

## **Has Athens Discovered the Holy Grail?**

Necessity has always been the mother of invention. In Athens the city was facing a dilemma not unlike most cities in our nation. The problem of rising asphalt prices combined with an economic downturn means that roads will not be paved as frequently. The problem is simple math a road pavement last on average 20 years depending on several conditions. So if a city has 100 miles of roads then they would need to pave between 5 miles of roads per year to keep them on a replacement cycle equal to the life cycle of that pavement. 10 years ago that may have only cost about \$50,000 per mile, but today that cost about \$100,000 per mile.

The solution is also simple, but getting there is tough. If the budget was \$250,000 10 years ago and is still \$250,000 today then you will only be paving roads on a 40 years cycle. Each city now has three choices:

1. Double the amount of money spent on paving
2. Decrease the amount of city maintained roads
3. Increase the life of roads

The city of Athens looked at all options, but decreasing the amount of city maintained roads was not and really an option, although I have read articles of other places allowing certain road to divert back to gravel. A property tax increase helped increase the amount of funds used toward paving, but that is only going to work if the price of asphalt stabilizes. All options should be considered, but the 3rd option is the real, "Holy Grail". If we can increase the life of roads then we can decrease our dependency on the price of paving and of course foreign oil.

The first step Athens used to increase the life of roads was to improve upon the tools they had in preserving pavements and to add additional tools. Here are some of the initial improvements:

1. Already had a great pothole and utility patching program with great operators and added an asphalt recycler to extend the patching season throughout the winter with less dependence on expensive cold mixes and to also include recycled asphalt into the mix. They purchased a Falcon Asphalt Recycler that allows up to 1/3 recycled material to be added to virgin material. This also reduced cost of a patch.



(Asphalt Recycling and Patching)

2. Added cold crack sealing to a hot crack sealing program. Currently the city did hot crack sealing one or two months per year and wanted to double the amount of crack sealing so they devote a little more money to crack sealing by cold applications years round when time allows. Cold crack sealing can be done on smaller areas with less crew members and during down time and without getting out and firing up a hot crack sealing machine. By employing both methods more crack sealing can be accomplished.
3. Mandated that utility cuts on road less than five years old be infrared patched and cuts over 100 feet long have that section resurfaced. Athens found that many of the roads were prematurely aging not due to wearing surfaces, but the frequency of utility cuts. Infrared patching results in an almost seamless cut.



(Infrared Patching)

The biggest tool recently acquired was the in-house double slurry seal operation using a product supplied by Sealmaster called, "Liquid Road". Liquid Road is the cold application of liquid asphalt and aggregate with the use of a spray/squeegee machine. The result is a new wearing surface of about  $\frac{1}{4}$  inch thick similar to micro surfacing only cold applied and in-house. This is the second season that City of Athens has been applying liquid road and has learned several lesson for anyone wanting to start and in-house operation:

### **Lesson One- Startup Costs**

A good spray/squeegee machine will cost around \$50,000 and you will also want to purchase a cold tack tank and spray unit. Total startup cost is about \$55,000-\$60,000. You will also need to supply crews with hand squeegees.

### **Lesson Two- Training Employees and Residents**

The city of Athens found that their crews performed better resulting in a cost reduction in materials from the first year to the second year. The first year they spent \$2.65/Square Yard to apply liquid road and the second year they only spent \$1.30/ Square Yard. The difference is less waste with better trained operators and understanding the process. The second year they also changed the operation and instead of mixing the aggregate themselves they ordered liquid road with the aggregate already added. This sped up the process and made putting it down faster and easier. The crews went from a 9 man crews to a 4 man crew with the Spray/Squeegee Machine operator mastered the technique. They also learned the traffic control techniques needed for closing a road for over 2 hours which is the minimum dry time of Liquid Road under good conditions.

Residents were informed through newspaper articles, but also fliers and letters explaining the process. The second year resulted in no complaints on the process. The first year you begin learning always pick a road with few residents to make it easier.





