

☰ *National Status and Trends
in Shingles Recycling:
Environmental Issues*

An Overview Presentation
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☰ *Thanks to Sponsors*

- ❖ CMRA
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☰ *States with DOT Specifications*

- ❖ Allowing manufacturers' shingle scrap
- ❖ Allowing tear-off shingle scrap



☰ *OSHA Regulations*

- ❖ 1926.1101 “Construction”
- ❖ 1910.1001 “General Industry”



☰ *Many states have Beneficial Use Determinations (BUD)*

- ❖ Allowing manufacturers’ shingle scrap
- And/or
- ❖ Allowing tear-off shingle scrap *



☰ *States with Asbestos Sampling and Testing Requirements*

- ❖ Sample locations (before or after the grind)
- ❖ Methods of sampling
- ❖ Frequency of testing
- ❖ PLM testing method



☰ *Other Environmental Issues*

- ❖ Management of total dust
- ❖ Water emissions
- ❖ Air emissions from HMA plants
- ❖ Speculative stockpiling
- ❖ Alternative end uses



☰ *Key Questions*

- ❖ Need to share information and asbestos data?
- ❖ Need for more standardized sampling protocols?
- ❖ Effectiveness of visual inspections to identify suspect asbestos materials?



4TH ASPHALT
SHINGLE RECYCLING FORUM

November 5 & 6, 2009
Doubletree Hotel Chicago
Magnificent Mile
Chicago, IL

ShingleRecycling.org

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Wisconsin Regulatory Experience with Asphalt Shingle Recycling

National Asphalt Pavement Ass'n Webinar
October 7, 2009

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Influences on shingle recycling

- Gov's Task Force rpt dated Dec. 2006 – C&D recommendations
 - More recycling of C&D, market research, use of shingles in DOT specs
 - Assess impacts of C&D Lfs on groundwater & upgrade rules
 - Recommended OFR for small C&D Lfs
 - Future C&D Lf rule changes?
- Market forces
 - Drastic Increases in costs of oil/asphalt
 - Up to \$400 per ton for road grade asphalt by late Summer 2008
 - Diversion of shingles from MSW landfills to reduce filling rates
- Add'l concern - impacts around some small C&D Lfs
 - Some effects seen in indicator parameters around unlined C&D Lfs
 - Observations of diversity of waste disposed of in C&D Lfs
 - Odors from certain C&D Lfs due to wallboard & water

Shingle Recycling Projects in Wis.

- Several small projects proposed over past decade or more
 - Usually one-time
 - Little to no documentation
 - Not sure that many were implemented, and no reporting of results
 - Usually involved shredding of residential shingles for asphalt mix, road bed, mixing with subbase gravel, etc., for low volume roads or demonstration projects
 - Informal approval process, or assumed to fit into code exemptions
- More significant proposals in recent years
 - Reduced numbers of C&D landfills
 - Increased tipping fees at C&D and MSW landfills
 - Emphasis on recycling more waste types
 - Cost of oil, asphalt, diesel fuel

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More Recent Projects

- 2007 – need for more disciplined, formal approach
 - Consistency when dealing with multiple applicants
 - Shingles grinding vs asbestos issue
 - Mixed roofing waste vs separated shingles
 - Windblown material?
 - Sorting – at job site vs at processor or asphalt plant?
 - Grinding – how much control is needed?
 - Tub grinders vs twin shaft grinders – ability to meet size specs
 - Testing for asbestos
 - Before or after grinding?
 - Every load, every X tons, before or after grinding?
- 2008 – 12 app'd facilities - asphalt plants, storage, processing

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La Crosse County

- County set up program in 1990's-2000's
- MSW landfill uses differential fee structure to encourage contractors to supply separated shingles to processing area
- Contracted landfill operator uses a tub grinder to shred shingles
- Asphalt plant operator uses shingle grind in mixes
- Asbestos testing – one sample per roof, contractor pays for part of cost
- Waste reduction & recycling grant – field test in 2006
- Experience
 - Several 100's of asbestos tests, only a few detected >1% asbestos
 - Use of tub grinder resulted in acceptable grind, but may need multiple passes and resulted in some agglomeration of shreds
 - Better removal of nails, metal, wood, etc would help final asphalt quality
 - Wood contamination caused odors & smoke in hot mix operation

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B.R. Amon & Sons, Elkhorn WI

- Operates fixed & mobile hot mix asphalt plants & aggregate quarries
 - Produces DOT & specialty asphalt concrete mixes, as well as aggregates
 - Proposed use of shingles, as additive to hot mix asphalt to replace part of asphalt & fine aggregate
- Approval by use of rule exemption for processing facilities that use asphalt or concrete as raw material into structural material
 - Also has to obtain approval for use of the material as proposed
 - Approval is means for requiring reporting, testing, etc.
 - Restricted to residential asphalt shingles (1-4 residential units)
 - Asbestos testing of samples of ground product rather than shingles
 - Sampling every 50 tons of product & testing by PLM
 - Increase to every 25 tons on detect of >1% asbestos until 3 rounds are <1%
 - Two year sunset limit on approval – renewal to be based on experience gained and test results

