

Pavement Management. . .

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of our roads and what to expect one and two years into the future. We will become aware of the monies required for complete maintenance and rehabilitation of the total road network. Most importantly, we will be able to determine the most economic manner in which to spend our monies (find the most affordable path).

There are many ways to go about implementing a Pavement Management System and the costs are directly related to the intricacy of the system. A town may, or may not, wish to hire a consultant. They may, or may not, decide to invest in a small computer to assist in analyzing all the data being collected. Yet, no matter how elaborate or simplistic the program, it is worth investing the time to begin some form of Road Surface Management.

(4) Who's the manager? — An individual such as the Road Agent, Highway Superintendent, Town Engineer or Public Works Director is the front line manager. This person must be allowed to play a key role when it comes to planning and implementing a Pavement Management program. It is their keen knowledge, their ability to acquire new information for solving new problems and their creativeness which supplies the ingredients necessary to build a strong base for such a program. The Selectmen, Town Managers, and other local government personnel serve as the behind the scenes second line managers. They are the financial controllers. A good Pavement Management System demands a cooperative effort from all involved parties.

(5) What exactly is being managed? — The bottom line is simple. Pavement Management manages both time and money. It tells us the best way we should spend our money and it tells us the best way we should spend our time. Pavement Management looks at the service life of each road (time) and the most cost effective way to maintain it (money). If we can manage this. . . we will have managed well!

(6) Why is it so popular? — Because it works. It is said that 90% of any problem is being aware of it. Pavement Management not only makes everyone aware of a situation but it supplies an approach as well. It may be a long term plan, but it's something we can hold in our hand, implement and evaluate.

(7) Who benefits? — The nice thing about Pavement Management is that it has benefits for everyone. First, it involves more than just one person or department. An integrated management team is required for the system to work. This in turn builds important communications and mutual interest. Second, it provides a consistent and effective procedure for relating pavement performance to specific maintenance

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Pavement Maintenance Treatments

Pavement treatments from a cost-effective point of view.

The purpose of this article is to quantify and estimate the life of various treatments commonly used to maintain roads in New England. These include sprayed on seals, cold mixes and hot mixes. (For more information on seal coats in terms of construction procedure and materials used, refer to the article in this newsletter entitled "Standard Definitions for Seal Coats").

There are numerous variables that can significantly effect durability or performance of maintenance treatments. TRAFFIC, DRAINAGE, EXISTING ROAD CONDITION AND STRUCTURAL CAPACITY (quality and thickness of original construction), QUALITY OF SURFACE TREATMENT, and of course, ENVIRONMENTAL FACTORS (degree of frost and winter elements) just to mention a few. These conditions are reflected in the estimates of service lives to be discussed in this article. Although it would not be uncommon for an application to fall outside these estimate ranges, yielding a longer or shorter life depending on how favorable or unfavorable the conditions actually are, some basic rules of thumb have been found to hold true. These rules can provide us with some good hints when it comes to evaluating the most cost effective treatment.

Before taking a look at specific treatment methods there is one general rule of thumb to remember. Loss of crown, excessive rutting in the wheel paths or anything that ponds water on the surface will

greatly affect service life and performance. Liquid asphalt seal coats are usually thin uniform layers and do not correct for this without preleveling to restore the crown and provide good surface drainage.

Below is a quick reference guide with comments on performances, advantages and disadvantages of six maintenance treatments:

■ **Sand Seal** — Yields a thickness about 3/16" thick at about 18-25 pounds per square yard. . . Generally this has the lowest initial cost compared to other seal coating applications. It seals only and does not add structural strength. It does not level, smooth or correct crown significantly unless preleveling is done first. Application is dusty and best restricted to low volume low speed roads. The average service life is 3-6 years. The main advantage is that it can be done with local labor and sometimes local aggregate. The manhole or watergate castings are not generally adjusted.

■ **Slurry Seal** — A single coat 1/8" thick = 12 pounds per square yard. A double coat 1/4" thick = 25 pounds per square yard. . . A slurry seal coat must be applied by a specialty contractor which results in a moderate to higher initial cost. The main advantages are that it's a quicker, neater application, and manhole castings generally do not need adjustment. It should be applied in good, low humidity weather. The average life for a single coat is 3-5 years. A double application is 5-8 years. A slurry seal provides a smooth tight surface similar to hot mix. It is good for low and moderate volume roads. But it is not recommended for high speed roads.

■ **Aggregate or Chip Seals** — A 3/8" thick seal uses 3/8" to 1/2" chips at 33 to 45 pounds per square yard. A 1/4" thick

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Below: Routine pavement maintenance treatments categorized by treatment type, ranked in order of general treatment cost, and matched to average road volume (traffic volume).

