PD-22: Long-Life Pavement

1-7 points

Goal: Minimize life-cycle costs by designing long-lasting pavement structures.

Affected Triple Bottom Line Principles

Sustainability Linkage

Including long-life pavement supports the environmental and economic principles by reducing the life-cycle costs of the road and the need for raw materials over time.

Background and Scoring Requirements

Background

The definition of long-life pavement for this criterion is:

- Service life of 40+ years for new construction and major reconstruction projects that add travel lanes to an existing roadway or bridge. Service life of 20+ years for small reconstruction and bridge replacement projects that do not expand capacity of the roadway, preservation projects, and restoration projects.
- Pavement will have reduced potential for rutting, cracking, faulting, and spalling.
- Pavement will maintain desirable ride and surface texture characteristics with minimal intervention activities, if warranted, for ride and texture, joint resealing, and minor repairs.

This criterion is not applicable to roads that are not surfaced with hot mix asphalt (HMA) or portland cement concrete (PCC), such as gravel roads, dirt roads, and roads sealed with bituminous surface treatments. Existing pavements that are to partially remain in place (in any condition) can also qualify for this criterion. In these cases, evaluation shall be based on the final pavement structure, which may include (1) existing pavement remaining in place, and (2) any new pavement structure added. In this manner, a diamond grind of an existing PCC pavement or an overlay of an existing HMA pavement can qualify for this criterion if the resultant pavement structure meets the requirements stated above.

Scoring Requirements

Implement one or more of the methods listed below. **Points for different scoring requirements are cumulative; however, this criterion shall not exceed a total of seven points.**

Requirement PD-22.1

1-5 points. Long-Life Pavement Design

Long-life pavement design must be in accordance with a design procedure that is formally recognized, adopted, and documented by the project owner. In many instances (but not all), this could be the process described in AASHTO's *Guide for Design of Pavement Structures, 4th Edition with 1998 Supplement*[1] or the process described in AASHTO's *Mechanistic-Empirical Pavement Design Guide, Interim Edition: A Manual of Practice*[2].

One of the following scores applies:

- **0 points.** No long-life pavement is used, it does not meet the minimum requirements of this criterion, or it does not meet the minimum quantities described below.

- **1 point. Bus Pull-outs.** Design at least 95 percent of the total new or reconstructed pavement surface area dedicated to bus pullouts to meet long-life pavement design criteria with specific bus axel loads considered. The length of the bus pullout designed should, at a minimum, include all pavements subject to turning and deceleration forces.
- **2 points. Dedicated or Primary Bus Lanes.** Design at least 75 percent of the total new or reconstructed pavement surface area for dedicated or primary bus lanes to meet long-life pavement design criteria with specific bus axel loads considered. Compute the total surface area of all trafficked lanes dedicated to buses and show that, at a minimum, 75 percent of that area is designed for long-life. Include stripe-to-stripe lane widths, including intersections.
- **5 points. Regularly Trafficked Lanes.** Design at least 75 percent of the total new or reconstructed pavement surface area for regularly trafficked lanes of pavement to meet long-life pavement design criteria. Compute the total surface area of all trafficked lanes and show that, at a minimum, 75 percent of that area is designed for long-life. Do not include shoulders, medians, sidewalks, and other incidental paved areas in the computation.

Requirement PD-22.2

5 points. Increase Asphalt Concrete Pavement Density

Design and specify 100 percent of the total new or reconstructed asphalt pavement for regularly trafficked lanes using materials and technologies to achieve a field construction density of 94 percent of maximum theoretical density. The density at construction must represent the in-place density after the asphalt mixture has been compacted with the rollers, but prior to opening the roadway to traffic.

Compute the total asphalt pavement quantity of all trafficked lanes and show 100 percent of the quantity is designed and specified using materials and technologies to meet this requirement. Do not include drainage layers, permeable base course, asphalt treated permeable base (ATPB), open graded surface course, surface friction course, and other permeable designed layers of asphalt pavement in the computation. Do not include shoulders, medians, sidewalks, and other incidental paved areas in the computation.

Requirement PD-22.3

2 point. Leverage Pavement Smoothness Incentive

Leverage a performance-based pay incentive for pavement smoothness targeting a pavement ride quality of 58.5% or better. Alternatively, the specifications may require that the contractor meet this ride quality goal without providing a pay incentive (mandatory performance).

Resources

The following resources are referenced in this criterion and consolidated here:

1. AASHTO, *Guide for Design of Pavement Structures*, 4th Edition with 1998 Supplement (1993, 1998), https://bookstore.transportation.org/item_details.aspx?id=374
2. AASHTO, *Mechanistic-Empirical Pavement Design Guide*, Interim Edition: A Manual of Practice (2008), https://bookstore.transportation.org/item_details.aspx?ID=1249

Scoring Sources

The project is considered to have met this criterion if the requirements above can be reasonably substantiated through the existence of one or more of the following documentation sources (or equal where not available):

1. Calculations indicating the total percentage of trafficked lane pavement surface areas designed for long-life.
2. The project owner's formally recognized, adopted, and documented pavement design procedure.
3. Documentation showing long-life pavement was designed using a minimum 20- or 40-year service life (per the appropriate requirements above).
4. Documentation showing long-life pavement was designed and specified using materials and technologies to achieve a construction field density of 94 percent of maximum theoretical density (per the appropriate requirements above).