



Ohio's Asphalt Paving Industry: "Green" Impacts

Ohio's asphalt paving Industry has contributed significantly to the advancement of "Green" (i.e. sustainable) construction practices. "Green" asphalt construction has saved millions of Ohio taxpayer dollars, virgin raw materials, and has created a beneficial use for what would otherwise become construction demolition debris.

"... the Ohio asphalt industry's recycling effort is so large that each year, just in recycled content alone, there is quantity enough to pave a road from Columbus to Fairbanks, Alaska."

The Industry's entrance into green construction came in the early 1980's as a result of cost and supply concerns created by the OPEC Oil Embargo. Since then, Ohio's asphalt producers have been recycling and reusing reclaimed asphalt into new pavements. In recent years, reclaiming post-consumer recycled asphalt shingles (PC-RAS) from roof replacements and a new green manufacturing technology referred to as Warm Mix Asphalt (WMA) are "greening-up" the asphalt paving industry to an even greater extent.

In 2013 the National Asphalt Pavement Association released a survey of the states conducted in 2012 to determine recycling usage during the 2011 paving season. The survey, "2nd Annual Asphalt Pavement Industry Survey on Reclaimed Asphalt Pavement, Reclaimed Asphalt Shingles, and Warm-Mix Asphalt Usage: 2009-2011", was conducted in partnership with the Federal Highway Administration. Flexible Pavements of Ohio conducted a survey of its own to determine RAP and PC-RAS usage in 2012. The table below provides the amounts of reclaimed materials reused into Ohio's new asphalt pavements for the most recent data.

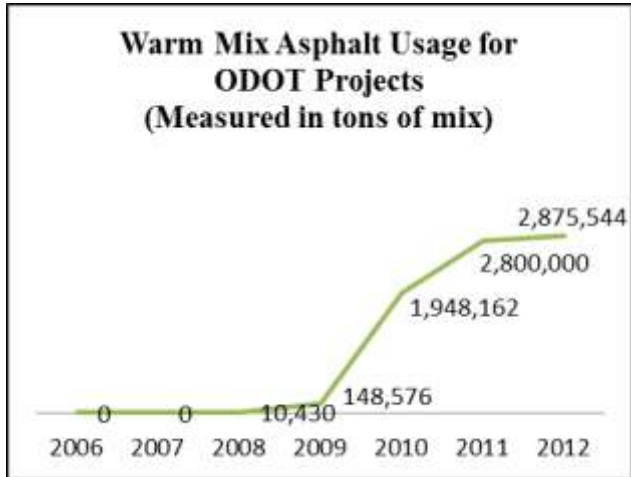
Summary of RAP, PC-RAS and WMA Usage (total Ohio market)	
Reclaimed Asphalt Pavement (RAP)	3.86 million tons
Post-Consumer Reclaimed Asphalt Shingles (PC-RAS)	61 thousand tons
Warm-Mix Asphalt (WMA)	5.7 million tons

Reclaimed asphalt pavement (RAP) comprised 23 percent of the total asphalt market in 2009 and steadily grew to 24 percent in 2012. That means the average ton of asphalt mixture manufactured and placed in 2012 had 24 percent recycled material in it. The 3.9 million tons reclaimed in 2012 had an estimated value of \$141 million. To provide some perspective, the Ohio asphalt industry's recycling effort is so large that each year, just in recycled content alone, there is quantity enough to pave a 2-lane road from Columbus to Fairbanks Alaska.

Ohio ranks within the top seven states in the nation as a user of reclaimed asphalt pavement (RAP). Above Ohio are Michigan (36%), Nebraska (30%), Florida (30%), Indiana (26%), Virginia (26%) and Utah (26%). The reason for Ohio's good record is that the Ohio Department of Transportation was a pioneer of recycling which opened up the opportunity for local governments in our state to use the technology.

The asphalt industry is also incorporating scrap tires into asphalt mixes. Old tires are used as an aggregate replacement which conserves virgin resources or as an asphalt modifier improving the performance of the asphalt mixture. In fact, nationally, approximately 10 million tires are annually removed from the waste stream and incorporated in high-performing asphalt pavements. Throughout Ohio, scrap tires have been used as an asphalt modifier for projects contracted by ODOT and local government agencies such as Franklin and Lucas Counties, and Cities of Columbus and Dayton.

Ohio ranks first in the region for use of Warm Mix Asphalt¹, a technology that reduces cost, lowers air pollutant emissions during manufacturing and has promise of extending pavement life. ODOT experienced explosive WMA growth. WMA grew from approximately ten thousand tons in 2008, to



nearly 2.9 million tons in 2012. WMA tons contracted by ODOT in 2012 accounted for approximately 60 percent of the asphalt used to pave ODOT projects.

Research conducted by ODOT in 2008 indicates WMA technology afforded an approximate 14 percent fuel savings in asphalt manufacturing. The same research found emissions results supporting WMA emissions testing from around the nation. Although variability existed in the ODOT project results, their analysis expects NOx emissions to be

15 to 30 percent lower, CO2 emissions 10 to 20 percent less, and VOC emissions 10 to 40 percent lower than that experienced in conventional asphalt manufacturing.

The asphalt industry is advancing other green pavement technologies as well. Perpetual Pavements are designed to last indefinitely. This removes the need for roadway reconstruction and affords the lowest impact on motorists. Also, since Perpetual Pavements only require surface maintenance less need exists for virgin raw materials. Perpetual Pavement research is being conducted on three major highways in Ohio – Delaware County US-23, Wayne County US-30 and Stark County I-77.

Porous Asphalt Pavement is another green technology advancing in Ohio. As the name implies, porous asphalt allows water to flow through it. In doing so storm water is better controlled, stemming soil erosion and leaving rivers cleaner. In fact, a University of New Hampshire study determined porous pavements actually reduce roadway pollutants by more than 90 percent and a recent Texas Department of Transportation evaluation of a related technology made a similar determination.² ODNR in cooperation with ODOT is constructing three porous asphalt parking lots. Multiple porous asphalt parking areas have been constructed in northeast Ohio by the National Park Service and metro parks.

Asphalt ... Defining Value!
Safe, Smooth and Sustainable

¹ Summary Report of 2008 Warm Mix Asphalt Trials, Powers P.E., Asphalt Materials, Ohio Department of Transportation, November 21, 2008

² Cleaner Water With Asphalt Pavements, Asphalt Pavement Alliance