Pavement Type Selection in Virginia

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Pavement Type Selection Procedures:

- Pavement Design
- Initial Cost Estimate
- Life Cycle Cost Analysis (LCCA)
- Justifications
Pavement Design

a. Design Considerations
b. Design Method
c. Input Parameters
d. Output Parameters
Design Considerations

1. Pavement Performance
2. Traffic
3. Subgrade
4. Materials of Construction
5. Environment
6. Drainage
7. LCCA
Design Methods

1. Virginia Method
   a) Used for flexible pavements only and is based on the AASHO road test, with modifications to meet Virginia’s Conditions

2. AASHTO 93 Method
   a) An empirical method used for both flexible and rigid pavement designs; this design procedure is used mainly for high volume roadways
1. Virginia Method

- California Bearing Ratio (CBR)
- Resiliency Factor
- Traffic in terms of the Equivalent Single Axle Loads (ESAL’s)
- Thickness Equivalency Factor, which is a relative index of strength the material contributes per inch of pavement thickness. This parameter yields a structural number or total thickness of the pavement.
2. AASHTO Method

- Flexible Pavements
  - Resilient modulus
  - Cumulative ESAL’s
  - Drainage coefficient of unbound materials
  - Reliability level
  - Overall standard deviation
  - Serviceability

- Rigid Pavements
  - Modulus of subgrade reaction
  - Elastic modulus of concrete
  - Modulus of rupture of concrete
  - Load transfer factor
Output Parameters

• The Virginia Method and AASHTO both yield a structural number for the total pavement and the individual layer thickness
Initial Cost Estimates of Paving Materials

• Planning Estimating System (PES)
  • Quantity
  • Location
  • Production Rate
Life Cycle Cost Analysis

LCCA is an economic method used to compare alternatives that satisfy a need in order to determine the lowest cost.

Factors include the following:

a) Initial cost
b) Maintenance
c) Rehab
d) User cost
e) Reconstruction cost / Salvage Value
Justifications

• A combination of LCCA and engineering judgment are documented to finalize the pavement type selection. When the net present worth of both types of pavements is within 10%, other factors are examined such as:
• Traffic
• Soil characteristics
• Weather
• Construction consideration
• Recycling
• Cost comparison
• Performance of similar pavements in the area
• Adjacent existing pavement
• Conservation of materials and energy
• Municipal preference
• Local government preference
• Local industry
# Life Cycle Cost Analysis Example

## AC Construction/Reconstruction Option

- **Total Travel Lanes Width:** 24 Feet
- **Inside Shoulder Width:** 10 Feet
- **Outside Shoulder Width:** 12 Feet

- **Mainline Area:** 126720 Square Feet
- **Inside Shoulder Area:** 52800 Square Feet
- **Outside Shoulder Area:** 63360 Square Feet

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**Cost Estimate:** $870,027