

3rd Asphalt Shingles Recycling Forum
Thursday, November 01, 2007
Pre-Forum Roundtable –
Notes from DOT Officials Roundtable

AGENDA

1. How can an agency try a test section since the cost of processing shingles would be relatively expensive for a small test section?
2. Is asbestos a problem? How does the purchaser (user agency) and contractor deal with it? What kind and frequency of testing is necessary? Are there EPA requirements? Does the testing make it unattractive and unfeasible for an asphalt contractor?
3. What are the limits for the amount of shingles to allow?
4. Do we know how fine the shingle waste needs to be shredded to effectively mix with the virgin binder in an asphalt mix?
5. What kind of QC/QA requirements (ensuring quality) should there be?
6. What kind of modifications do you have to make to mix designs?
7. What are the qualities of an asphalt mix containing waste shingle material?
8. How much does the quality of shingle asphalt binder vary? Has any sampling and testing of shingle waste been done to develop a range of values?
9. What states are allowing shingles and how are they using them? Alabama, Georgia, North Carolina, Minnesota, Missouri, Pennsylvania and Texas have specifications. AL, GA and MO allow post-consumer. The others have experimented with post-consumer. (May not be an all inclusive list.)

NOTES

OPENING COMMENTS

- Landfills becoming increasingly difficult to site and open
- State waste management officials working to reduce amount of shingles to landfills
- Many recyclers/contractors are able to sell presorted shingles to processors at market price equal to cost of landfilling the material

IOWA

- Iowa is investing \$500,000 /yr in incentives to avoid landfilling

PENNSYLVANIA

- Landfill tip fees collected by PA DEP provide funds to Penn DOT to support use of recycled material
- Penn DOT has two specifications (tear-offs and manufacturers scrap)
- Provisional specs developed in response to contractor interest in use
- Currently have 2.4 mile project w/ shingles.
- Need for stringent QA/QC as contractors fear use will drive up costs and may result in lost contract
- Contractor must have good understanding of how to use shingles
- Additional QC tests are being performed to address performance issues, including monitor temperature of mix. Found out delivery temps should be higher
- PA DEP considers shingles a waste material, and a beneficial use determination (BUD) permit is required. The permit process is difficult and many contractors reluctant to go through process
- PA DEP has general BUD for RAP which took 10 years to finalize

NORTH CAROLINA

- NCDOT has been using the material for over 15 years
- Initial cost increase experienced, but after process developed, costs came into line and now contractors are looking for material
- Reducing virgin binder cost by ~1% by using RAS shingles in asphalt mixes

MISSOURI

- MoDOT started by using experience and conditions based on NCDOT, MnDOT and others' experience
- Contractors are bidding projects like any other mix
- 9000 tons of RAS in 2007 in mixes containing < 5%
- MDNR does not consider processed residential tear-off shingles a waste anymore

MINNESOTA

- MnDOT uses 20,000 tons per year of manufactured waste shingles in HMA
- Currently using 5% Shingles and typically up to 30% RAP and shingles are considered the same as RAP in the specification

ALABAMA

- ALDEM determined that the chances of finding asbestos in residential shingles is insignificant therefore asbestos testing is not required
- Need for uniformity amongst states in the environmental regulatory arena

CALIFORNIA

- CA has many different air quality districts

ONTARIO

- Uses only manufacturing waste; allows in stone matrix asphalt (SMA)

DISCUSSION QUESTIONS

1. How can an agency try a test section since the cost of processing shingles would be relatively expensive for a small test section?
 - MO asks contractor to try and work it into an existing project. A landfill and contractor approached DOT. They observed a test section on an access road then allowed use in an existing highway project that the contractor was constructing.
 - CA trying to tap into existing projects. Shingle recyclers have offered to donate material for projects
 - MN has some experimental projects working with the contractor to develop specs. They are using tear-offs on a recreational trail
 - FHWA recommends research on the best coarse size of shingle to use
 - One issue with tear-off shingles is that contractor says material they have is close enough and does not adhere to established specs
 - PA working at municipal level, they receive state funding and generally follow specs. Municipalities support good test sections and many times offer money to help fund a portion of the project