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B.R. Amon & Sons - continued

- Minor sorting at the hot mix plant (sorted shingles from IL proc fac's)
 - Sorting conducted by haulers/roofers – best mgt practices guide
 - Loads inspected at plant, rejected loads sent to landfill
 - No personnel have to physically handle shingles/roofing waste
 - All material movement by end loaders, conveyers, etc.
- Dumping on paved pad to minimize dirt in shingles
- Equipment & labor needed is mostly available as part of quarry or hot mix plant
 - End loaders, generators, pumps, etc.
 - Mobile conveyers with magnets
 - Location within quarry takes advantage of runoff controls, fencing, access controls, already in use
 - Add'l equipment includes rented shredder, paved pad, windblown controls

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B.R. Amon & Sons - continued

- Major windblown material – cellophane scrap
 - Messy, but doesn't seem to affect hot mix process
- Shingles ground to about ¼ in by twin-shaft grinder
 - Oversize separated by screens & periodically loaded into shredder
 - Undersize – asphalt or other markets
- Dust control by water sprays at shredder
- Magnetic separation of nails at conveyor discharge
 - Very effective
- Product used by Amon & supplied to other asphalt plants
 - Testing to determine mix ratios for meeting DOT specs
 - 5-10% shingle admixture by weight
 - Need to balance asphalt & aggregate in shingles, use of recycled asphalt concrete, use of virgin aggregate & asphalt, fuel usage

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Feedback/hangups with recycled shingles

- Asbestos & impact of air regs
 - Testing so far (La Crosse, B.R. Amon, Payne & Dolan) indicates very infrequent asbestos content of >1% - a few percent of tests
 - Lab reports detects in entrained transite siding or mastics, not in ground shingles
 - How often to test, what material (shingle or ground product), where sampled – still has to be resolved for longer term
- Shingle processing – issues – who does it – haulers/roofers vs processor/end user
 - How much inspection is needed
 - Should haulers/roofers be required to have processing facility plans & approvals?
- Shingles diverted statewide in 2008 – estimated 51,000 tons

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QA/QC & Recordkeeping

- DNR has a couple of mechanisms for regulation
 - Processing facility approval or low hazard waste grant of exemption
 - Different authorities, but can require the same items
- Primary emphasis on sorting & visual examination to achieve clean shingles
 - Sampling for asbestos – post-grind product vs shingles?
 - PLM testing is available from commercial testing labs
- Processors to provide training for haulers/roofers
- Annual reporting – for basic statistics & info
 - Total tonnages of shingles used
 - Results of asbestos testing program
 - Locations where asphalt containing shingles was used – how much info is needed?
 - Problems & solutions

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Wis DOT Add'l Special Provision 6 - 2008

- Asphalt industry identified lack of published DOT specs as impediment to expanded use of recycled shingles
 - Local gov'ts & contractors often use DOT specs for contract purposes
 - DOT spec would provide benefits to selling product
 - Contractors don't have to do research
- DNR & DOT staff contacts
 - Field trip to operating shingle recycling location
- Industry input to DOT
 - Performance
 - Contaminants – nails, combustibles, etc
 - Effect on grades of asphalt in final mix
 - Past experience with recycled pavement
- WDOT Add'l Special Provision 6 – issued in 2008
 - Emphasis on control of binder properties
 - Puts RAS (recycled asphalt shingles) on similar level as RAP (recycled asphalt pavement)

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Effective with April 2009 Letting ASP-6

460.2.5 Recycled Asphaltic Materials

(1) The contractor may use recycled asphaltic materials from FRAP, RAP, and RAS in HMA mixtures. Stockpile recycled materials separately from virgin materials and list each as individual JMF components.

(2) Control recycled materials used in HMA by evaluating the percent binder replacement, the ratio of recovered binder to the total binder. Conform to the following:

MAXIMUM ALLOWABLE PERCENT BINDER REPLACEMENT		
RECYCLED ASPHALTIC MATERIAL	LOWER LAYERS	UPPER LAYER
RAS only	20	15
RAP only	35	20
FRAP only	35	25
RAS and RAP	30	20
RAS and FRAP	30	25
RAS, RAP, and FRAP	30	25

(3) Ensure that the combined recycled and virgin aggregate conforms to the requirements of table 460-2 and to the gradation requirements of table 460-1.

460.2.6 Recovered Asphaltic Binders

Replace the entire text with the following effective with the January 2009 letting:

(1) Establish the percent of recovered asphaltic binder from FRAP, RAP, and RAS for the mixture design according to AASHTO T 164 using the appropriate dust correction procedure. If production test results indicate a change in the percent of recovered asphaltic binder, the contractor or the engineer may request a change in the design recovered asphaltic binder. Provide at least 2 recent extractions from the contractor's mixture design laboratory supporting that change.

(2) The contractor may replace virgin binder with recovered binder up to the maximum percentage allowed under 460.2.5 without changing the asphaltic binder grade. If using more than the maximum allowed under 460.2.5, furnish test results indicating that the resultant binder meets the grade the contract originally specified.

<http://roads.wisconsin.gov/standards/dot-wi.gov/standards/standspec/asp6.pdf>

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