TREATMENTS IN ORDER OF COST	AVERAGE ROAD				
	LOW	MED-LOW	MEDIUM	MED-HIGH	HIGH
\$ Sand Seal	X				
Slurry Seal	X	X			
Chip Seal	X	X	X		
Cold Mix	X	X	X		
Thin Hot Mix (Sand mixes)	X	X	X	X	
Thick Hot Mix (Asphalt concrete)	X	X	X	X	X
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NOTE: The above is appropriate as a general guideline only. At all times it is recommended that local practices and experience be taken into consideration.

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seal uses 3/16" to 5/16" chips at 25 to 35 pounds per square yard. . . Chip seals have a low to moderate initial cost depending on how much local labor and aggregate sources are available. The manhole castings are generally not adjusted and a good chip seal provides excellent skid resistance and can provide attractive color by choice of stone. The average life is 5 to 8 years and works well for moderate volume roads. Exceptionally good ones have gone much longer. The 3/8" - 1/2" chip seal is the most common seal coat treatment used in New England.

■ **Thick Hot Mix** — 165 pounds per square yard to 220 pounds per square yard is general coverage for a 1 1/2" to 2" thickness. . . Hot Mix or Asphalt Concrete is a high quality, thoroughly controlled hot mixture of asphalt cement that is well graded, has a high quality aggregate and is thoroughly compacted into a uniform dense mass. This thick overlay not only seals but adds significant structural improvement often doubling or tripling capacity (depending on existing thickness). It seals, smoothes the ride and corrects crown and drainage features substantially. Extra rough roads may require pre-leveling in applying a 1 1/2" overlay. It is the highest form of maintenance and upgrading treatment for low volume roads and is the most expensive of all the treatments listed here. Thick hot mix is probably the most common rehabilitation treatment used in New England. It has an average life of 15-20 years on high volume roads and longer on lower volume roads.

■ **Thin Hot Mix Overlay** — 55 to 110 pounds per square yard is general coverage for a 1/2" to 1" thickness. . . Thin hot mix overlays (sandy type mixes less than 1" thick) are of a finer graded aggregate than normally used in the thicker type mix. Also, they are considered as sealing treatments primarily and not structural improvements. They smooth the surface quite well, yet, very rough surfaces need to be pre-leveled or the mix will apply poorly and the mat will have to be thickened. Thinner treatments can be used on lower volume roads in better shape, while thicker treatments are recommended on higher volume roads and rougher surfaces. Multiple treatments, if applied in timely stages, can add strength. However, care must be taken that these relatively stiff treatments are not put on roads in need of significant structural upgrading as large deflections will cause the surface to crack. The average life is 6-12 years.

■ **Cold Mix Overlays and Maintenance Applications** — Quantity applications of Cold Mix are similar to the Hot Mix applications noted except they are not recommended for use in thin layers as an exposed surface. . . Asphalt mixes that use

liquified cutback and emulsified asphalts so they can be mixed cold, either through plant or on the grade using graders or travel mixers, are often called maintenance mix, stockpile mix, cold mix or a combination of all three. Cold mix is less costly than hot mix since local labor and aggregate can be used. Due to the fact that cold mixes use cutbacks or emulsions, they are not considered as high a type of pavement material as hot mix asphalt concrete. Cold mix durability, in particular its ability to seal, (most cold mix can be used to level and strengthen) is difficult to predict as precisely as hot mix. Most cold mix is sealed with a seal coat before or immediately following one winter. Exceptions exist and local experience and practice must be consulted.

The information for this article was obtained, edited and printed with permission from R. H. Joubert of The Asphalt Institute. ■

Did You Know?

You can "piggy-back" with state contracts to save you money when purchasing.

Would you like to save money on the new tires, chain or truck you have to purchase? Now you can.

The state of New Hampshire has a list of vendors they currently purchase goods and services from. Any NH governmental body is entitled to take advantage of possible discounts set up for the State.

Your town may already have a list of these vendors. If not, you can get a list from the New Hampshire Municipal Association by calling 1-800-852-3358.

Just one of NHMA's many fine services is acquiring updated vendor information from the state and distributing it to their members. Most likely, your town is already an NHMA member, if not, you can get more information about NHMA by calling their toll free number, 1-800-852-3358. ■

Comments?

Questions?

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Call us on our toll free number.
We want to hear what you have to say! This is a program for you.

1-800-423-0060

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and rehabilitation treatments and costs (the reader is referred to the pavement deterioration/rehabilitation relationship graph and the pavement maintenance treatments article in this Newsletter). Third, it allows for a logical approach to budgeting, therefore, minimizing the amount of guess work and "gut feel" involved. Fourth, it provides an avenue for communicating needs to an elected body in a logical and concise manner so that the decision makers will be able to reasonably predict the outcome of their decisions. Fifth, it makes it easier to handle problems identified by citizens. When a citizen can be told what is being planned to correct the problem and how a specific road fits into the overall needs of the community, further complications are quickly diffused. Sixth, and most important, it allows for priorities and needs to be defined so that the best results can be achieved with the monies that are available. In other words, the "greatest bang for the buck".

If you would like to know more about Pavement Management, please contact the Technology Transfer Center by calling toll free, 1-800-423-0060. ■