
- ❖ Mauer said that there is a concern that the RAP component is worn out pavement. We need to show that by performance RAP is not making a pavement a lower quality pavement
- ❖ Newcomb if we can show that the performance is not all that different we will be able to get more RAP use
- ❖ West does not want us to get stuck on one performance test that will be able to answer all questions. We need to discuss what tests should be used.
- ❖ D'Angelo said the simple performance is more of an intermediate temperature test. The beam fatigue is closer to evaluating the difference between mixes. It is complicated to run but it works quite well. The dynamic modulus is easy to run and based on modeling you can identify if certain mixes will work well.
- ❖ Mauer said that dynamic modulus can be used to determine if there is good blending. Is it going to change binder grade
- ❖ Brock said that in the real world the predominant mixes produced are surface mixes. If we limit RAP in surface mixes it is diverted to private mixes. How do we increase it in surface mixes.
- ❖ D'Angelo if it does well with a fatigue test then you can assume it will performe reasonably well
- ❖ Brock said how do we increase surface mixes safely. Can we use low temperature stuff to our advantage with RAP? With the low temperature mixes there is less oxidation during the mixing process.
- ❖ D'Angelo commented that we might be getting less blending with Low temperature mixes since the binder is not getting heated up as much. This is something that needs to be looked at.
- ❖ Brock said that once you get rid of moisture the asphalt is the first thing to heat up and it is sticky and could transfer. Probably homogenous blending since the sticky state is reached.
- ❖ Acshenbrener commented on NAPA documented using information obtained from AASHTO ballot comments were made to NAPA. Aschenbrener has some concerns about page 13 if this was used during the intervention. Thinks that the ignition furnace guidelines need to be looked at more indepth. The correction factor for ignition ovens is unknown for RAP samples. Colorado has had some issues with assuming that the correction factor was negligible.
- ❖ D'Angelo: Most RAP will come from local area. If on the virgin mixes there is a correction factor of 1 then it is probably a safe bet that it will be relatively the same for RAP.

- ❖ Mauer said there can be tremendous errors if sample not precisely weighed and washing down incorrectly
- ❖ Musselman said there are probably a lot of little details that this group will need to address before going out to states to encourage greater RAP use
- ❖ D'Angelo said you have to do different things: 1) How do you come up with the mix design; 2) Once you have the mix design how do you produce it then in the field
- ❖ Brock said that two things are important is 1) getting a good sample and 2) getting a good burn off
- ❖ West commented that the coefficients of variability are helpful
- ❖ D'Angelo if we can get data like what we saw yesterday it would be helpful in showing how well RAP can work

- ❖ Cecil presented results of survey
 - 38 State agencies responded
 - Will follow up with states who did not respond
 - Part of the survey was to find out current practice of each state and asked for links to the spec
 - We could ask the subcommittee of materials to actively support the ETG's goals for increased RAP usage
 - Maybe at the upcoming AASHTO meeting is to get discussion going about increased RAP usage
 - Contact states with 25% or more RAP to get field information in regards to performance

- ❖ Break at 10:20 am until 10:35

- ❖ Re-grouped and began to discuss subcommittee groups
- ❖ Some long term research goals and short term goals should be identified. An NCHRP project would be considered to be a long term goal.

Subcommittee Groups Broke out

Subcommittee #1 – Envoy

Jim Musselman

Ron Sines

Tim Aschenbrener

Don Brock

Andrea Kvasnak

Cecil Jones

Identify Target Audience

- Based on RAP usage survey, identify states that are using 1) lower percentages of RAP and 2) current technology levels that also have a desire for more information about higher RAP mixes.
- Who in the Agency are we targeting? Chief Engineer level would be most effective. Need to specifically direct inquiries to the Chief Engineer after a

presentation at Standing Committee on Highways (SCOH). Target SCOH meeting in September 27 – October 2, 2007 in Milwaukee. Also need to get SOM/State Materials Engineer buy in as well. Cecil to do brief “pep talk” at August 2007 SOM meeting. Include State Asphalt Pavement Association rep as well.

- User/Producer Group Meetings. (SEAUPG, NCAUPG, etc.)

Marketing Strategies

- Discuss benefits/challenges regarding the use of RAP....
 - Benefits:
 - Conserves resources – aggregate, binder, energy, landfills
 - Economic benefits
 - Sustainability/ “Green Tsunami” – reduced fuel consumption, less hydrocarbons/lower emissions; renewable resources; political benefits, etc.
 - Allows milling as a resurfacing option.
 - Dwindling sources of quality aggregate – RAP contains older, higher quality aggregate
 - Challenges/Issues:
 - Ask states that are not using RAP why they aren’t using it.
 - Ownership
 - Calculating “best value”
 - Perceived performance problems/lower quality material
 - Technical issues – lack of knowledge regarding the best practices (Agency & Contractor); equipment issues;
 - Pavement friction
 - Chicken and egg scenario.
- Provide guide specifications and NAPA QIS. Create and provide RAP usage guidelines, RAP Guide Specifications, Condensed Best Practices (1 – 2 pages), lessons learned (previous problems, failures, pitfalls, successes, etc.,) and FAQ’s.

