

**ASPHALT SHINGLES WASTE MANAGEMENT IN THE NORTHEAST
FACT SHEET
February 2007**

Background

Asphalt shingles make up roughly two thirds of the U.S. residential roofing market. They are made of the same four basic materials contained in hot-mix asphalt used in road construction. These materials include: fiberglass or cellulose backing (2-15%); asphalt cement (19-22% on a fiberglass-matt base, 30-36% on a cellulose-felt base made with paper); sand-sized, ceramic-coated natural rock called aggregate (20-38%); and mineral filler or stabilizer that includes limestone, dolomite and silica (8-40%). The asphalt used in shingles is made through the partial refinement of petroleum.ⁱ

According to the Asphalt Roofing Manufacturers Association, there are nine asphalt roofing manufacturers servicing the U.S. markets. The following table lists these companies.

Asphalt Roofing Manufacturer	Corporate Headquarters	Locations of Manufacturing Facilities in the Northeast US
Atlas Roofing Corporation	Atlanta, Georgia	None
CertainTeed Corporation	Valley Forge, Pennsylvania	Norwood, Massachusetts
ELK	Dallas, Texas	Myerstown, Pennsylvania
EMCO Building Products Corp	Quebec, Canada	None
GAF Materials Corporation	Wayne, New Jersey	Baltimore, Maryland Millis, Massachusetts Quakertown and Erie, Pennsylvania
IKO Production Inc.	Toronto, Canada	Wilmington, DE
Owens Corning	Toledo, Ohio	Jessup, Maryland Kearney, New Jersey
Pacific Coast Building Products, Inc.	Rancho Cordova, California	None
TAMKO Building Products, Inc.	Joplin, Missouri	Frederick, Maryland

Each year, the U.S. manufactures and disposes of an estimated 11 million tons of asphalt shingles. Of this waste, ten million tons is from installation scraps and tear-offs from re-roofing and one million tons from asphalt shingle manufacturers.ⁱⁱ The U.S. Environmental Protection Agency estimates that shingle waste makes up 8% of the total building-related waste stream and 1-10% of annual construction and demolition debris (C&D).ⁱⁱⁱ

As a substantial portion of the C&D waste stream and because they are usually separated from other debris, asphalt shingles have the potential to be recycled. In addition, technology has created some money-saving opportunities for recycled shingle markets. Using hot-mix asphalt with only 5% recycled shingle material can save \$1 - \$2.80 per ton of hot-mix asphalt, as well as improve the quality of hot-mix asphalt used in paving.^{iv}

Waste Management Strategies

1. Source Reduction & Reuse

An easy way to reduce asphalt shingle waste and other building-related debris is by implementing the following source reduction measures.

Careful Purchasing - By purchasing conservatively and reusing excess materials, contractors and homeowners save money, increase resource efficiency, and limit solid waste.

Donation – Another source reduction strategy that contractors and homeowners may use is donating excess shingles for reuse to Habitat for Humanity® or other charitable organizations. Reusable shingles may also be posted on a Materials Exchange website. Materials Exchanges provide residents and businesses with the opportunity to list and search through unwanted, reusable items. A list of the Northeast Materials Exchange may be found on the web at <http://www.nerc.org/>.

2. Recycling

Using recycled asphalt shingles (RAS) in new products is important to reduce the negative environmental impacts associated with the extraction, transportation, and processing of virgin materials. It also conserves valuable landfill space. In addition, the use of these recycled materials reduces the amount of virgin resources used in production and reduces costs for manufacturers and consumers. By recycling used asphalt shingles, roofing and contracting companies are able to reduce their disposal fees and enhance their public image.

Markets for the nascent recycled asphalt industry sector are developing as new studies and research on potential end-uses are completed. Currently, a substantial portion of asphalt shingle recycling involves mixing 5% ground up shingles with hot-mix asphalt used in road paving and cold patch materials. (Please note: There is no existing comprehensive list of companies using RAS for new products.)

Researchers have found that using recycled asphalt shingles in hot-mix can actually improve the pavement's performance by increasing its resistance to wear and moisture, and decreasing deformation, rutting, and thermal fatigue and cracking^v. A Minnesota study showed that hot-mix asphalt containing 5% tear-off shingles performed no differently than regular hot-mixes up to a decade later.^{vi}

Information on Research Efforts

States that have conducted laboratory studies using recycled asphalt shingles in hot-mix asphalt include Georgia, Ohio, North Carolina, Minnesota and Texas. In addition, Pennsylvania, North Carolina and Minnesota have conducted field studies where portions of highways or trailways have been paved with asphalt containing recycled shingles and monitored over time. The following is a list of states that allow a certain percentage of recycled asphalt shingles in hot asphalt mix pavements:

- Florida up to 5% manufacturer's scrap,
- Georgia up to 5% manufacturer's scrap,
- Indiana up to 5% manufacturer's scrap,
- Maryland up to 5% manufacturer's scrap,
- Michigan up to 5% manufacturer's scrap,
- New Jersey up to 5% manufacturer's scrap,
- North Carolina up to 5% manufacturer's scrap,
- Ohio "certain percentage of recycled material", and
- Pennsylvania up to 5% manufacturer's scrap.^{vii}

Barriers to Recycling Asphalt Shingles

Most of the asphalt shingle waste stream is composed of tear-off shingles from re-roofing. The primary barrier to recycling tear-offs are varying aggregate composition and contaminants—nails, wood, and asbestos.^{viii} From the early 1960's to the late 1970's, some shingle manufacturers used asbestos in the production of the fiber matt contained in their shingles^{ix}. In addition, the United States Geological Survey reports that the United States used 55% (1,392 tons) of the total asbestos

consumed in 2005 to make new roofing products.^x Since recycling of asbestos-tainted materials is prohibited by federal law, processors must test shingle loads in accordance with state and local requirements.

