



U.S. Department of Transportation
Federal Highway Administration

5TH ASPHALT
SHINGLE 
RECYCLING FORUM

October 27-28, 2011
Dallas, TX

ShingleRecycling.org

Federal Highway Administration “National Perspective”

Lee Gallivan
Asphalt Pavements Engineer
Office of Pavement Technology

Benefits of Using Recycled Asphalt Shingles

- Decreased optimum content of virgin asphalt cement
- Increased stiffness of the asphalt
- Decreased susceptibility to rutting
- Positive use for the 7-10 million tons generated annually of roof shingle tear-off waste and the up to 1 million tons of manufacturing shingle scrap.



Sources of Asphalt Shingles

- Manufactures' waste ~1 MT annual
..... Not in every state
- Tear-offs ~10 MT annual
..... Everywhere

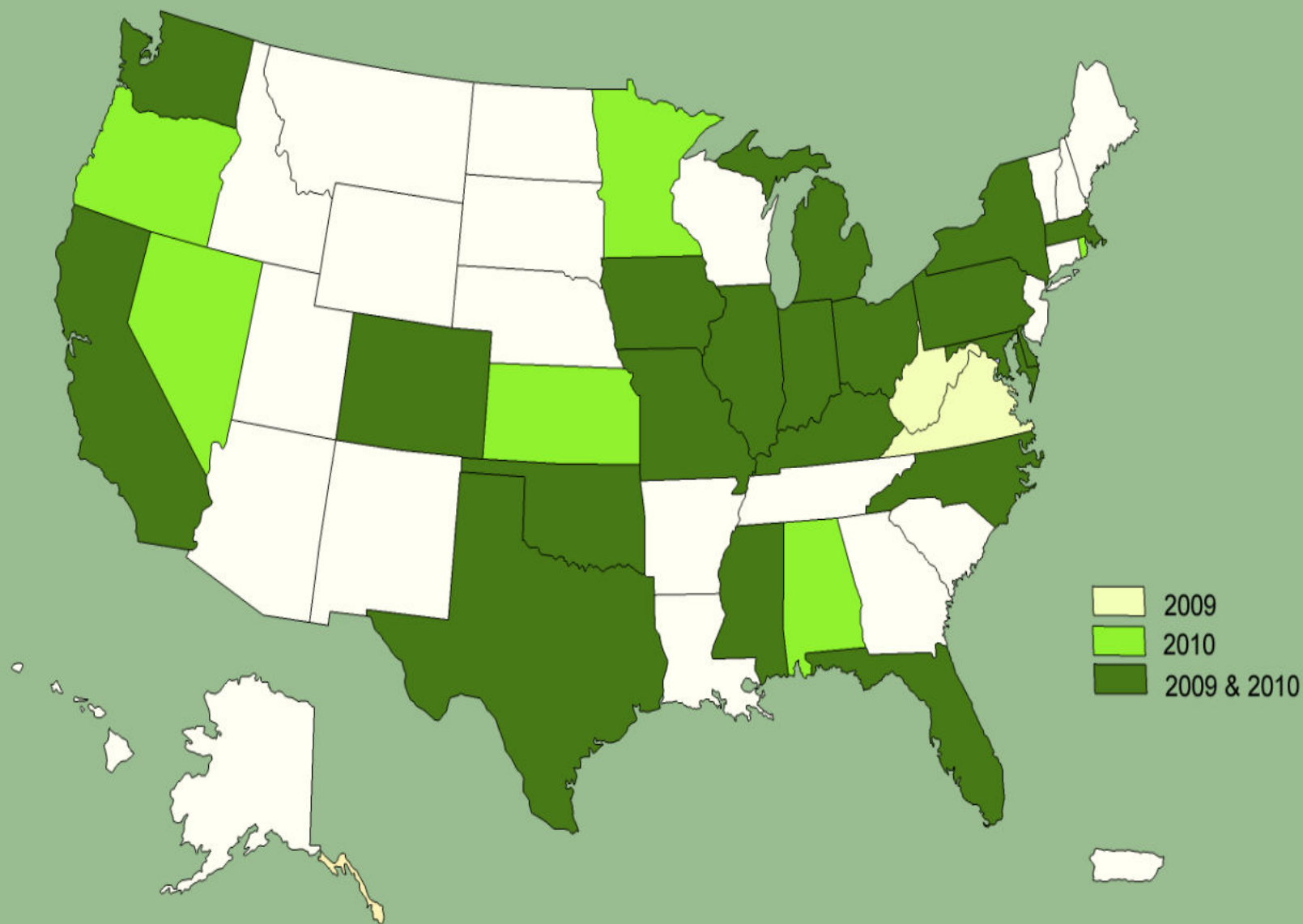
Approximate Location of Fiberglass & Organic Shingle Manufacturing Facilities



Ref: Economic Impact Analysis of the Proposed Asphalt Roofing and Processing NESHAP, Final Report, USEPA, July 2001

