What Elected and Appointed Local Officials Need to Know *About*

Funding & Maintaining Pavement Maintenance

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Need To Know About Pavement Maintenance

Elected and appointed officials in today's government face many trials and tribulations in the process of performing the responsibilities that accompany their positions. The struggle to balance wants and needs with available funding seems to be never ending.

Each year the process of planning, preparing and approving operating budgets grows more cumbersome. Officials are often stuck between a rock and hard spot as they try to accommodate taxpayers desires for low tax rates in a manner that prevents reductions in services for the community. This becomes very difficult considering that the costs of goods, materials and services used by most governments continue to rise annually.

This task can be less stressful in communities that are fortunate to be in a growing mode. However, it can be very difficult and trying in communities that are experiencing very little or no growth. The pressure from citizens to hold property tax and utility rates steady each year is and will always bear heavily on officials responsible for delivering the goods and services their publics desire and often demand.

During times of tight budgets and reductions in funding officials sometimes make reductions in budgets submitted to them for maintenance of the public-owned infrastructures that surround them. This infrastructure includes a community's utilities such as electric, natural gas, water, wastewater and storm water systems. It includes public-owned buildings and facilities. It also includes roads, streets and highways and their related pavements.

In years past, elected and appointed officials of many communities in efforts to prevent rate increases chose to not provide the funding requested by department managers and directors for maintenance of water and wastewater systems. It is also possible that many of the utility managers chose not to ask for increases in funding believing their efforts would be in vain. Whatever the reason, it likely appeared at the time that those officials were helping reduce or minimize costs for their citizens and customers. However, the dollar saved in those past years is often costing the community three or four dollars today as many communities have had to drastically increase maintenance funding in order to comply with state or federal mandates related to the Clean Water Act. Some communities are now having to annually budget millions of dollars for utility infrastructure rehabilitation on systems that in years past failed to have the funding for adequate and proper maintenance.

One other vital public-owned infrastructure has been critically under funded for many years as well by many communities. Funding for maintenance of roads and streets has too often been an area often cut or reduced by elected officials as they toiled with reducing or minimizing tax increases in their community. This practice has ultimately resulted with many communities having streets whose pavements are in very poor and failing condition. Some streets are in such poor condition they are having to be completely reconstructed at costs that are four to five times that which would have been paid if they could have been simply resurfaced on a timely schedule and frequency.

The historical lack of adequate funding in many communities may be attributed to a number of reasons. As noted earlier it could be due to elected officials and their attempts to reduce budgets or minimize increases in funding and tax rates.
It could also be due to reluctance by city managers, public works and street directors or others who are hesitant to request the funding increases sufficient to allow for adequate maintenance believing their attempts would be in vain.

One other possible reason might be that the actual department director or other person responsible for street resurfacing and maintenance is somewhat fearful of asking for funding increases due to fear of how the request might be received by his or her

superior(s). Many city managers and administrators are advising all department heads to submit reduced budgets. As such, department leaders may believe it to be potentially detrimental to them if they made such a request.

And one more possible and very real reason for officials to not provide adequate funding for pavement maintenance could be attributed to a total lack of knowledge and/or understanding of pavements and how they age and deteriorate with time.

This is to be expected considering that most elected officials and city managers typically have no formal experience, education or training in pavement maintenance. They should have confidence in and expect their public works leaders and highway maintenance managers to provide them with background information in this area. However, it is quite common to find public works directors and engineers that actually have no real knowledge in the area of pavement maintenance as well. Many engineers I have known openly admit that they have no experience in this area and acknowledge that their college engineering courses did not address pavement maintenance in depth, but rather focused more on roadway and pavement design and construction.

