



Successful Implementation of a Pavement Preservation Program

Although it is a fact that pavement preservation is the most cost-effective long term method of managing a pavement network, few local agencies have successfully implemented such a program. Success requires that an agency implement the 3R's approach. This will require the decision-makers to have a solid knowledge base concerning the current condition of the pavements and the long-term consequences associated with different levels of funding. Additionally, all pavement improvement projects must be designed and constructed properly. In order to gain support of the community at large, the public must be educated as to why pavement preservation is the best long-term approach to managing any pavement network.

I. The 3 R's: The Right Treatment at the Right Place at the Right Time

For any pavement preservation program to be successful, the right treatment must be applied at the right place at the right time. Crack sealing and surface treatments will not be cost-effective if applied to a severely deteriorated pavement. All agencies need to take the following steps:

1. Select the right treatment - agencies should take advantage of the many types of repair treatments that are available today. This should include patching, crack sealing, surface treatments (including chip seals, micro-surfacing and NovaChip), overlays, as well as, recycling and full depth reclamation. For any of these treatments to be cost-effective, trained personnel should be utilized to determine under what conditions each treatment is appropriate. Examples of pavement conditions are shown in Figure 1.

2. Select the right road - pavement conditions must be evaluated in order to determine which streets are good candidates for each type of maintenance or repair treatment. This is typically accomplished by performing a pavement condition survey. The survey should include the evaluation of distresses such as structural and environmental cracking, material defects/aging, rutting, roughness, drainage and possibly safety issues (i.e. skid resistance). Each agency must determine which pavement deficiencies must be evaluated. A simple rule is to evaluate only deficiencies that would cause the agency to repair the pavement. If an agency isn't



Figure 1: Rating Pavement Conditions

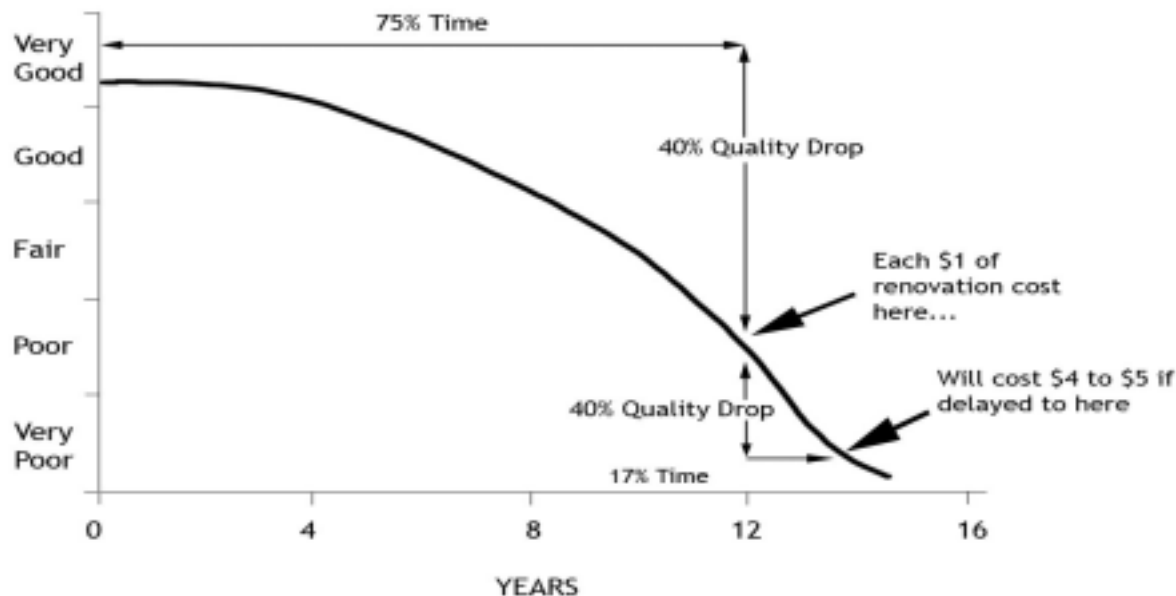


Figure 2: Pavement Deterioration Curve

going to repair longitudinal joint cracking, then that distress does not need to be evaluated unless the agency wants to track the information for research purposes.

3. Timing is everything - since there is a relatively short amount of time when the more cost-effective treatment can be properly utilized, proper timing is crucial to a successful pavement preservation program. Figure 2 shows a generic pavement deterioration curve over 12 years. Simply put, if preventative maintenance is delayed for several years, small cracks can become much larger cracks and spread throughout the pavement. This increased level of deterioration will require a more expensive repair.

II. Implement a Pavement Management System

Determining when you need to change the oil in your car is easily accomplished. However, trying to keep track of the current pavement condition of each street, knowing what should be done to each street and how much it will cost is not so easily accomplished. Fortunately, pavement management systems such as RSMS (Road Surface Management System) developed by the New Hampshire T2 Center are available to assist agencies in managing these costly assets. Pavement management systems will provide a systematic approach to gathering and analyzing data, as well as presenting information in a clear, logical manner so that decision makers will understand the long term consequences of today's budgeting decisions.

Benefits of a pavement management system include:

- Contains a database with powerful analytical tools
- Provides strong report generating and mapping (w/GIS) capabilities
- Generates long-term budgets based upon different levels of funding and "worst-first" vs. "best-first" funding scenarios
- Creates a historical database that allows for tracking of "performance" over time
- If properly implemented, it will allow an agency to select the right treatment at the right place at the right time.