Delivery

1. Consider using Websites, DVD’s, site visits, demonstration projects, videos, etc.
2. Challenge each state to do at least one project using a minimum of 20% RAP. More advanced states should try higher percentages. Ideally we’d go higher but higher percentages would require fractionation. Surface mixes might have friction issues with higher percentages of RAP unless it’s fractionated.
 - Maybe two strategies – one to get to 15 – 20%, the other to get to 25 – 30%.

Action Items

1. Identify target states Maybe two strategies – one to get to 15 – 20%, the other to get to 25 – 30%. (Cecil)

2. Develop details (talking points/compelling document) of benefits/challenges of recycling (**Don/ Andrea**)
3. Presentations to AASHTO SCOH and SOM on RAP. (**Cecil/Dave/ Eric**)
4. Develop the following: RAP usage guidelines, RAP Guide Specifications, Condensed Best Practices (1 – 2 pages), lessons learned (previous problems, failures, pitfalls, successes, etc.,) and FAQ's. (**NCAT**)
5. Possible other funding sources

Subcommittee #2 – Synthesize information

Becky McDaniel

Gerry Huber

Dave Newcomb

Andy Mergenmeier, FHWA

Performance

Focus on Surfaces

Identify Sections with >25% (good and bad)

Document (visit)

Specs and mix design

Process (plants, milling, crushed, fractionated?)

Field Control

Pavement Structure

Traffic

Climate

Performance

Information Available

Mn/DOT Training for local agencies

NAPA (RAP Processing, etc.)

NCHRP (9-12 et al.)

State Research

Action Items

Self guided instruction on RAP usage on local level (**Becky**)

Brochure for states and locals (**NCAT**)

Lists of websites (**Becky/Andrea/Cecil**)

Develop “compelling” document (**Becky/NCAT**)

6-10 good case studies well distributed geographically

Subcommittee #3 – Research Needs

John D’Angelo

Dean Maurer

Randy West

David Lippert

States	Industry
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<ul style="list-style-type: none"> • Fatigue, durability and moisture damage concerns • Binder grading and bumping (aging) • Modulus of RAP Mixes • Long term performance • Mix design Binder content, Agg Gravity, recovery methods, consensus proprieties (volumetric issues –control) • Performance Test • Other materials • Cold mix • Warm mix with high RAP % • Polymers and other modifiers (Rubber) 	<ul style="list-style-type: none"> • Control of Material • Fractionating • QC processes contamination with deleterious materials • Production process-aging, long term performance • Mix design submission requirements (time limits/documentation – i.e. one mix per job or approved until major change) • Materials variability – agg, binder, RAP
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Other issues

Friction of Surface mixes

ETG regrouped

- ❖ SWAT team:
 - Sit down with DOT and contractor to go over mix design and concepts of specs
 - Help to develop detail plan and mix design and field control and new technology for the project
 - Think about what needs to be done in terms of documentation
- ❖ Perhaps have next meeting at demo job (late September)
 - Perhaps DOT can let us use a meeting room
 - Look at project in morning when it is cooler
- ❖ Possibly use engineering judgment to set up project and then do performance testing after the fact
- ❖ Cecil does not think that his state needs the SWAT team
- ❖ Goals for next meeting
 - Discuss project
 - Discuss progress on tasks assigned at this meeting
 - Review presentation for the SCOH meeting
 - Preliminaries on documents and experimental plans

- ❖ Gerry Huber gave presentation on Indiana RAP procedures
- ❖ Demonstration Projects
 - 5 states – projects 25 to 30%
 - Change orders on existing projects
 - ◆ Use prescriptive specifications – how to handle for these jobs only
 - AASHTO Sponsorship to get states to allow travel
- ❖ Workshops might be helpful
- ❖ States to target for high rap demos are FL, CO, PA, IL, NC, IN, and SC
- ❖ Don Brock will identify contractors in next 10 days
- ❖ NCAT and others will give mix design assistance and production mix sampling and testing
- ❖ NCAT will work on promotional documentation
- ❖ SWAT Team will be members of ETG
- ❖ NCAT will work on best practices document and FAQs
- ❖ John D'Angelo will work on making travel costs for state employees work