

# Road Preservation

## *A “ Right Treatment on the Right Road at the Right Time” Program*

### Local Roads Are Wearing Out

There are over 17,000 miles of public roads in New Hampshire. Cities and towns maintain almost two-thirds of the mileage. Residents expect to drive on safe, smooth, and well-maintained roads. In many places, residents and commercial vehicles travel on rough, poorly maintained roads. Even towns with good roads see repair needs increasing. Municipal roads wear out due to many factors:

- **Increased traffic.** Both vehicle volumes and weights have increased throughout the state.
- **Climate.** New Hampshire’s cold winters and hot summers accelerate deterioration.
- **Lack of proper maintenance.** Few budgets have kept pace with maintenance and repair needs.

### Road Preservation

Some road managers have applied practices that provide well-maintained roads. Recently, FHWA and state DOTs pulled together these practices. This article draws on their report to describe “Road Preservation.”

Road preservation treats roads and streets as an asset that serves customers. Its goals are to extend road life, improve road performance, ensure cost-effectiveness, and provide safe, smooth roads for motorists and passengers. The program includes asset management, preventive maintenance, and multiyear plans and budgets

### Asset Management

Asset management is an organized, logical approach to maintain and upgrade physical assets cost-effectively. It provides a framework for both short and long-range planning. This approach involves the following steps.

1. Inventory all road assets.
2. Identify conditions with scaled measures across the road network.
3. Establish desired, future condition levels.
4. Determine priorities, needed repairs, and costs.
5. Develop annual budgets to maintain roads at or above the established condition levels.

The result is a systematically developed repair plan by year. It ensures cost effective repairs. Roads will better serve municipal residents and commercial interests. The program enables city and town officials to report actual budgets and expenses for roadway asset repairs, an option in GASB 34.

The UNH T<sup>2</sup> Center’s Road Surface Management System (RSMS) has applied this approach since its inception in the 1980s. It also applies the principles of preventive maintenance to prepare multiyear plans and budgets.

### Preventive Maintenance

Figure 1 shows the classic deterioration curve and preventive maintenance (PM) cost effectiveness. The vertical axis is pavement condition; the horizontal axis is time in years. The thick line shows how roads initially deteriorate slowly for some time. Without any maintenance, they soon wear out.

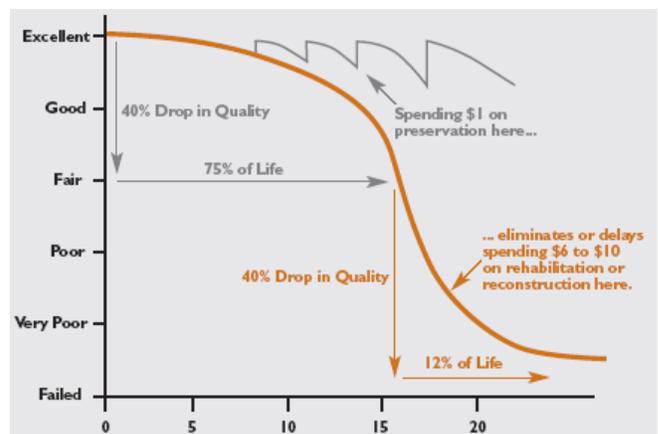


Figure 1

*Deterioration Curve and PM Cost Effectiveness*

The increased deterioration occurs because water has penetrated into the structure. Traffic over the saturated structure quickly breaks it up. On paved roads, the earliest distresses are small cracks, which soon grow wider and deeper. Left unsealed, cracks allow water to penetrate the pavement into the aggregate base. Unpaved roads rely on smooth, sloped cross sections to keep excessive water out of the base. Traffic removes gravel and creates minor corrugations and potholes. Without PM, these get bigger and hold water that filters into the structure.

Preventive maintenance is a set of repair treatments applied early in the deterioration cycle. PM repairs retard deterioration. They preserve the road network while improving it. For paved roads, PM treatments include crack sealing and surface coats -- sand seals, chip seals, and thin (1 to 1½ inch) overlays. For unpaved roads, shaping and grading the road surface, and adding some gravel as necessary, are PM treatments. For both road surface types, PM includes cleaning ditches and culverts.

The top wave-like curve in Figure 1 shows that even repeated PM treatments cost less than waiting to rehabilitate or reconstruct roads. These less expensive repairs extend road life. Applied before structural deterioration, they make more expensive repairs unnecessary for many years. In other words, preventive maintenance means **APPLYING THE RIGHT TREATMENT TO THE RIGHT ROAD AT THE RIGHT TIME.**

Figure 1 is from a national publication. In New Hampshire, cities and towns should expect to seal cracks on 4 to 6 year roads rather than the indicated 8 years.

## **Multiyear Plans and Budgets**

When applying road preservation, cities and towns prepare multiyear plans to accomplish all the work. Many PM treatments are within a highway department's capability. Crack sealing and surface treatments usually require contractor assistance. For all PM work, municipalities should have dedicated annual budgets to accomplish PM. They should have separate budget line items for rehabilitation and reconstruction. Road managers should give PM higher priority than rehabilitation or reconstruction.

## **A Road Preservation Program**

A road preservation program is a municipal program. Establishing a program requires actions by road managers, and approvals by municipal officials and residents.

**Road Managers.** The above asset management section describes the planning steps for a road preservation program. Road managers must prepare competent plans and budgets, monitor progress, and modify the plan as necessary. They will also have to educate their governing body, municipal officials, and the public.

**Municipal Officials.** In the past, many officials have given priority to roads in poor condition. PM means repairing roads still in relatively good condition, before having to rehabilitate or reconstruct them. Road managers will have to educate some officials that "making bad roads good" is ineffective in two ways. First, it is more expensive to wait until roads need reconstruction or major rehabilitation. Second, deteriorated roads are rough, and at times unsafe, to drive on.

**Residents.** Many residents have given bad roads priority when approving budgets. Road managers must educate them as well. All concerned should also know that some additional work will still be needed. For example, crews will still have to patch potholes, unplug drainage facilities, remove fallen trees, and fill ruts and washouts.

Officials and residents should also understand that PM yields long-term benefits. In addition to initial selling of the program, road managers should create early successes and publicize them.

This spring and fall the UNH T<sup>2</sup> Center will hold "Repair Treatments" workshops. The purpose is to help road managers select the right treatment for the right road at the right time.

Source:

Galehouse, Larry, James Moulthrop, and R. Gary Hicks. 2003. "Principles of Pavement Preservation," *TR News*, No. 228, September-October 2003.