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NEBRASKA
Good Life. Great Journey.
DEPARTMENT OF TRANSPORTATION

2024 Nebraska Asphalt Paving Workshop

Best Practices of Inspection and Construction for Asphalt Paving, Compaction, and Plant Operations

What are the Components of an Asphalt Pavement?

Learning Objectives

- Understand the components of an asphalt pavement
- Know the typical mixes available in Nebraska
- Understand the role of water in pavements
- Identity Nebraska DOT specifications that relate to asphalt pavements

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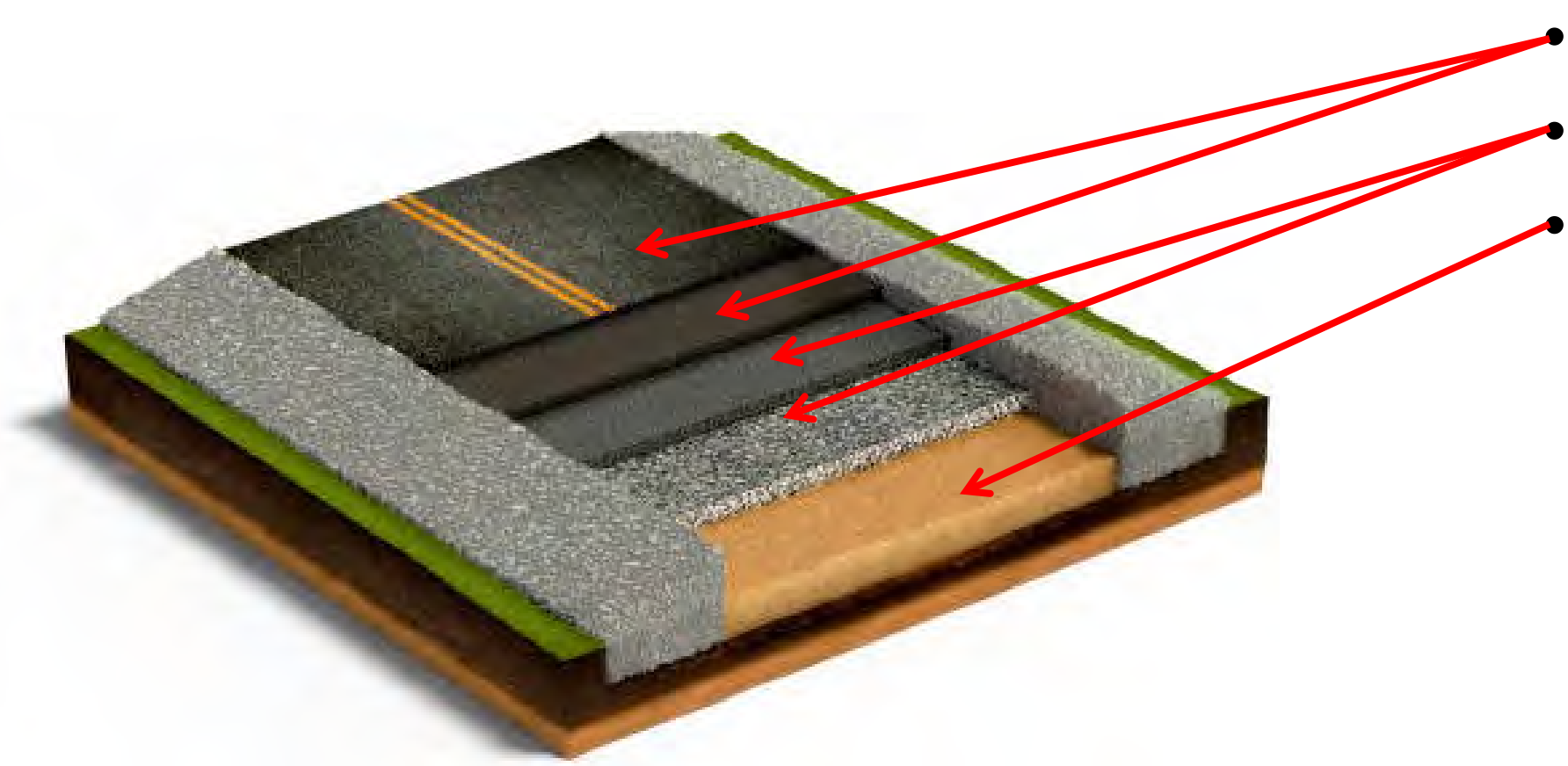
Components of an Asphalt Pavement



- Pavement
- Base
- Subgrade

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Subgrade

In-situ material is the foundation for the roadway.