(Liquid Road Application)

### **Lesson 3- Pick the right road for the application**

With most maintenance technology you have to have the right tool for the right job and at the right time. Liquid Road needs to be installed in our area between April and October to insure that you have the right curing temperatures. Shade also has a big impact on curing times. If the road is totally shaded, it may not be a good candidate for liquid road or you may want to try it during a warm month before the leaves come out like during April. Working during a warm fall is not an option because leaf litter makes it hard to keep road clean. Liquid Road is recommended by Athens for residential roads or low volume commercial roads. Look for speeds below 30 mph. This is most of the roads for most cities. Also look for roads that are older than 10 years, but not ready for paving. Athens has successfully applied Liquid Road to 10 year old roads and to 30 year old pavements, but the condition and preparation is extremely important. Don't do a road with excessive cracking or major base issues that is not resolved.

### **Lesson 4- Preparation**

The road preparation does almost as much good as the application of Liquid Road and the process has made us more conscious of the small problems that you normally don't notice. You start the year before and seal all the cracks and if you have some humps, dips, or alligator cracking that is indicative of base failure you repair and have them infrared sealed. Then right before application you do a thorough cleaning including sweeping, washing, and vegetation removal. Remember you

are only replacing a wearing surface and protecting the existing asphalt you are not bridging imperfections or crack sealing with liquid road. The cleaning is necessary to ensure a tight bond, but Athens also tacks areas that are stained by dirt or grease as well as intersections and steep hills with a light cold applied tack coat to ensure a good bond.



### **Lesson 5 - Payback**

The idea of Liquid Road is that it will prolong the life of the road at least 10 years. Our initial results are looking good, but they are only 2 years old so we have not learned this final lesson. We do know that the cost of putting down liquid road is estimated to be \$1.75/SY and we did it this year at \$1.30/SY. Contractors charge about \$3.00/SY to install if we contracted it out and a 1 inch overlay will cost about \$5/SY. So it looks like we are adding half of the life back to a surface at less than 1/3 the costs of paving. If we only get 5 years out of the surface I think we would break even so time will tell if we have the Holy Grail or not. This year Athens diverted less than 15% of their paving budget to Liquid Road and completed surfacing 3.67 miles of roads, which almost quadrupled the surface area they would have treated with the same amount of funds if paved.

(Athens purchased their Spray/Squeegee Machine with a Green Development Grant. The other great benefit of Liquid Road application is the CO2 reduction. See chart below for cost of application compared with CO2 reductions over traditional surfacing.)

<b>Treatment</b>	<b>Contract Price per Square Yard</b>	<b>Contractor Cost /mile</b>	<b>Life Extension</b>	<b>Self-Applied Price per Square Yard</b>	<b>Self- Applied /Mile</b>	<b>Current CO2 Reduction based on average of 8 lane miles or 4 miles of paving in lbs.</b>
Guard Top				.40	5,700	Gallons 2,535
PMM Slurry Seal	1.85	\$26,048	5.00	1.00	\$14,080	51,806.00
Liquid Road	3.50	\$49,280	12.00	1.75	\$24,640	97,137.00
Aspen Sealer	0.45	\$6,336	3.00	0.25	\$3,520	33,787.00
1.5 inch resurface	7.79	\$109,665	20	not applicable		0
*Mile assumes 24 foot width						

The Holy Grail may have been found in Athens or may not time will tell. Other cities have contracted out Liquid Road applications and found they do not hold up well under heavy traffic and turning movements or they don't fare well to a metal snow plow. We know that rubber tipped plows seem to have no impact. I believe the worst case scenario is that Athens has paid back the initial capital investment in the first to second season and delayed paving at least 5 years and possibly 10 years. They have also found that the process of preparing road has given them new tools, better inspections, and better roads by forcing them to look at roads between 10-20 years old with a magnifying glass to seek out the very start of a problem and made Street Maintenance more proactive than every before.