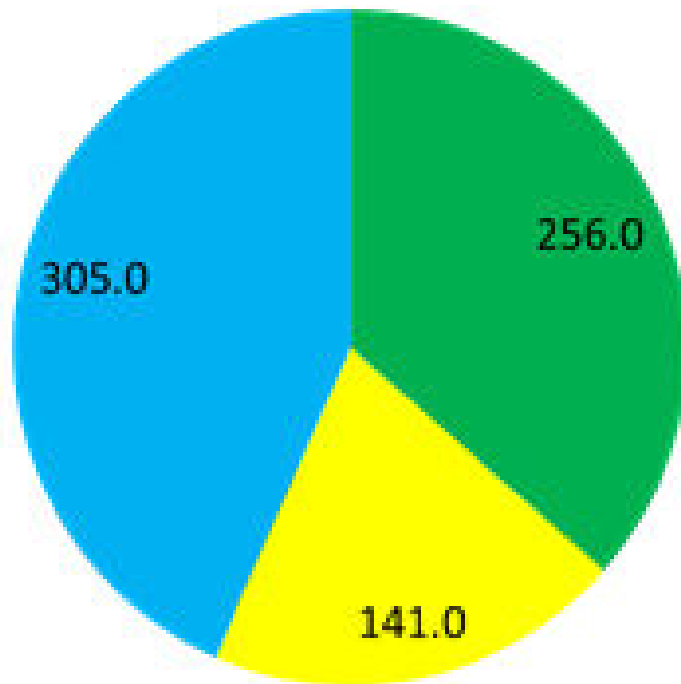


States with HMA Producers Using RAS

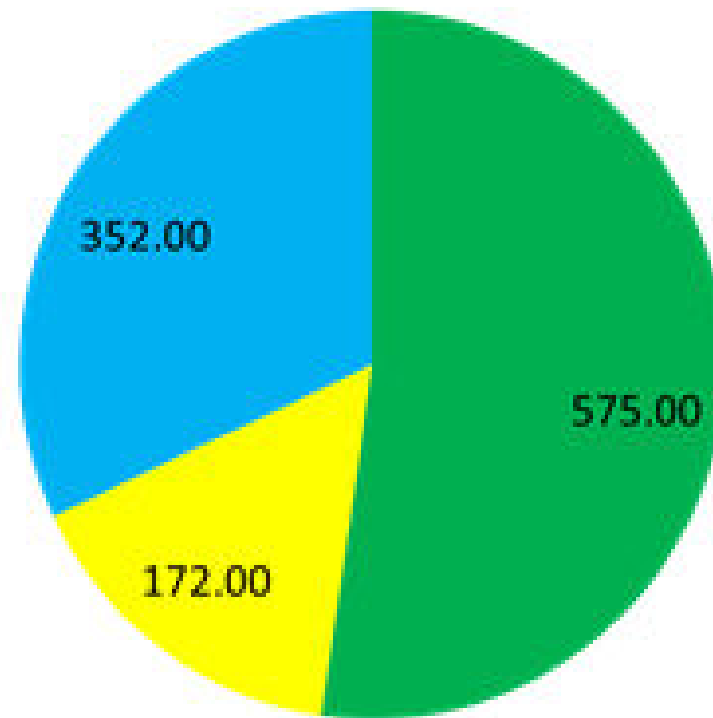


RAS Use by Sector Thousand Tons

2009



2010



■ DOT

■ Other Agency

■ Commercial and Residential

What we have seen

- Shingles are too valuable to throw away
- Use manufacturers' waste if available
- Tear-offs
 - Work with roofers to get clean material.
 - Work with local agencies on sampling plan
- Performance
 - Improved rutting resistance



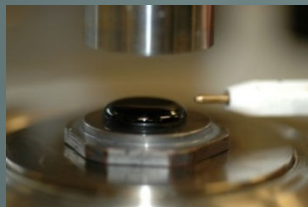
What we have seen

- Mix AC Content
 - Will reduce the amount of new asphalt
 - Total asphalt contents often higher (0.2-0.4%)
- Plant production
 - Similar to RAP
- Mix design
 - Similar to RAP
- Construction
 - Use conventional equipment
 - Some contractors report easier density



Remaining Performance Issues

- ~ Effect on binder grade
- ~ Temperature Susceptibility
- ~ Moisture Susceptibility
- ✓ Rutting resistance



Performance of Recycled Asphalt Shingles in Hot Mix Asphalt

Pooled Fund Study -TP-5(213)

- Best practices for using RAS in HMA with focus on material properties and mixture performance.
- Participants FHWA, MO, CA, CO, IA, IL, IN, MN, and WI
- Also QC/QA concerns, demo projects, performance database

<http://www.pooledfund.org/>



AASHTO Guidance

- PP 53-09 Design Considerations when Using Reclaimed Asphalt Shingles in HMA
- MP 15-06, Use of Reclaimed Asphalt Shingle as an Additive in Hot-Mix Asphalt
- Under development by FHWA RAP/RAS Expert Task Group to develop a binder replacement portion in M323 to include RAP and **RAS**



RAP Percentage

Based on Percentage Binder

- Historically, agency limit RAP based on RAP percentage by weight of total mix
- With high RAP contents, the primary issue is impact on binder properties
- Determine contribution of RAP binder toward total binder in the mix, by weight.
 - Example - “70% of binder content must be virgin” or “no more than 30% binder content can come from RAP or RAP & RAS”.



Additional Information

FHWA Pavement & Material Web Site

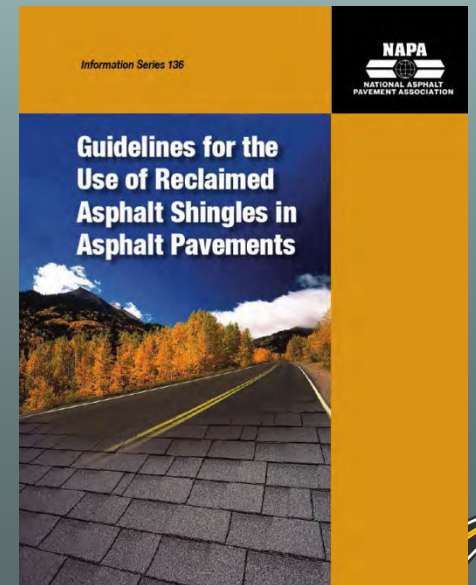
<http://www.fhwa.dot.gov/pavement>

National Asphalt Pavement Association

<http://www.asphaltpavement.org>

And

<http://shinglerecycling.org/>



Thank You



U.S. Department of Transportation
Federal Highway Administration

