



Legislative Audit Division

Performance Audit Summary

Pavement Preservation Projects

May 2001

Introduction

The Legislative Audit Committee requested a performance audit to assess how the Montana Department of Transportation (MDT) determines when to use resources associated with construction and when to use resources associated with maintenance to complete pavement preservation work on highways. The responsibility for highway construction, repair, and maintenance is split between resources assigned to construction and maintenance functions within MDT.

Background

Pavement preservation is the term used by the department to define preventive highway work intended to increase the useful life of road segments. Primary highway pavement preservation activities include: crack filling, chip sealing, and pavement overlays. The department uses two approaches to complete pavement preservation projects. One approach involves the use of staff assigned to construction functions within the department. The other uses staff assigned to district maintenance activities. The scope of a pavement preservation project assigned to construction is usually more comprehensive than a project assigned to maintenance. For example, construction-designated projects might include re-construction of shoulder slope or elimination of curves. Maintenance pavement preservation projects are restricted to work on the existing road surface.

Completed Construction and Maintenance Pavement Preservation Projects (Fiscal Years 1998-99 and 1999-00)

Fiscal Year	Construction	Maintenance
1998-99	49	91
1999-00	31	67

Pavement Preservation Funding

The department established an annual target of \$55 million for pavement preservation activities. This target was determined from analysis of the department's Pavement Management System (PvMS) data and is considered an average necessary to meet annual needs. Pavement preservation funding is designated for both construction and maintenance projects. The actual number of projects and the amount expended for

pavement preservation varies from year to year depending on district highway needs, the status of project planning, project size/complexity, and available funding. In fiscal year 1999-00, construction completed 31 projects and maintenance completed 67.

Construction Pavement Preservation Funding

The total construction project budget for the department exceeds \$250 million for the year. The construction budget dedicated to pavement preservation averages around \$45 million each year. Most construction pavement preservation projects are funded through federal reimbursement. When federal funding is used, a state funding match ranging from eight to thirteen percent is required. In order to qualify for federal funding, projects must meet criteria outlined in a project nomination agreement jointly developed by the Federal Highway Administration (FHWA) and the department. Interstate system, national highway system, and Montana primary and secondary roads can all qualify for federal funding.

Construction Pavement Preservation Funding (Fiscal Years 1998-99 through 2000-01) - In millions of dollars -

FY	Total Funds	State Funds	Per Cent	Federal Funds	Per Cent
1998-99	\$45.3	\$13.0	29	\$32.3	71
1999-00	\$50.4	\$10.5	21	\$39.9	79
2000-01	\$58.9	\$8.2	14	\$50.7	86

Maintenance Pavement Preservation Funding

The total maintenance budget is approximately \$75 million (including winter activities). For FY 1999-00, the department designated over \$14 million for maintenance pavement preservation activities. This funding was allocated to five state transportation districts and eleven maintenance areas based on review of road segment needs. Approximately \$9 of the \$14 million was state funding with the remainder federal. State funding for maintenance provides the department with the capability to respond to short notice requirements without the need to comply with federal contracting requirements.

Maintenance Funding Includes Federal Money

For the first time in fiscal year 1999-00, FHWA approved the use of federal funding for maintenance activities.

According to department officials, the assignment of department responsibility over paved secondary roads by the 1999 Legislature resulted in a search for additional funding sources. The FHWA agreed to limited use of federal funding by maintenance and authorized the reimbursement of up to \$4.9 million. Department officials indicated expansion of the use of federal funding for maintenance projects beyond the amounts approved for FY 1999-00 and 2000-01 is not anticipated, because it would duplicate the process already in place that is used by construction and engineering.

Eleven Decision-making Factors

During the audit, we asked district officials how highway segments are identified for pavement preservation work and how the segments are selected for assignment to either construction or maintenance for administration and oversight. Based on their input, we developed a list of eleven factors used consistently by district and central office officials. We found consideration of the following eleven factors was part of the decision-making process in all five districts.

- On-site Observation
- Pavement Life Cycle Review
- Pavement Management System Report
- Planning Documents
- Funding Availability
- Project Cost
- Environmental, Permits, and Right-of-Way
- Geometric Re-design and Upgrades
- Safety and Traffic Data
- Construction/Maintenance Resource Capability
- Local Government Influence

Audit Conclusions and Recommendation

Our review of pavement preservation contracting and oversight procedures resulted in a number of conclusions and the development of one audit recommendation related to maintenance testing and documentation.

Conclusion: *Construction and maintenance pavement preservation projects, though similar in appearance, are not the same. The scope of work differs and the factors used to make the assignment decision are not the same. The mission and goals of the construction and maintenance functions are different, which means the outcome of the projects is expected to be different.*

Conclusion: *The decision-making process used by the department for pavement preservation projects is reasonable. The factors considered in the process allow staff to distinguish between projects warranting assignment to construction or to maintenance. Federal contracting and oversight requirements significantly influence decision-making.*

Conclusion: *The department considers project cost, particularly for less complex projects such as chip sealing. However, it is not necessary to expand review of cost beyond the current level, because for most projects the significance of the other ten decision-making factors is more important.*

Conclusion: *The differences between the scope of work between construction-designated and maintenance-designated pavement preservation projects warrant the use of two contracting approaches. Again, federal funding requirements dictate many of the differences.*

Conclusion: *The primary differences between oversight of construction and maintenance pavement preservation projects are:*

- *Type/number of tests per day (more – construction)*
- *Testing documentation (more - construction)*
- *Project and testing costs (higher - construction)*
- *Potential risk to quality (higher - maintenance)*
- *Contractor payment procedures (more detailed for construction).*

Federal requirements dictate many of the construction contract testing requirements. Based on the expectations of construction pavement preservation projects compared to the projects assigned to maintenance, the differences in testing and oversight are reasonable.

Conclusion: *Data controls for PvMS appear to be reasonable. The information provided is an important part of the department's process for determining whether to assign projects to maintenance or construction. Neither district nor headquarters staff rely totally on PvMS for decisions; management officials consider the other ten decision-making factors before deciding on a treatment approach.*

Testing and documentation consistency is an area of concern, particularly as the department pursues more and more maintenance preventive work compared to the historical reactive (patching) approach. Either staff in one maintenance area are testing and documenting unnecessarily, or staff in another area are not providing enough verification of product quality. The combination of expertise currently available in all eleven maintenance areas could jointly establish quality control and testing standards for projects based on the type of work, material specifications, and final product. Due to the size and complexity of most maintenance projects, we do not believe it is necessary for maintenance to test and document testing to the same degree as currently required for federally funded construction projects, because it would not be a cost-effective use of staff resources and funding. ***We recommend the Maintenance Division establish quality control and testing standards.***

For a complete copy of the report (01P-01) or for further information contact the Legislative Audit Division at 406-444-3122; e-mail to lad@mt.gov; or check the web site at <http://leg.mt.gov/audit>.