Developing a Pavement Performance Model for Effective Pavement Management of Wyoming County Roads, Phase I

CTIPS-076 – UTC Project Information

Recipient/Grant Number:	North Dakota State University, University of Wyoming Grant No. 69A3552348308
Center Name:	Center for Transformative Infrastructure Preservation and Sustainability
Research Priority:	Preserving the Existing Transportation System
Principal Investigator(s):	Imran Reza, Ph.D. Shahbaz Khan, Ph.D. Khaled Ksaibati, Ph.D., P.E.
Project Partners:	USDOT, Office of the Assistant Secretary for Research and Technology – $84,812 Wyoming Technology Transfer Center, LTAP – $84,812
Total Project Cost:	$169,624
Project Start and End Date:	8/28/2026 to 11/30/2029

Project Description

As pavements progressively age and deteriorate over time, it becomes necessary for agencies to allocate substantial financial resources to sustain their pavement network in a condition deemed acceptable. A significant number of county roads were constructed decades ago and have received on-demand maintenance, resulting in suboptimal overall road conditions for Wyoming counties. Therefore, since 2014, the Wyoming Technology Transfer Center, in association with Wyoming Department of Transportation (WYDOT), has been collecting county road pavement performance data in Wyoming to make informed management decisions in the future. The pavement data collected includes rut depth, cracking, roughness, and other associated data such as route, direction, mile post, road width, length, district, county, and speed. Local governmental entities are responsible for the management of county roads, relying on their engineering expertise and judgment, without the implementation of a county-specific Pavement Management System (PMS). Also, different vendors have collected this data over time. There exists a need to check the consistency, quality, and continuity of this data from vendors. This study addresses this gap and plans to develop a pavement performance model from the collected data for county roads. Overall, this study is divided into two phases. Phase I of the research will review the data collected from different vendors for consistency, check quality, and continuity. Thereafter, the study will examine the existing pavement performance deterioration model for county roads. Finally, Phase II of this research plans to develop a new county pavement deterioration model and performance index, along with decision

trees for pavement management. This research will help aid decision-makers in making better choices by allocating the funding appropriately with preventive treatment, minor and major rehabilitation to ensure good quality county roads. Finally, the outcome of this research can be used by policymakers to implement the best practices of PMS in Wyoming counties.

USDOT Priorities

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Outputs

The results and products of this project, such as a developed effective pavement performance equation and associated decision trees, will be disseminated through peer-reviewed journal articles and showcased at scientific research conferences like the annual Transportation Research Board (TRB). This will help in transferring methodologies, results, and products to the national and international pertinent research communities. Workshops, seminars, and webinars will be arranged to further disseminate the research findings and communicate their outcomes with professionals, practitioners, and highway agencies such as WYDOT. The incremental results and progress of this project will be consolidated in a semi-annual progress report. Upon the completion of this project, it will be synthesized along with recommendations and guidelines in a technical report.

Outcomes/Impacts

The outcome of this research project will help to develop a pavement performance equation that will take care of the existing issues, such as negative value and cracking integration. Finally, the outcome of this research can be used by policymakers to implement the best practices of PMS in their respective regions.

Final Report

Upon completion, the final report link will be added to the project page on the CTIPS website.