



## Asphalt-Rubber Air Quality & Recycling

### Breathe a sigh of relief!

Asphalt-Rubber pavements use thousands of scrap tires every mile reducing the potential for tire fires. Because smoke from tire fires is very harmful, some believe that the granulated tire



Tracy Tire Fire, California 1999, photo courtesy of the Sacramento Bee, photographer Bart Ah You

rubber mixed with hot asphalt cement must be harmful as well. That is not the case. The rubber material is never processed in temperatures high enough to cause the tire rubber to smoke or burn.

**The rubber particles are not small enough to become volatile or air borne as particulate matter or PM10.**

Fume emissions studies from asphalt-rubber manufacturing and paving sites have been conducted routinely by state and federal air quality and health professionals since 1992. Every time, asphalt-rubber has been found to be the same as conventional, unmodified asphalt even when rubberized asphalt pavements were recycled.

The use of asphalt-rubber paving strategies can reduce the emission from trucks that haul the material to the paving site because the material can be placed in thinner layers.

**It's easy to calculate:**

**AR = Less Tons + Less Trucks + Less Emissions**

**It's clear from the studies cited below, A-R emissions are similar to other asphalt products:**

- Air Pollutant Emissions Test Asphalt Plant Baghouse Stack, San Antonio, Texas — Southwestern Laboratories, Houston, Texas, 7/92
- Evaluation of Exhaust Gas Emissions and Worker Exposure from Asphalt-Rubber Binders in Hot Mix Asphalt Mixtures — Kathryn O'C. Gunkel, Wildwood Environmental Engineering Consultants., Inc. Michigan Department of Transportation 1994
- NIOSH Health Hazard Evaluation Report: HETA #2001-0536-2864
- Crumb-Rubber Modified Asphalt Paving: Occupational Exposures and Acute Health Effects 2001



Rubber does not cause smoke at hot-plants. Above, a hot plant during production of A-R near Tucson, AZ.

- California Stack Emission Testing of Asphalt-Rubber and Conventional Asphalt Concrete Bay Area Air Quality Management District Northern California Rubberized Asphalt Concrete Technology Center, 2/5/02

## Rubber RAP!

Hot Mixed Asphalt (HMA) is one of the most recycled materials in the U.S.A. Each year, about 80 million tons of road surfaces are recycled as "Reclaimed Asphalt Pavement" (RAP).

RAP can be used as an addition to HMA, as an aggregate in cold mix asphalt, as a granular base, and as a fill or embankment material. RAP is most commonly used as a component of HMA in quantities ranging from a 10% to 30%.

Asphalt-Rubber pavements have also been successfully recycled. The rubber component in Asphalt-Rubber RAP is less than 2%, however the oil contents of A-R RAP is in the 6-8% range, providing a more valuable resource than conventional RAP with oil contents in the 4-5% range.

Studies from around the USA have been conducted to determine the feasibility of Recycling Rubber Pavements. States such as Arizona, California, Florida, Kansas, New Jersey, Michigan, Mississippi, Texas and Wisconsin have researched the physical considerations and cost effectiveness of Rubber RAP with conclusions describing the successful long term benefits.

Like conventional RAP, the millings are reintroduced at the HMA facility through screening and sizing equipment connected to the RAP Collar on the mixing drum.

The RAP collar allows the RAP material to commingle with the aggregate in the mixing drum at a location after the aggregate has been dried and heated. Since the virgin aggregate is used to heat the RAP, additional mixing time is required to achieve the appropriate mixing temperatures. At the end of the process, the hot asphalt cement is added to the mixture and loaded out for placement on the project site.

### THE RESULTS

Asphalt-rubber pavements have been and can be successfully reused in new HMA pavements in the typical 10%-30% quantities without any problems. The benefit is that the original A-R pavements will take about twice as long in service BEFORE they NEED to be recycled.

### THE PROCESS



The aged surface is milled off (above) and hauled to a storage location or RAP pile (right) and added to regular HMA mixers through a RAP collar (photo courtesy of ASTEC, Inc.)



**Rubber Pavements have  
been successfully recycled,  
That's a RAP!**