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JOHN DEERE


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Subgrade Discussion

- Section 200 of the Specification: Earthwork
  - 205 Excavation and Embankment
  - 206 Roadway Grading
  - Other sections are less pavement-related

Subgrade Discussion

- Section 205 Highlights
  - Subgrade material should be free of organics
  - Rocks larger than 3” must be deeper than 2 feet in the subgrade
  - Frozen lumps of soil, snow, or ice shall not be used
  - Borrow site approvals
  - Corps of Engineers approvals
  - Optimum moisture content during compaction
  - Paid by cubic yard

Subgrade Discussion

- Section 206 Highlights
  - Materials meet 205.02
  - Maintain drainage
  - Compaction requirements shown on the plans
  - Paid by the STA

Subgrade Discussion

- Section 300 Subgrade Preparation … Base Courses … Shoulder Construction
  - Section 303 Subgrade Stabilization
  - Section 305 Crushed Rock Base Course
  - Section 306 Granular Fill

Subgrade Stabilization

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- #1 Lime Stabilization
- #2 Cement Stabilization
- Fly Ash Stabilization
- Bituminous Stabilization
- Geosynthetics
- Mechanical Stabilization

Subgrade

- *If, after the upper 6 inches (150 mm) of the subgrade has been thoroughly mixed, sections of the subgrade are too sandy to provide a firm and stable foundation for the subsequent construction operations, these sections shall be stabilized, in accordance with the requirements of Section 303, using cohesive soil from sources approved by the Engineer.*

Base Material

- Natural gravel or crushed rock that is compacted and placed on a prepared subgrade or subbase

Base Material

Asphalt-treated base is a dense-graded asphalt mix intended for use as a base course or binder course

Base Discussion

- Section 300 … Base Courses … Shoulder Construction
  - Section 305 Crushed Rock Base Course
  - Section 306 Granular Fill

Crushed Rock Base Course

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- Material Quality
- Gradation
- Placement and Compaction
- Thickness
- Moisture Control

Granular Fill

- Material Quality (durable particles…)
- Gradation
- Placement and Compaction
- Thickness
- Moisture Control
- Testing (density)

Section 503.04

- *Before placing the asphaltic concrete, the surface of the trimmed subgrade shall be tight, dust-free, dry, and rolled to firmly incorporate any loose or disturbed material and provide a suitable foundation for the subsequent construction.*

Nebraska Mix Types

SPR	• Standard Paving Recycle Mix
SPH	• SuperPave Heavy, Special Use Mix
SPS	• Standard Paved Shoulder Mix
LC	• Leveling Course Mix
SLX	• Surface Laminated Xtreme Thin Mix
SRM	• Base Mix

SPR – Standard Paving Recycle Mix

Majority of Nebraska paving projects:

- High RAP content (0% - 55%)
- High-strength mix
- Resistant to rutting

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SPH – SuperPave Heavy, Special Use Mix

- Specialty mix for high-impact locations
- Up to 35% RAP
- Higher criteria on aggregates
- Highest level of laboratory compaction

SPS – Standard Paved Shoulder Mix

- Economical Mix
- Lower standard for aggregates
- Highest level of RAP (0% - 65%)
- Intended for use on shoulders

LC – Leveling Course Mix

- Leveling course or use as a stress-absorbing layer
- High asphalt content
- Placed 5/8” to 1” thick
- Smaller NMAS
- Up to 35% RAP

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SLX – Surface Laminated Xtreme Thin Mix

- Requires PG 58V-34 binder
- 20%-35% Fractionated RAP
- Minimum of 20% crushed ¼” rock chips
- Limit of 10% maximum natural gravel or sand
- Lower level of laboratory compaction (N_{design} = 50)
- Highest minimum binder content of all mix types (5.3%)

Mix Design vs Structural Design

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Mix Design

- The goal of mix design is to determine the optimum mixture of component materials for a given application. This includes detailed evaluations of aggregate, asphalt as well as a determination of their optimum blending ratios.

Structural Design

- The goal of structural design is to determine the number, material composition and thickness of the different layers within a pavement structure required to accommodate a given loading regime. This includes the surface course as well as any underlying base or subbase layers.

Mix Design vs Structural Design

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Water’s role in pavements?

