Managing Pavement Assets Using PASER and WISLR

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Asset management is a buzzword that local governments have been hearing for at least the last two decades. Many of the processes used to manage Public Works assets have been in use long before the term asset management became ingrained into the municipal vocabulary.

Public works assets include streets, sidewalks, street lighting, water mains, fire hydrants, water valves, water storage tanks, sanitary sewers, storm sewers, sewer access points (manholes), lift stations, treatment plant facilities, vehicles and equipment. In order to effectively manage public works assets a municipality needs to have an inventory of the assets under municipal control, know the condition of these assets and their remaining useful life or rate of deterioration, prioritize asset importance based of criticality of the assets and the risk of failure and identify costs of maintenance, repair and rehabilitation of the assets.

Street pavements are a significant part of the municipal public works asset inventory. Relatively simple tools to help local officials manage pavement assets in Wisconsin have been available since 1988. The PASER pavement condition rating system available from the Wisconsin Transportation Information Center (epd.wisc.edu/tic) is a simple 1 to 10 condition rating system that uses visual identification of pavement surface distresses to rate pavement condition. The numerical ratings correspond to the condition of the pavement and the appropriate maintenance, rehabilitation, and reconstruction treatment; with a rating of 1 being a failed pavement and 10 a brand-new pavement. PASER is used by almost all municipalities in Wisconsin to report pavement condition to the Wisconsin Department of Transportation every two years.

Free software tools to help municipalities in Wisconsin develop five-year plans for maintenance and rehabilitation of pavements have been available since the middle 1990s, beginning with PASERware and progressing to the current WISLR web-based pavement management software (wisconsindot.gov/Pages/doing-bus/local-gov/wislr). The development of PASER, PASERware and WISLR were funded by WisDOT in an effort to give local officials the tools they need to effectively manage the local road system -- a system that makes up about 90% of all Wisconsin road miles.

At its most basic level, WISLR provides tools for web-based reporting of condition ratings and inventory of pavement assets. The most important, but least utilized feature of WISLR is the ability to perform "what-if?" analysis using multiple budget scenarios and multiple maintenance and rehabilitation processes.

WISLR allows a municipality to specify the maintenance treatments that they use and to either use default treatment unit costs in WISLR or enter their own costs. Built into WISLR is a

deterioration equation, based on statewide averages, that projects what the condition of each pavement section will be in future years. WISLR also allows a municipality to set the importance of each road into one of four classifications that is used during the WISLR project selection process to prioritize proposed projects based on their importance to the community.

Using the WISLR tools, a municipality can estimate what the backlog of work will be in five years using the current budget and alternatives budgets. WISLR can also show what percent of the road system will be in each condition category at the end of five years, allowing the community to see if they are making headway in meeting their goals or if the backlog of needs will continue to grow (Figure 1). With these projections, WISLR develops a five-year pavement maintenance and rehabilitation program. This program can then be modified by the user to reflect other local considerations.
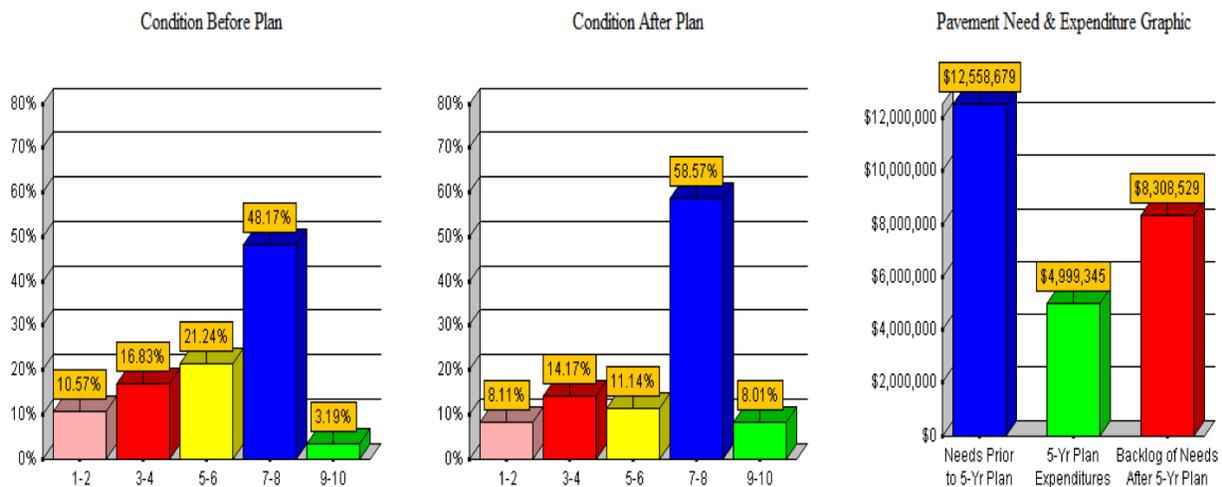
Figure 1. Examples of WISLR pavement condition projection and backlog projection

