

City of Phoenix Street Resurfacing Program

Pavement Management System

The City of Phoenix utilizes a state-of-the-art Pavement Management Program and software to assist in prioritizing streets for surface treatments. It measures asphalt distresses, their severity, and recommends the most efficient and cost effective surface treatments. City of Phoenix Pavement Engineering staff use the information provided by the software to conduct evaluations and prioritize streets for resurfacing based on need, utility conflicts, and budgetary constraints. A multi-year plan is updated annually.

Pavement Life

Asphalt pavement is designed to be flexible which allows it to adapt to the wide temperature swings that occur in Arizona. Following initial construction, pavement begins the process of oxidation, which is basically the evaporation of the oils in the pavement. Over time, the pavement becomes dry, brittle, more rigid, and less flexible. The aggregate starts wearing away, causing cracks. Some small cracks can start to show in the first year of new pavement. The City of Phoenix provides a quality maintenance program to extend the life cycle of asphalt 25-30 years and even up to 40 years saving taxpayer's money while providing safe and efficient roadways. Below are definitions of commonly used pavement maintenance techniques.



Crack Seal

Since asphalt pavement is flexible, this flexing causes cracks to develop, even in relatively new pavement. This will continue throughout the usable life of the roadway surface. To limit deterioration, cracks are filled with a rubberized sealant (crack seal) that will assist in the prevention of water between layers of asphalt and sub-grade, thus preventing premature pavement failures, deterioration, and potholes.

Research shows that crack sealing programs are cost effective in extending the life of pavement, as opposed to the cost of extensive pavement repairs for streets left unsealed.

Fog Seal

Fog Seal is a thin spray of emulsified asphalt that is used to rejuvenate pavement that is starting to oxidize. It adds a small amount of binder (glue) to the top of the asphalt to help hold it together. It is used on local streets with new pavements that are starting to lose fines (sand components of the hot-mix asphalt), exposing rocks and creating a rough surface.



Slurry Seal (Residential Streets)



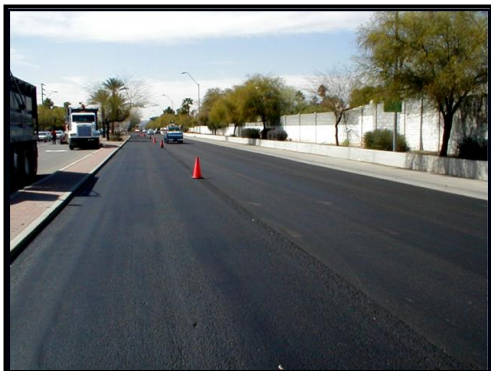
Slurry seal is a mixture of emulsified asphalt and fine aggregate (i.e., sand) applied to local streets to replace the loss of fine aggregate, protect the original surface, and provide a new wearing surface. To be most effective, the treatment should be applied to low volume streets with little cracking, usually to pavements less than ten years old.

Local Street Overlay

If large areas of a local street are showing signs of structural failure, potholes, or 'alligator' cracking, it may be milled down to the good pavement base. A new hot-mix of rubber or polymer-modified asphalt, rock, and sand is applied to extend the life cycle of the original pavement.



Microseal



Microseal is similar to slurry seal in appearance and application, but used on major and collector streets. It uses larger aggregate (coarse sand) and a polymer-modified emulsion. The modified emulsion sets very fast and lets the material withstand heavy traffic loads. It is typically used on newer arterial and collector streets with minimal cracking and patching to replace lost fines and provide a new wearing surface.

Major and Collector Street Overlay

When significant portions of major and collector streets show signs of structural failure, potholes, or 'alligator' cracking, it may be milled down to the good pavement base. A new hot-mix of rubber or polymer-modified asphalt, rock, and sand is applied to extend the life cycle of the original pavement.

Although rubberized asphalt reduces noise on high speed freeways and on concrete, this is less noticeable on urban streets with much slower speeds. The City does not have a program (or budget) for traffic noise reduction by paving with rubberized asphalt.



Service Cuts

The most common work seen on the road has nothing to do with pavement maintenance. Utility crews often cut into the road surface to install or repair sewer, electric, gas, or water lines located under the pavement. During the course of their work, the utility crews will cover excavations with metal plates, or fill trenches with a temporary asphalt patch. When the work is completed, the crew will re-compact the area, install a new sub-base, and make a permanent surface repair using hot-mix asphalt.

Planning and Preparation

Much planning and preparation goes into selecting which streets will be included as part of the annual resurfacing contracts. Preparation for an overlay starts approximately three years in advance, making it very difficult to add streets to a new or existing contract.

Prior to resurfacing a street, concrete work such as curb, gutter, and sidewalk repairs, valley gutter installation, and ADA ramp repair/retrofit must be completed. Federal Law requires that ADA sidewalk ramps be installed as part of the local, major, and collector street overlay programs. The ramps are installed under a Concrete Services Contract the year before the street is scheduled to be resurfaced.

The Street Transportation Department is currently planning the streets which will be overlaid three to four years from now. Streets that will be resurfaced in the next one to two years have already been identified and are in the middle of the preparation process.

Streets are reevaluated every year, as surface conditions may change due to weather,

traffic volume, etc. Streets are selected for resurfacing based on need, utility conflicts, and budgetary constraints. It is not uncommon for a street that is scheduled to be resurfaced two years from now to be moved further out in the program due to lack of funding, or possibly because another street has deteriorated more over time and is in greater need. It is also not uncommon for a street that was not scheduled for resurfacing for at least five years to be completed sooner due to recent deterioration.

Budgetary Constraints

The annual resurfacing program has been challenged to maintain service levels in the face of declining budgets and escalating construction costs. Since 1999, the annual program budget had been fixed at approximately \$13 million per year. Although there was no adjustment for inflation, that amount allowed the City to resurface a minimum of 220 miles of streets annually.

In 2005, higher asphalt prices led to a significant reduction in the miles overlaid. The 2006 program was further reduced by hot mix asphalt prices escalating 80% higher than the prior year. In 2001, 220 miles of City streets were resurfaced; in 2007 the budget allowed only 111 miles to be resurfaced.