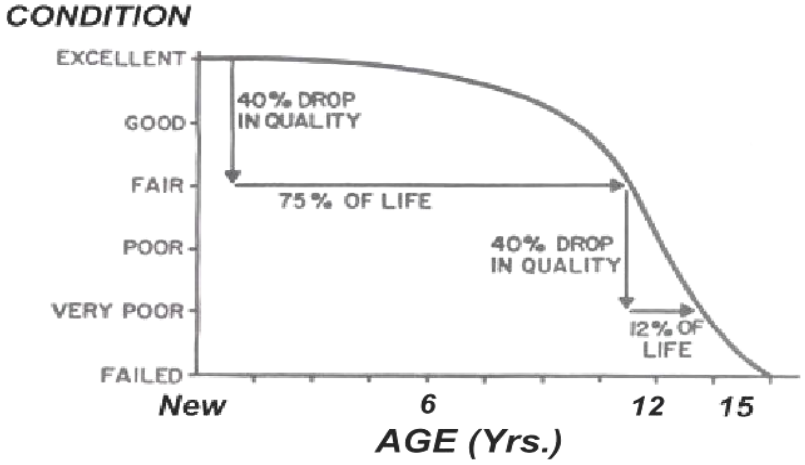
As such, there are ten basic but critical things that elected and appointed officials need to know about pavement maintenance and the consequences for failing to provide adequate annual funding for it.

1. Pavements begin aging and deteriorating the day they are constructed or applied.

2. On the average, most asphalt pavements have a cost-effective useful life of 15 years. Some will have a cost-effective life of only 10 to 15 years while others may have 15 to 20 years depending on design, structure, traffic volumes and weights and climate. This does not mean that pavements will completely fail after 12 to 15 years, although some do. It means that after that age the cost of performing routine maintenance on the pavement will greatly, but unnecessarily increase as the pavements develop more extensive cracking, pot holes, and other defects. Typically pavements remain in excellent to fair condition for the first five or six years of their life. Then after approximately 6 years they begin to exhibit cracking and loss of fine aggregates from the surface. Their condition slowly changes from excellent to fair over the first 11 or so years, then the condition dramatically deteriorates over the next 5 to 7 years as noted on the graph at the top of the following page.

3. In order to keep up with the average rate of deterioration, most independent agencies such a s be resurfa

Typical Asphalt Pavement Deterioration Curve



4. Cities and communities need to resurface 6.6% of their streets annually in order to keep up with the average rate of deterioration and have their pavements on a 15 year cycle.

5. The current (2009) average cost for resurfacing one mile of 25' wide roadway in Tennessee is approximately $80,000. It should be noted that the actual cost for cities and/or counties can vary depending on overlay thickness, volume of work, availability of multiple bidders to provide competitive pricing, and proximity from the lowest bidders to the work location.

6. A formula to use for calculating and determining how much approximate funding should be in a typical city or county's annual resurfacing budget is :

   Total Miles of Street (Centerline miles) X 6.6% X $80,000

   Example: City "A" has 100 centerline miles of street. It should have a resurfacing/contracts budget of $363,000 annually. Using the above formula…… **100 X 6.6% X $80,000 = $528,000.**

7. One dollar spent using proper preventive maintenance during a pavement's first five years of life can save three to four dollars over the pavement's next 10 to 15 years of life.

8. There are many time proven and cost effective preventive maintenance activities, such as penetrating asphalt rejuvenators that can be used during a pavement's first 1 to 5 years of life to extend its useful life from 15 to 20-25 years.

9. Cities can resurface more miles of pavement annually by using thinner hot-mix overlays such as 0.75" and 1.0" in depth rather than the historical and common 1.5" overlay. (One ton of asphalt mix placed at 0.75" thickness will cover twice the amount of pavement as one ton placed 1.5" thick.) Approximately 75% of most cities streets are in residential areas and do not need the thicker 1.5" overlay assuming the street has a sound structure.

10. Longer lasting pavements reduce an agency's pavement's life cycle cost per year. A pavement managed and maintained in a manner that provides for a 20 year life will have an annual life cycle cost that is approximately 25% lower than that of a 15 year pavement.

    Example:

    A. The annual life cycle cost for a 15 Year pavement one mile in length and applied at a cost of $80,000 per mile equals $80,000÷15 or $5,333 per year.

    B. The annual life cycle cost for the same pavement but with a 20 year life equals $80,000 ÷ 20 equals $4,000 per year, a savings of $1,333 per yr.

A survey conducted by the City of Oak Ridge in 2002 indicated that the average per cent of total miles resurfaced annually by the cities surveyed was approximately 4.5%. This amount equates to a 22 year resurfacing cycle, which means those cities are not keeping up with the rate at which pavements deteriorate. A 22 years cycle would result with the overall average condition of the pavements getting worst each year meaning more costly resurfacing and repair techniques would be required.