III. Developing Long-Term Budgets

From a long-term theoretical standpoint, the best-first is the most cost-effective method of managing a road network. In the real world, however, it is not realistic to expect the entire budget to be spent on the streets in good condition. Most elected officials and the public would quickly disregard anyone who would suggest such a crazy plan. However, not attempting to change from a "worst-first" policy to a "best-first" policy is cheating the public. Therefore, a compromise is necessary. In most cases, the T2 Center suggests starting slowly and building up a preventive maintenance program over time. For example, possibly allocate 10% to 20% of the budget the first year towards preventive

Street Type	Traffic Volume	Major Cause of Deterioration	Life* (years)
Arterial	High	Fatigue (from vehicle loads)	15-20
Collector/Industrial	Medium	Fatigue & Aging	20-25
Residential/Alley	Low	Aging (from Weather & Time)	25-30
*Assumes regular maintenance. Useful life without regular maintenance will be 5 to 10 years shorter.			

Figure 3: Comparison of Street Types

maintenance and increase by 5 to 10 percent each year, thereafter, until a cost-effective balance is reached.

Although developing a balanced long-term budget can be a daunting task, it can be more easily accomplished with the use of a computerized pavement management system. Most computerized pavement management systems provide users with the ability to generate long-term projections of the overall network condition level for various combinations of funding for reconstruction, rehabilitation and preventive maintenance projects. This provides the municipality's decision-makers with a much clearer picture of the projected, long-term consequences that would result from this year's budgeting decisions.

IV. Proper Engineering

Once a network level budget is developed, trained personnel must investigate each of the streets selected and determine the full scope of work necessary for a successful project. This should entail a thorough investigation of each street that may include but not be limited to:

- Field measurements
- Identifying all necessary prep work such as crack sealing and patching and necessary surface cleaning
- Identifying potential drainage issues
- Identifying potential sidewalk and curb issues
- Identifying potential utility and right-of-way issues
- Pavement corings and/or test pits

Maintenance & Repair Technique	Street Condition	PCI Range*		
		Arterial	Collector	Residential
No Maintenance Required	Very Good	91-100	91-100	86-100
Slurry Seal	Good	76-90	71-90	71-85
Cape Seal	Fair	NA	NA	51-70
Light Overlay		56-75	41-70	41-50
Heavy Overlay	Poor	31-55	26-40	21-40
Reconstruction	Very Poor	0-30	0-25	0-20
*Ranges vary depending on factors including street maintenance history, subgrade conditions and drainage pattern.				

Figure 4: Techniques for Treating Street Conditions

Once the scope-of-work has been identified, pavement designs and other engineering issues must be resolved. Lastly, thorough contract documents must be prepared by someone experienced in writing contract documents and knowledgeable about the type of construction activities to be covered by the documents. Quality construction starts with properly written contract documents that create a level playing field which allows the "quality conscious" contractors to have a fair shot at winning the bid. Additionally, contract documents create the "set of laws" which will govern the construction project. Weak contract documents make enforcement of proper construction techniques, as well as, conflict (dispute) resolution very difficult.

Figures 3-5 illustrate considerations for developing budgets and choosing treatments.

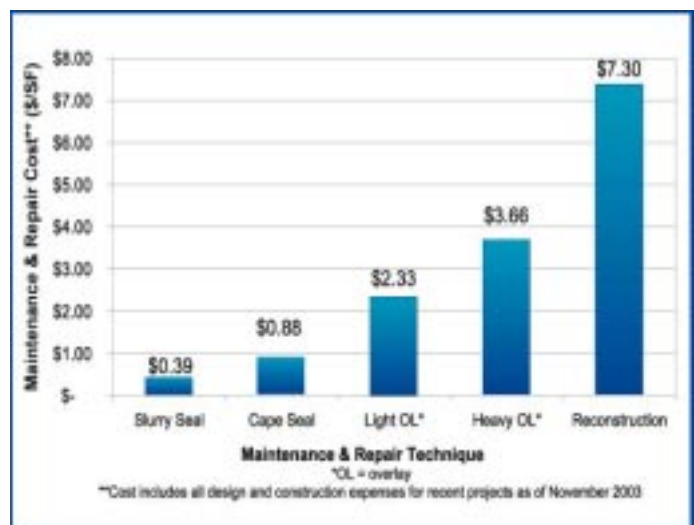


Figure 5: Costs of Maintenance & Repair Techniques

Warning - cutting and pasting specifications from other projects, especially when done by inexperienced personnel can be a very risky and costly practice.

V. Quality Construction

Construction inspection is necessary in order to ensure that the contractor is meeting the requirements set forth in the contract documents. Even the best contractors will admit they make mistakes (off the record, of course). Agencies must remember that the “lowest bid” environment creates low profit margins and contractors have tremendous pressure to complete the project as quickly as possible and for the least cost. Having well-trained, knowledgeable inspectors present during construction will definitely help to minimize problems and will provide reliable documentation of what actually happened during the project.

VI. Public Relations

Pavement preservation is founded on maintaining the streets that are in relatively good condition, not just simply spending all of the available funds on the few streets that are in the worst condition. To the average citizen, many of the streets to be repaired as part of a preservation program will appear to be in relatively good shape. As such, this new approach will most likely result in citizens complaining that money is being “wasted” on streets that are in good condition while other streets in worse condition aren’t being repaired. Minimizing the number of complaints will require that the municipality educate the public in the wisdom of pavement preservation.

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