In the "condition before plan" and "condition after plan" charts, pavements rated 1-2 have already failed, those rated 3-4 require significant rehabilitation and strengthening, 5-6 require patching and surface treatments, 7-8 require crack sealing and routine maintenance, and 9-10 are new or newer pavements. The cost of treatments for the lower rated pavements (1-4) are significantly higher per square yard than the higher rated pavements (5-7). Importantly, the treatments for the higher rated pavements focus on extending the life of the pavements through lower cost preventive maintenance.

The charts also show a balanced asset management program that prioritizes preventive maintenance while also addressing some of the poorest pavements in the community. About half of the pavements needing surface treatments were included in the program, moving them into a "good" rating category and extending their life by more than 5 years. The program also rehabilitated or reconstructed about 20% of the poorest pavements, moving them into the "best" category and extending their useful lives for at least 15 to 20 years.

The "Pavement Need and Expenditure" chart shows that while increases in the useful lives of the assets resulted from the program, a significant amount of work is left to do in future years.

WISLR also provides mapping tools to help visualize existing pavement condition and proposed five-year maintenance and rehabilitation programs.
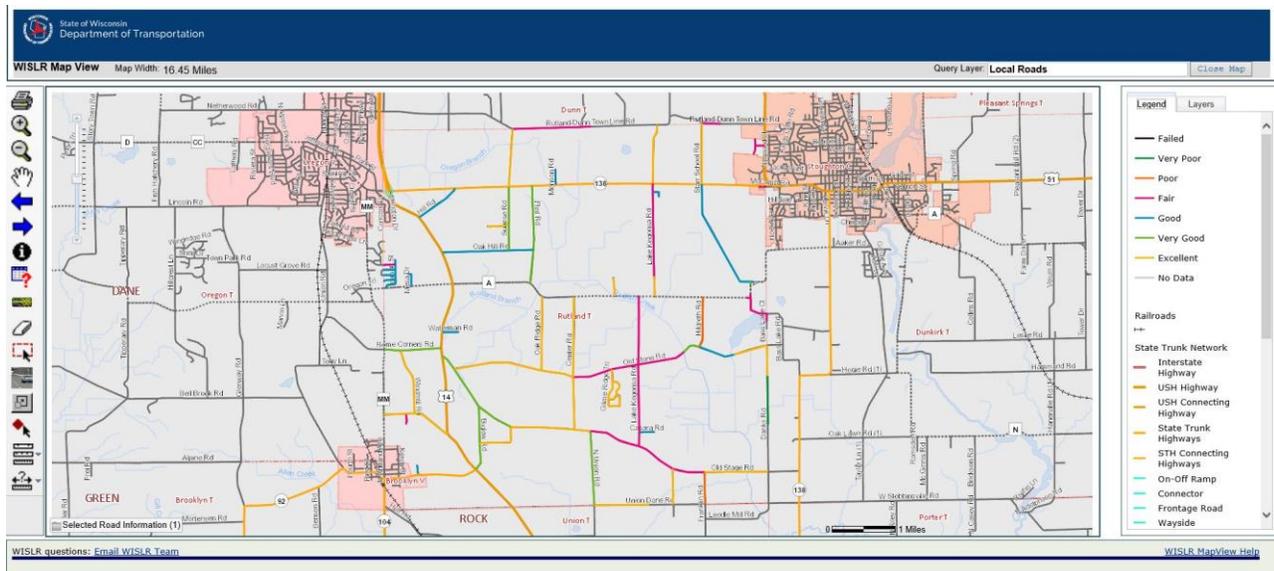

Figure 2. WISLR Map showing current condition of pavements

The map output from WISLR can be used very effectively to present the proposed maintenance and rehabilitation plan to elected officials and the public.

WISLR and the WISLR mapping and analysis tools are available free of charge to Wisconsin local government. If your municipality is not utilizing these tools you are missing an opportunity to improve the pavement maintenance and rehabilitation decision making for your pavement assets.

Live in person training on WISLR and PASER is being offered July 29 in Mineral Point, July 30 in Pewaukee, July 31 in Kimberly, August 1 in Weston and August 2 in Hayward. Details on these upcoming training sessions is available at epd.wisc.edu/tic/workshops.

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