



**CMRA Webinar Held on June 15, 2010:
*Recycled Asphalt Shingles (RAS) in Hot Mix Asphalt
(HMA):
Case Studies of New State Specifications and
Implementation***

Summary of Questions Asked

This webinar was sponsored by the Construction Materials Recycling Association (CMRA) and its *ShingleRecycling.org* web page and the new, *E-Newsletter* service. CMRA and *ShingleRecycling.org* are the producers of the *Asphalt Shingle Recycling Forum*.

This webinar focused on case studies of how two states, Iowa and Wisconsin, recently adopted DOT specifications and implemented their recycling programs. We heard from engineers from Iowa DOT and Wisconsin DOT, one of the Wisconsin HMA producers, and the Asphalt Paving Association of Iowa. The focus will be on how the state DOT's worked with industry during the R&D period as well as during program implementation as one key to their success.

The agenda for the webinar was presented in the following order:

- Intro
- Wisconsin:
 - Judie Ryan, WisDOT
 - Eric Olson, Payne & Dolan
- Iowa:
 - Scott Schram, IA DOT
 - Bill Rosener, APAI
- Q&A

The *ShingleRecycling.org* webinar team promised to post a summary of the questions asked during the webinar. Many of these questions were answered during the Q&A portion, but not all. The questions themselves provide a good means to survey the landscape of issues surrounding the planning, research, development and practical implementation of asphalt shingles recycling.

The questions can be grouped into three main categories:

- Use in HMA and impacts on pavement performance
- Processing and recycling equipment and systems
- Supply development (including environmental / safety issues)

The following questions are derived from the “Public Chat” component of the webinar where participants were able to type questions, and their own answers, on the screen for the speakers. This summary provides limited answers to the questions posed in an attempt to reconnect and document these online, sidebar Q&A threads during the webinar.

Spec development; Use in HMA and Impacts on Pavement Performance; Other Market Development Questions:

- Has any one used Shingles in Superpave Mixes?
- Did WIS DOT adopt a spec based on data/experience from other states, prior to a demonstration in Wisconsin?
- Does Wisconsin DOT count the extracted binder content or only the effective binder content toward the allowable replacement?
- Is the effective AC content considered the same as the recoverable RAS AC content?
(Answer #1: I shredded over 300,000 tons in Ohio to minus 1/3 inch with about 75% passing the 4 and we get almost 100% effective AC. Answer #2: I have access to the shingle factory so I know exactly what goes in the shingles here.)
- Comment: Didn't realize fiberglass has that much absorption. Then why do boats float? The 30% AC shingles may be organic shingles with paper instead of fiberglass.
- Fibers only represent about 3 to 5 percent of a shingle so how can it absorb 1/3 of the AC?
(Answer #1: It's not only the fibers, but a function of contact time, plant temperature, haul distance, and rheology of the shingle binders. Answer #2: The fiber may be 5% by mass the density is low and has a high absorptive capability.)
- What is FRAP? (Answer: Fractionized RAP.)
- Do you use a softer virgin A/C to get the specification binder grade? (Answer #1: We require a bump to a softer binder grade when the virgin binder replacement exceeds 20%. The RAS fibers are expected to help low temperature performance of the mixture.)
- Are there any aesthetic impacts on the pavement when RAS is used in it?
- Does any one have TSR data?
- For Iowa DOT: What quantity in paving are you doing for each of your test sections?
- What is the main paving grade used in Iowa?
- What type of Warm Mix technology was used in the Iowa studies?
- Any advice to a local solid waste agency on working with its state's asphalt pavement association?
- What is the main paving grade used in Iowa?
- What method of introduction was the shingles introduced into the plant (e.g. blended with screenings)?
- With the use of RAS and RAP, how do you assure the low temperature performance?
(Answer: The RAS fibers are expected to help low temperature performance of the mixture.)
- Input from anyone on public/ private partnerships to promote the beneficial reuse of tear-offs?
- Is felt paper acceptable or deleterious in WI and IA? (Answer: It is acceptable.)

Processing, Recycling Equipment / Systems, Stockpiling, and Pricing:

- What size screen do you use?
- What are the RAS processing / storage best practice recommendations: Do you produce RAS "as needed" or is stockpiling allowed? If stockpiled, is there a "cutting" material used to prevent reagglomeration? E.g., Is sand used to blend with finished RAS?
- I have been told the tear offs do not glue back (reagglomerate) like the manufactured shingles what are the thoughts on this?
- What is the cost to grind the shingles? (Answer #1: Direct cost could be \$20/ton. Permitting, asbestos testing, QC, and land costs are all above and beyond this direct cost estimate.)
- What is the current price of virgin ac? (Answer: A/C depending on location, any where from \$490 - \$520 per ton of virgin AC.)

- What will a contractor pay for a RAS product for its AC content what? What is today's market value of RAS ? (Answer #1: I have heard \$40 to \$50 dollars a ton when the RAS is ground to a ½-inch minus. Answer #2: RAS is selling here for about \$35 to 45 per ton.)
- Does PG 58-28 virgin binder cost more than PG 64-22 in Wisconsin and Iowa? (Answer#1: It is \$70 a ton higher in Ohio. Answer #2: PG58-28 is about \$10 to \$20 more than PG 64-22 in Iowa. Answer #3: Wisconsin sees about the same increase.)
- Need help understanding particle size percentages? (Answer: the particle sizes shown represent the amount of material in percent passing each screen size. I.e., It represents the percent of the sample size passing that specific sieve size.)
- What is a #4? (Answer #1: #4 gradation are particles smaller than a ¼-inch. Answer #2: Equivalent to 4.75 mm sieve.)
- Are other recyclables being collected and recycled such as plastic roof vents, water bottles, plastic wrappers, etc.?)

Supply Development (Including Environmental / Safety Issues):

- What went into your decision not to require roofing contractors to source separate their roofing debris? (Answer #1: In our experience, you can create an incentive to source separate materials, but you still must have a centralized facility sort before grinding. Our landfill fees are around \$50 a ton, which also is an influence.)
- How often are loads rejected due to possible asbestos? Did you see any hits on asbestos, if so how many ? (One of several answers: We did a pilot from April 2007 to February 2009. We rejected 3 loads in that time based on simple visual inspection. We had zero hits for asbestos on "suspect" loads (those on projects built before 1978). Employee education is key. Documentation is a must.)
- What type of employee asbestos training did you do? (Answer: We are a recycler of construction waste. We did the tear-offs as an experiment starting in 2007. Identifying the visual characteristics of asbestos in charts, then of course the 1978 guideline.)
- What do your state environment departments require in terms of RAS storage? In Washington state, our State Department of Ecology requires a covered storage on a pad. (Answer: Indiana RAS storage is the same, subject to change after certification, cleaning and processing.)
- EPA is proposing to regulate coal combustion residuals as a "special waste". Coal combustion products are used in some asphalt roofing products. If EPA classifies components of shingles as a special waste (subject to regulation under subtitle C of the Resource Conservation and Recovery Act), how will this impact the recycling of asphalt shingles in hot mix asphalt?

We thank everyone for their participation, including these excellent questions and some limited written dialogue on the answers. Stay tuned for more information about the next webinar.

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