



**HIGHWAY FACTORS GROUP CHAIRMAN'S
FACTUAL REPORT**

Highway Attachment – Selected Pages from UDOT Pavement Management Manual

Bryce Canyon City, Utah

HWY19MH012

(5 pages)

UDOT Pavement Management Manual

Introduction

The Utah Department of Transportation (UDOT) is responsible for maintaining approximately 20,000 lane miles of pavement. This would not be possible without an extensive inventory of information about these pavements. Many groups within the department play a role in collecting and analyzing this information.

In addition to monitoring the pavement condition, the focus of the department's management efforts have been determining the funding requirements, forecasting the future condition, and recommending an appropriate mix of projects to ensure the future condition is maintained.

UDOT manages the pavement throughout the state with the philosophy that "good roads cost less." We want to provide the best road pavement condition with the greatest long-term benefit as possible through preservation, rehabilitation and reconstruction. The correct treatment on the correct road at the correct time.

UDOT recognizes that not all state highways have the same traffic, or the same performance requirements for the pavement. UDOT is currently focusing on a prioritized "High Volume System" and "Low Volume System" approach. The High Volume System includes the Interstates, most of the National Highway System, and other routes with over 1,000 AADT. The Low Volume System is comprised of the remaining roads with less than 1,000 AADT. UDOT has identified different performance goals, treatment strategies, and funding programs for these systems.

UDOT Pavement Management Group

The Pavement Management group at UDOT consists of a Statewide Pavement Management Engineer, Statewide Modeling Engineer, Statewide Pavement Engineer, and Statewide Pavement Design Engineer in Central Materials and Pavements and four Region Pavement Management Engineers.

Central Materials is responsible for managing the dTIMS deterioration model that provided the region offices with budget allocations and project recommendations.

Roles and Responsibilities

Pavement Management activities within UDOT focus on maintaining the current High Volume System, improving the Low Volume System, and prioritizing future needs. UDOT divides pavement management efforts among several work areas.

Central Materials and Pavements

Central Materials and pavements resides in Program Development and is responsible for system level pavement management function. These duties include, but are not limited to:

- Develop pavement management policies.
- Collection, processing, management and reporting of system and project level pavement condition data.
- Maintain pavement condition database.
- Training of personnel involved in the collection of pavement condition data.
- Development of QC/QA processes on all collected data.

- Develop pavement management and preservation priorities statewide to determine funding requirements.
- Recommend appropriate allocation of resources to maintain a properly balanced preservation and rehabilitation program.
- Develop and maintain system level pavement management model, dTIMS.
- Maintain information on treatment histories for use in pavement management models.
- Analyze pavement deterioration trends.
- Maintain and update Pavement Management Manual
- Provide support and guidance to the Region Pavement Engineers.
- Participate in pavement related research activities.
- Support UDOT Long Term Pavement Performance (LTPP) project responsibilities.
- Perform process review of Region pavement design activities and pavement type selection, focusing on consistency and accuracy of materials applications.
- Implantation of new materials concepts for pavement preservation and rehabilitation.
- Implementation of new materials design and construction concepts.
- Data Analysis and training for material property calculations with FWD data.
- Materials Specification and Special Provision development and management
- Priorities and program reconstruction projects.

Planning and Statistics

The Planning and Statistics Unit resides in Planning and Programming and is responsible for the statewide route inventory and traffic data. These duties include, but are not limited to:

- Collection, analysis and reporting of traffic data, including truck weights and volumes.
- Collection, compilation, and reporting of route mileage and road inventory data.
- Development of QC/QA processes on all collected data.

Central Maintenance

The Central Maintenance Division resides in Operations and is responsible for the hard surface pavement program. These duties include, but are not limited to:

- Participation in Pavement Management Meetings
- Allocation of Code 1 funding for Corrective Action preventative treatments.
- Maintaining the MMQA maintenance performance measures.

Region Pavement Managers

Each Region has a Region Pavement Management Engineer (PME), who reports directly to the Region Materials Engineer (RME) and coordinates with the Statewide Pavement Engineer. The Region PME with RME concurrence has a lead responsibility for all pavement management activities and pavement design activities in the Region. These duties include, but are not limited to:

- Program Development
 - Identify and prioritize Region projects.
 - Provide input for system strategy selection.
 - Consult with Region Engineering Team to identify, nominate, and program preservation and rehabilitation projects.

- Develop and maintain three year plan for preservation and rehabilitation.
- Identify, and nominate reconstruction projects.
- Ensure that current construction history information is collected through project closeout.
- Research and document construction history.
- Participate as a member of the Pavement Management Working Group and Pavement Management meetings.
- Manage and update pavement databases.
- Project Development
 - Verify existing pavement Structure.
 - Pavement Type selection.
 - Preliminary and final pavement design approval.
 - Review and approval of pavement designs performed by consultants.
 - Technical Support for Various Functions in the Region.
 - Participate in annual meetings with maintenance shed.
 - Provide technical guidance and details for Preconstruction, Construction, Maintenance and Consultant activities.
 - Provide materials design and support to assure construction of pavement designs meeting or exceeding the structural requirements used in the pavement design process.

Low: Faulting < 0.3"

Medium: Faulting 0.3" to 0.5"

High: Faulting > 0.5"

1.1.4 Rutting

Rutting is the distortion of the surface where one or both wheel paths are lower than the rest of the pavement. This can be caused by poor material, weak subgrade, or wear on the surface – especially where chains are frequently used. This is an important measure due to the potential for holding water and reducing vehicle control. It is important to determine the cause before correcting this condition.

Rutting is measured in each wheel path independently, with maximum values recorded at each location, with the average of the values summarized for each .1 mile interval. Several methods are being used to simulate a string line measurement. UDOT's profiler has 3 lasers. The current technology uses a transverse scanning laser to record the surface across the full lane, and summarizes them over 100 times per mile.

Condition rating is based on the average depth of rutting, and varies by type of road.

Good: Rut depth < 0.2"

Fair: Rut depth > 0.2" to 0.5"

Poor: Rut depth > 0.5"

1.1.5 Surface Friction

Surface friction is dependant on the type of pavement and amount of wear of the aggregate. This can be an important safety measure – especially when the pavement is wet. Bleeding, or sometimes new seals with excess oils can cause low values. Concrete pavements also tend to have lower values. Many other factors need to be considered to determine if there is a safety issue when a location has a low test value.

This data is collected with a locked-wheel skid tester, using the ASTM E 274 method, with a ribbed tire. The measured skid number (SN) is adjusted to 40 mph and reported as the SN40.

This system level data is collected at 1 mile intervals on a 2 year cycle.

Condition rating is based on the SN40 values

Sufficient: SN40 > 45

Approaching need for further evaluation: SN40 > 35 & < 45

Needs further evaluation: SN40 < 35

1.1.6 Surface Deflection

Surface deflection data is collected to measure the pavement and subgrade strength. Asphalt pavements are generally designed for a fatigue life of 20 years. This can usually be extended with overlays and routine maintenance. Deflection data can be used to estimate the remaining life, as is or after rotomilling several inches.