Q: Can FHWA set aside money for research on existing roadway projects?
A: Under the upcoming highway bill, FHWA will ask state DOTs to set aside money for research on existing projects
2. Have PAH emissions been characterized?
 - TX is currently conducting a study on this issue
3. Is storage of RAS near grass or water a problem? Is leaching a problem?
 - Regarding leaching, there is much more concern for what is leaking from cars than shingles or asphalt
4. What are the limits for the amount of shingles to allow?
 - Most states allow 5%
 - Ontario only allows 4% manufacturers scrap, no tear-off
 - Standard Grades - 67-22 (AL), 65-34 (NC), 64-22 (MO) fatigue test
 - MnDOT allows up to 5% shingle use *as long as virgin binder is contributing up to 70%*
 - Limiting factors with shingles are dust and stiffening agent used
5. Do we know how fine the shingle waste needs to be shredded to effectively mix with the virgin binder in an asphalt mix?
 - Minus ½", but the finer the better; more work on this could be done
6. What kind of QC/QA requirements (ensuring quality) should there be?

- Same as RAP (0.5% in aggregate)
 - At up to 3% deleterious limit, MO saw no real problems
 - MO seeing more shingles from re-roofing than demolitions
7. What kind of modifications do you have to make to mix designs?
- Replace shingles for 5% of the RAP. Turn in mixtures w/ and w/out RAP, they are almost identical
 - MoDOT has not noticed any difference in asphalt modified w/ shingles. No noticed increase in curing time
 - 55% of shingle asphalt is effective in the binder (number came from contractor in MN using manufacturing waste). Higher numbers are tear-offs in total AC
 - MO planning a standard gradation for contractor use. Asking for nail-free shingles
8. What are the qualities of an asphalt mix containing waste shingle material?
- Depends on the type of mixes being used
 - SMA 50% or 70%
 - VADOT did some fatigue testing and did not note any difference
 - Surface friction is not necessarily improved because not enough shingles in mix
 - Mixture properties have been the same between virgin and shingle mixtures according to MoDOT
9. How much does the quality of shingle asphalt binder vary? Has any sampling and testing of shingle waste been done to develop a range of values?
- Mixes are normally stiff
 - Using low percentage of virgin asphalt does not necessarily affect properties
 - Polymer modified asphalt better to use than air blown asphalt as ageing not as much of a factor
10. What states are allowing shingles and how are they using them?
- AL, GA, NC, MN, MO, PA and TX have specs
 - AL, GA, NC and MO allow post-consumer
 - Others have experimented with post-consumer. (May not be all-inclusive list)
 - 5% max is within the acceptable range for contractors to consider
 - MN not planning to go higher than 5%
 - SC using 8% shingles. Are there any problems? How is it progressing?
 - MO allows up to 20% RAP without binder modification; substitution of RAS on 1:1 basis
 - One state allows shingles to be substituted for RAP on a 1:5 basis, e.g., 1% RAS = 5% RAP
11. Has there been any reduced cracking?

- MN has not seen any improvement in cracking; performance is about the same as non-shingle asphalt
 - From a practical standpoint, contractors want to put as much RAP and shingles in without having to change binder grade
12. Is there a reason to be worried about the ADT (average daily traffic)?
- ADT for MN is 15000, PA is 5000
 - Easel Road E is 10m ADT
13. Warm asphalt may be increasingly used in next 10 years. Can shingles be incorporated in a warm asphalt mix?
- May end up being used as an aggregate contribution as opposed to a binder
 - Many contractors do not want a third party contractor to source shingles as they prefer control over whole process and QA/QC
 - Not much difference in savings from use of RAS in warm mixes vs HMA
14. How are shingles being processed?
- Ottawa using natural sand to keep shingles (manufacturers) from binding; ratio of sand to shingles is 3-5%
 - Tear-offs or age hardened material you can liberate that material
 - Binding has not been a problem in NC as stockpiles do not sit long therefore there is no need for sand
15. Outreach
- To increase awareness and publicity about shingle recycling program, issue a press release
 - MoDOT got a lot of response from theirs, including municipalities in CA
16. Additional questions
- What kind and frequency of testing is necessary?
 - Are there EPA requirements?
 - Does the testing make it unattractive and unfeasible for an asphalt contractor?
17. Needed for advancing use of recycled shingles:
- Uniform agreement between state EPA's on interpretation and enforcement of NESHAP rule on 30 CFR 61 Subpart M.
 - Cold weather performance testing of shingle binders and mixtures.