FDM 14-1-1 General *November 15, 2022*

1.1 Originator

The Chief of the Materials Management Section in the Bureau of Technical Services is the Originator of this chapter.

1.2 Objective

A roadway pavement is a structure of superimposed layers of select materials placed on the existing subgrade. The main structural function of these materials is to support wheel loads and distribute those loadings to the subgrade. Pavement surfaces are typically considered to be flexible (Hot Mix Asphalt (HMA) pavements) or rigid (concrete pavements).

The objective of pavement design is to provide the most economical combination of pavement structure layers, over the subgrade, that will reduce the stress caused by loading to within the load-carrying capacity of the subgrade soil during the selected design performance period.

1.3 Asset Management

In embracing a systemwide asset management approach, WisDOT pavement design recognizes that treatment choices at the project level must be tempered and harmonized with what is best for entire system. Pavement asset management uses an iterative analysis that combines the engineering science of pavement design with the financial realities of annual funding constraints to arrive at an optimized statewide pavement treatment strategy. Optimized system health is the balance point of miles of needy pavement treated and best possible treatment strategy within a constrained budget. If there is an attempt to treat too many miles, the robustness of the statewide treatment strategy is reduced to cover the cost of those additional miles. Conversely, if there is an attempt to put too robust a treatment strategy on the needy miles, the number of miles treated is reduced to cover the costs of that more robust treatment strategy.

The iterative asset management optimization results in thematic metrics for how pavement conditions within the entire statewide system would prioritize for treatment, and what category of treatment that would be (referred to as the Theme). The Theme includes an aggressive pursuit of preservation and life extension actions to achieve that systemwide optimization. Preservation seeks to provide low cost pavement treatments to certain, more robustly designed pavements while they are still in reasonably good condition as a low cost means to maximize the life cycle period of good pavement condition. Life extension provides low cost pavement treatments on segments near the end of remaining life to infuse additional remaining life before their condition becomes unserviceable. However, even with these strategies, it may not be possible to attend to all pavements currently meeting need thresholds warranting treatment attention. Segments put into this group are strategically chosen and referred to as backlog. Backlog segments, while meeting need criteria, are still serviceable pavements with low operational demands that may allow them to remain needy yet serviceable for an additional number of years.

If looked upon only from a project-by-project perspective, it could appear that funding is being spent on better condition roads at the expense of lower condition roads. However, when viewed in aggregate from a systemwide perspective, these are data-driven strategic choices that provides the highest possible statewide system health within current funding constraints. Asset management dispels the historical project-by-project view of ‘worst first’, where prioritization was determined almost solely on ranking segmental pavement conditions. Iterative asset management analysis shows the ‘worst first’ concept leads to an overall decrease in statewide system pavement conditions.

Therefore, as one proceeds through FDM Chapter 14 on the engineering details for WisDOT pavement design, it is imperative to keep the systemwide asset management concept firmly in mind. It provides the basis for achieving Performance Based Practical Design within the pavement design process. The performance of the entire system in aggregate is paramount for making practical pavement design decisions at the project level.

Purpose and Need statements in project environmental documentation should reference this section, FDM 14-1-1.3, WisDOT Pavement Asset Management statewide system prioritization metrics. Template wording for this topic within a project’s environmental documentation can be found on WisDOT’s Environmental forms and tools site.

1.4 Design Procedures

In general, WisDOT follows the pavement design procedures provided in the American Association of State Highway &Transportation Officials (AASHTO) Interim Guide for Design of Pavement Structures, 1972, Chapter III Revised, 1981.

1.5 WisDOT Pavement Design Software: WisPave

For pavement design, WisDOT developed and uses the WisPave 4 design program (refer to Section 14-15 Pavement Type Selection).

To request access to WisPave 4, send an email to WisPave's administrator (peter.kemp@dot.wi.gov), with your complete name, company name, and your Wisconsin Web Access Management System (WAMS) User ID (do not send your WAMS password). Users must have a WAMS account to access WisPave.

Self-register for a WAMS account at:

https://on.wisconsin.gov/WAMS/home

You will not be able to access WisPave without sending the requested information and receiving authorization. After you have received authorization, you can access WisPave 4 at:

https://trust.dot.state.wi.us/wispave/home.do

Refer to the WisPave 4 User Manual for further information regarding the computer program.

https://wisconsindot.gov/Documents/doing-bus/eng-consultants/cnslt-rsrces/tools/qmp/wpmanual.pdf