One of the cities surveyed averaged resurfacing only 1.6% of its streets annually. This means that the city was on a 62 year resurfacing cycle. That city has approximately 400 centerline miles of streets and therefore should have had approximately $1.4 Million in annual resurfacing funds and should have been resurfacing 26 or so miles each year. Instead that city only had an average of $500,000 in its annual resurfacing budget was falling behind on and essentially neglecting nearly 20 miles per year. Since the survey, the city has apparently seen the light of its errors and indicated it plans to spend $3.2 million over the next two years on resurfacing. To avoid future borrowings, the city will need to commit to budgeting of $1.6 Million per year every year afterwards or it will find itself in the same predicament within the next 5 to 10 years. It is good that this city's leaders have stepped up to the plate as their past practice might have otherwise been seriously frowned upon by upcoming GASB 34 guidelines and auditors.

The problems with proper pavement maintenance are not limited to the state of Tennessee. In fact, the Federal Highway Administration and the Federal Pavement Preservation task force has launched a new initiative referred to as Right Treatment for the Right Pavement at the Right Time. In essence they have acknowledged the problems with pavement maintenance by many city, county and state highway agencies across the nation and the fact that historically inadequate funding has been a major force behind the problem. Both agencies are trying to educate and emphasize to cities and counties the availability of cost effective preventive maintenance strategies that can greatly aid in addressing the problems of aging and deteriorating pavements.

So, in summary what can cities do to protect and maintain their costly road and street infrastructure?

First of all, its elected and appointed officials should use the noted formula to determine if the city has adequate funding for street resurfacing and preventive maintenance activities. If they don't meet the formula's calculation, they have no choice but to increase their budgets in a manner that meets that requirement, preferably the sooner the better, like within 1 to 3 years.

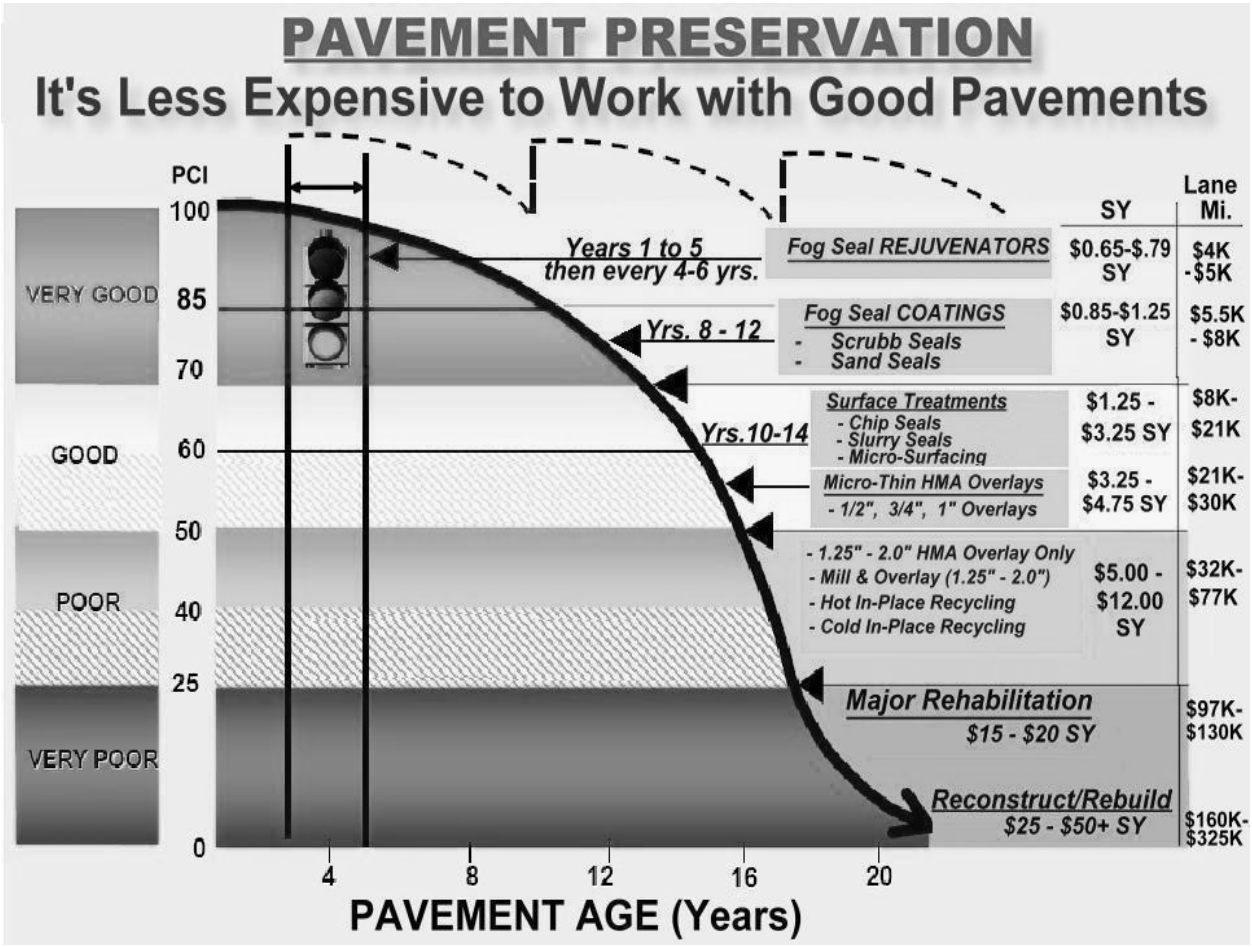
The cities should implement the use of an Enhanced Pavement Maintenance Program (EPMP) that uses a wide variety of both **preventive and corrective** maintenance activities rather than just a conventional 1.5" overlay.