Another barrier that has limited the use of RAS in asphalt pavement is states' Department of Transportation (DOT) paving standards and how they are used. It is common practice for state DOTs to use pavement standards for non-road pavement applications (e.g., temporary roads, parking lots and driveways), which limits the amount of RAS in hot-mix asphalt. This greatly reduces the amount of asphalt shingle waste that can be used by states. State DOTs also prefer manufacturer's scrap in hot-mix asphalt, because of its guaranteed uniform content.

In addition, some hot-mix plant operators are still resistant to adding shingles to their mixes, report some recyclers. They say they have enough recycled asphalt pavement (RAP) in there already, or that it is not economically feasible. Also, older plants often are not equipped to properly handle the shingles safely.^{xi}

Recycled Asphalt Shingle Uses – The first step to recycling asphalt shingles is the removal of non-shingle waste. The shingles are then ground to ¼” – 2 ½”, depending on the intended future use. The following are potential end uses for recycled asphalt roofing shingles:

- Hot-mix Asphalt (HMA) additive
- Cold patch for pothole repair
- Temporary roads, driveways and parking lots
- New shingles additive,
- Aggregate road base, and
- Dust and erosion control at construction sites and rural roads, and
- Fuel.^{xii}

Resources on Asphalt Shingle Recycling Efforts

- Minnesota Shingle Recycling Project Overview
<http://www.pca.state.mn.us/oea/market/resources/shinglestoolkit/shingles-overview.pdf>
- Minnesota Shingle Recycling Research
<http://www.pca.state.mn.us/oea/market/resources/shinglestoolkit/shingles-minnesota.pdf>
- Shingle Recycling Case Studies
<http://www.pca.state.mn.us/oea/market/resources/shinglestoolkit/shingles-casestudies.pdf>

3. Disposal

Disposing of asphalt shingles in landfills is much less efficient than recycling. A growing number of landfill facilities established to handle large waste streams exacerbate other environmental issues such as methane gas emissions which contribute to global climate change. Since asphalt is made from refined petroleum, incinerating old or unwanted shingles also creates harmful emissions.

Contact Information

- Asphalt Recycling Organizations and Resources [<http://www.shinglerecycling.org/links.asp>]
- American Roofing Recyclers [<http://www.roofingrecyclers.com/>]
- Green Building Links [<http://www.ciwmb.ca.gov/GreenBuilding/Links/>]
- State of Minnesota Research and Results
[<http://www.moea.state.mn.us/lc/purchasing/shinglestoolkit/shingles-minnesota.pdf>]
- Asphalt Shingles Overview and Publications [<http://www.ciwmb.ca.gov/condemo/Shingles/>]

- Technical Reports [http://www.shinglerecycling.org/tech_reports.asp#4]
- Fact Sheets [http://www.shinglerecycling.org/fact_sheets.asp]
- Literature on Asphalt Shingle Recycling [<http://www.shinglerecycling.org/literature.asp>]
- <http://www.epa.gov/asbestos/> [<http://www.epa.gov/asbestos/>]

State Resources

Connecticut

http://www.ct.gov/dep/cwp/view.asp?a=2709&q=324192&depNav_GID=1643
http://www.ct.gov/dep/lib/dep/Permits_and_Licenses/Waste_General_Permits/Asphalt_roofing_shingles_gp.pdf
http://www.ct.gov/dep/lib/dep/Permits_and_Licenses/Waste_General_Permits/Asphalt_roofing_shingles_reg.doc
http://www.ct.gov/dep/lib/dep/Permits_and_Licenses/Waste_General_Permits/Asphalt_roofing_shingles_inst.pdf
http://www.ct.gov/dep/lib/dep/Permits_and_Licenses/Common_Forms/transmittal_form.doc

Maine

<http://www.maine.gov/dep/rwm/solidwaste/#ru>
 Chapter 418 - Solid Waste Management Rules: Beneficial Use of Solid Wastes

Vermont

<http://www.anr.state.vt.us/dec/wastediv/recycling/CnDReports.htm>

Sources

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- ⁱ http://www.epa.gov/epaoswer/non-hw/debris-new/pubs/roof_br.pdf , <http://www.ciwmb.ca.gov/ConDemo/Shingles/>
- ⁱⁱ http://www.epa.gov/epaoswer/non-hw/debris-new/pubs/roof_br.pdf
- ⁱⁱⁱ Biocycle: Analyzing What's Recyclable in C&D Debris
- ^{iv} <http://www.greenguardian.com/pdf/ManufacturedShingleScrap.pdf>
- ^v http://www.epa.gov/epaoswer/non-hw/debris-new/pubs/roof_br.pdf
- ^{vi} <http://www.moea.state.mn.us/lc/purchasing/shinglestoolkit/shingles-minnesota.pdf>
- ^{vii} <http://www.shinglerecycling.org/states.asp>
- ^{viii} http://www.epa.gov/epaoswer/non-hw/debris-new/pubs/roof_br.pdf
- ^{ix} http://www.epa.gov/epaoswer/non-hw/debris-new/pubs/roof_br.pdf
- ^x 2005 USGS Minerals Yearbook <http://minerals.usgs.gov/minerals/pubs/commodity/asbestos/asbesmyb05>
- ^{xi} Overview of Asphalt Shingle Recycling, William Turley, Executive Director, Construction Materials Recycling Association, 2006 <http://www.shinglerecycling.org/overview.asp>
- ^{xii} http://www.epa.gov/epaoswer/non-hw/debris-new/pubs/roof_br.pdf