

# BERKSHIRE PLANNING TOOLS



One in a series of "toolbox" items to accompany the Regional Plan for the Berkshires

June 2002

## Rsms: r o a d s u r f a c e M a n a g e m e n t s y s t e m s

### What is RSMS?

The Roadway Surface Management System (RSMS) is a methodology intended to provide an overview and rough estimate of a roadway system's condition and the approximate costs for future improvements. Developed at the University of New Hampshire, RSMS provides a systematic way for local officials to answer basic questions about their road system to guide future improvement and investment. With RSMS, officials will know the condition of their roadway system, how it's changing, what improvements should be a priority and a general estimate of the cost of improvements, based on the specific priorities of local leaders.

RSMS is implemented using a computer based software package. RSMS provides information on the condition, traffic, and importance of roads in a town to create a long-term maintenance program. This helps municipalities apply limited budget resources where they will provide the greatest road quality benefits.

### Why use RSMS?

In most municipalities throughout the US, road and street surfaces are the largest single cost of building and maintaining a transportation system. Forty to fifty percent of public funds spent on roadway systems are for road surfaces. For many smaller communities, this percentage can be higher.

Because of this tremendous investment in roadway systems, local agencies must control costs by slowing roadway surface deterioration. This requires making cost effective decisions regarding the maintenance, repair, rehabilitation, and reconstruction of the municipal roadway network. Developing a maintenance budget based on cost-effective decisions requires a rational, systematic process. Road managers evaluate the condition of the road network and allocate funds where they can do the most good.

However, most maintenance budgets are developed without a systematic decision making process. Typically, communities develop budgets using methods such as last year's budget, "squeaky wheel" approach, worst first, political pressure or gut feel. Though these decision-making criteria can work if a community has adequate resources and the majority of road surfaces are in good shape, this is often not the case. As such, municipal officials could benefit from a system that enables them to assess the condition of the network, weigh alternatives, and establish long-term programs and budgets. This is where RSMS can help.

### Other Benefits of RSMS

#### Efficient use of limited resources

Since few communities have adequate funding to support all required maintenance and

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rehabilitation each year, prioritization of projects is essential.

### Customized for each municipality

RSMS can be customized for each municipality, and flexibility can be built into the program to fit community needs.

### Substantiate results

Annual budgets can be built around sound road condition assessments with a minimum amount of guesswork.

### Quantify condition of the road network

After the assessments are done, RSMS numerically quantifies the condition of the roads and can easily show from year to year if the road network is improving or not.

### Communicate results convincingly

RSMS generates simple, easy to read reports. It is hard to disagree with a plan that is developed using a rational decision-making process.

### Accessible information

The data files set up in the RSMS program are easy to retrieve, view, and update year to year.

## **Common Problem: Bad Roads**

Nearly all Berkshire municipalities have the same problem: many of their paved roads need rehabilitation or reconstruction. Additional miles of paved and aggregate, or unpaved, roads also require repairs. Capital improvement and road maintenance budgets can seldom meet these needs. Town roads are deteriorating more quickly than their local road manager can maintain, much less reconstruct, them and the public is vocal about the situation.

Many local road managers are frustrated because they lack the resources to repair the roads. Town Boards recognize the problem and seek long-range work and budget plans to restore municipal roads. Use of a pavement management package,

such as the Road Surface Management System, will yield this plan.

## **The RSMS Process**

- Inventory the road system
- Determine and document the condition of each road
- Assign maintenance or repair methods for each condition type
- Determine costs of maintenance and repair methods
- Assign repair and maintenance methods to each road
- Establish maintenance and repair priorities and
- Establish long-range work and budget plans

To use this plan, however, requires:

- Gathering inventory and road condition data by driving the roads and making visual inspections
- Entering that data into a computer; and
- Operating the software to get reports for management analysis

Performance of these tasks with the local road manager and his crew requires taking them from roadwork. In other words, many municipalities need not only a management system but also trained people to help them carry it out.

Highway agencies of all sizes have found RSMS an effective way to identify road conditions and to prepare plans and budgets to repair them. The system is based on three guiding principles:

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- Roads deteriorate at an increasing rate over time.
- Roads with inadequate drainage deteriorate at a faster rate than roads with adequate drainage.
- It is much cheaper to repair roads just beginning to deteriorate than to repair roads in poor condition.

### Components of the RSMS

The management system, and the RSMS software that supports it, contain five components. Each is discussed in turn below.

Road Inventory. The inventory contains essential information for the RSMS management process, plus optional information for agency records and for reference to a GIS. Users divide many roads into sections based on changes in geometry. They gather information from agency records and a windshield survey. Field surveyors can record the field information directly on a laptop computer, or record it on paper with data entry in the agency's office.

Road Condition. RSMS measures road condition in terms of surface distresses and drainage characteristics, and their respective severities and extents. The default surface types and distresses are for local roads in New England. Managers can modify them for the road and distress types common in their geographical region. Field surveyors identify conditions during a windshield survey with occasional closer inspection.

Priority Analysis. Based on the condition measures, RSMS categorizes each road section and determines a strategy for its repair. It then calculates a priority value for each road section. Consistent with its guiding principles, RSMS gives the highest value to road sections needing routine maintenance and having poor drainage;

the lowest value sections have good drainage but need major rehabilitation.