The EPMP should include such activities as:

- **Preventive maintenance** activities including the use of:
    - Penetrating asphalt rejuvenators in years 1 to 5 of a pavement's life.
    - Restorative seals, slurry and micro-thin (1/2-inch) resurfacing for pavements 8 to 10 years old.
    - Crack filling and/or sealing on pavements 8 to 10 years old or older

- **<u>Corrective maintenance</u>** activities should include :
    - A variety of pavement milling techniques and depths including both Wedge and Whole Width milling techniques
    - A finer grade asphalt mix design for use with 0.75” , 1.0” and 1.25” thick overlays
    - Conventional asphalt mix designs for 1.5” thick overlays.

The graph below shows the various maintenance options and approximated costs that should typically be expected and/or used on pavements of various ages.



Elected and appointed city officials and city department heads and leaders should remember they are all on the SAME TEAM. It is all of their professional responsibilities to protect and adequately maintain their taxpayers public-owned roads and streets and other infrastructure. It is also their responsibility to provide sufficient funding and planning to ensure proper maintenance is provided, even when doing so might cause moderate to severe increases in funding levels and tax rates.

Their knowledge and understanding of the pavement deterioration process and maintenance strategies will allow them to properly educate or advise citizens of the reasons behind their decision making process.

The elected officials have the ultimate and last decision when it comes to providing adequate funding for pavement maintenance. They can choose to ignore the situation in order to prevent tax increases (possibly in an attempt to insure reelection) or they can step up to the plate and do what is necessary. They need to remember during budget preparation that the pavement maintenance dollar they cut or save today will cost their taxpayers of tomorrow three to four dollars, if not more.

The old saying of "*pay me now or pay me later*" is right on when it relates to pavement maintenance, however, a truer version now might be "Pay me a $1 today or Pay me $5 later".

About The Author

John Calvert has over 30 years experience in municipal government and public works. He is a graduate of Middle Tennessee State University and retired from the City of Oak Ridge as Public Works Division Manager in 2003 after 28 years of service. He joined the staff of Pavement Technology, Inc. in July 2003 as technical consultant for the company where he meets and works with local and state public works and highway officials across the nation. He also serves as Director of the Tennessee Public Works Institute and Administrator of the Tennessee Chapter of the American Public Works Association.

He has been a speaker and presenter on pavement maintenance at APWA national and state conferences and served as APWA's Speaker on Pavement Preservation for its 2007 nationwide live webcast on Pavement Maintenance. He has also taught pavement maintenance classes for the UTAH LTAP and UTAH League of Cities "Road School", the University of Tennessee TTAP (LTAP) Office and the National Center for Pavement Preservation funded by the FHWA. He has written various articles for Tennessee Public Works Magazine, the APWA Reporter national magazine and other associations.