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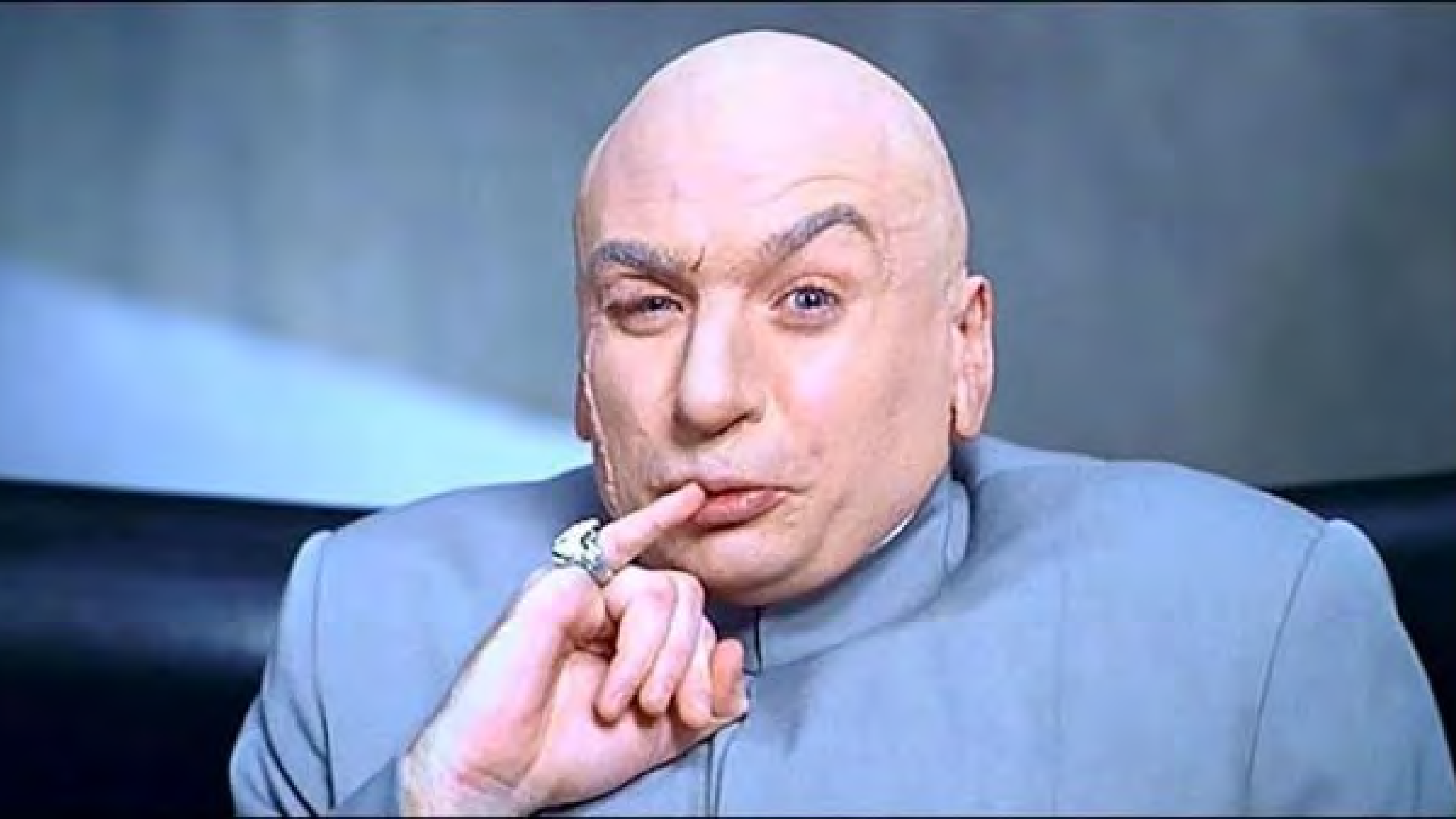

NDOT Pavement Design Manual

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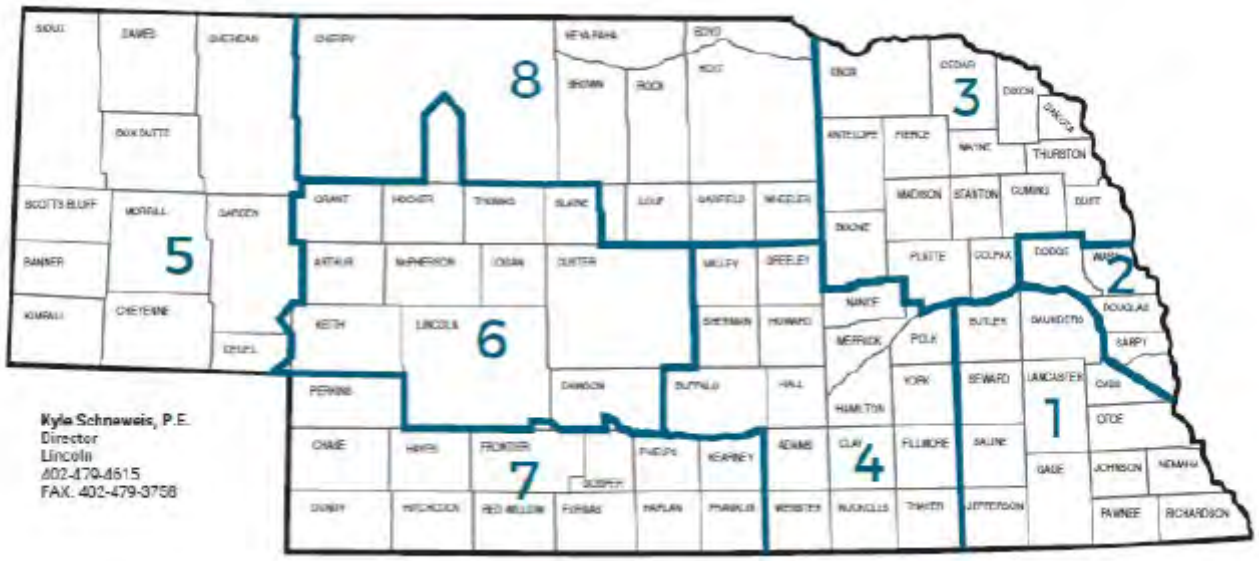
- Pavement Design Overview
- Pavement Design Guidance
- Pavement Strategy Summary



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Questions