Repair Selection. The RSMS database contains information on many specific repairs. Users can customize the repairs to reflect local practices, unit costs, and expected service life improvement. RSMS provides a short list of repairs appropriate for each road section. When users select a specific repair, RSMS calculates an estimated cost for that section, and the total cost for the network.

Planning and Budget Preparation. Users can plan repairs, in single or multiple years, by selecting different repairs and analyzing their effect on total costs. They can then budget for funds to accomplish their plan. The RSMS software also has work orders to document completed work and its costs.

### The Surface Deterioration/Rehabilitation Relationship

All pavement management systems are based on the pavement deterioration curve shown on the next page, which illustrates that roads in good shape cost less to maintain than roads in bad shape.

A reality of small town road maintenance is that many communities allow their roads and streets to deteriorate through deferred treatment. Though built at a considerable cost, many roads show signs of major distress and if not corrected, the cost to bring the road to an acceptable condition can be many times more than the cost of timely repair. As roads worsen, maintenance budgets need to increase, possibly resulting in more deteriorated streets each year with the cost per mile increasing disproportionately.

This surface deterioration / rehabilitation relationship is best illustrated by the figure on the next page. This figure shows the relationship between pavement condition and service life, and shows the cost of surface rehabilitation in relation to when the rehabilitation takes place.

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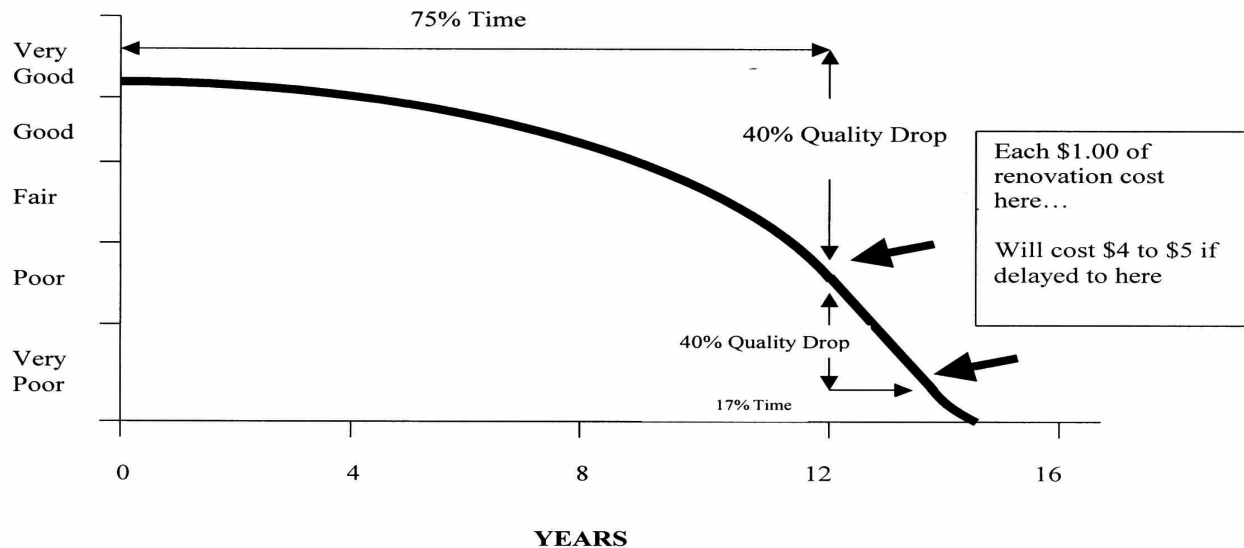
The basic premise is that *paved* roads have a “service life”, generally about 15 years, without maintenance. After the first 75% of a surface’s service life, the performance level only drops from excellent to fair – a 40% drop in quality. In other words, after 10-12 years, it is still in satisfactory condition. However, in the next 12% of life, the quality of the surface drops an additional 40%, from fair to poor. More importantly, a surface that would cost \$1 to renovate at 75% of its life will cost \$5 to \$8 to renovate at 87% of its life. **Allowing the condition of the surface to deteriorate from fair to poor will increase repair costs five times.**

### Case Study: Mount Washington

At the request of the Selectboard in the town of Mount Washington, BRPC conducted a complete assessment of the municipal road surfaces in that town using the RSMS methodology. Staff from BRPC spent approximately 15 hours assessing the road surfaces, and another several days establishing the database and generating reports and maps.

Based on the data that was gathered and with DPW input on repair strategy selection, Mt. Washington now has a well thought out plan that will allow them to bring the road network into decent shape.

BRPC is available to assist your community in establishing an RSMS database, typically as a fee for service. For more information, please contact our transportation department.



*This publication is one in a series of “toolbox” items to support the Regional Plan for the Berkshires. If you would like to receive additional copies of this or other toolbox items, please contact the Berkshire Regional Planning Commission, 1 Fenn St., Pittsfield, MA 01201 or call (413) 442-1521. Copies of the toolbox items are also available on the web. Visit [www.berkshireplanning.org](http://www.berkshireplanning.org)*

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