Traffic Characterization with the MEPDG

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Why is traffic important to pavement design?
AASHTO Design Procedure
Damage vs. axle weight

- Remaining traffic, %
- Cumulative damage, %

Tandem axle load, kips

- < 5% of traffic
- 58% of total damage
What information do we need?
Information we need:

- Volume
- Classification
- Weight

- Design lane only
- Heavy vehicles only
Truck Volume

- Lane Distribution
- Direction Distribution
- Growth Factors
- Seasonal, Hourly factors
Day of Week Truck Volume Variation

- Rural Cars
- Rural Small Trucks
- Rural Combination
- Urban Cars
- Urban Single Units
- Urban Combinations

Day of Week:
- Sunday
- Monday
- Tuesday
- Wednesday
- Thursday
- Friday
- Saturday
Seasonal Truck Volume Variation

- Urban Cars
- Rural Cars
- Rural Combination Trucks
- Rural Single Unit Trucks
Time of Day Truck Volume Variation
Screen Inputs
Truck Growth

- Monthly
- Traffic Growth
  - By class
  - Liner
  - Compound
Vehicle Classification
### Vehicle Class Distribution

- 13 FHWA Classifications
- Only concerned with trucks

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<th>Class</th>
<th>AADTT Distribution (%)</th>
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Axle Configuration Parameters

- Wheel Base Width
- Axle Spacing
- Tire Pressure
- Dual Tire Spacing
- Axle Width
Traffic Wander

Used to calculate pavement responses & the number of axle load applications over a point for predicting distress & performance.

- Mean wheel location = 18 in.
- Standard deviation = 10 in.
- Design lane width.
Vehicle Weight
Vehicle Weight (Axle Load Spectra)

17% of Single Axles Class 9 Vehicles Weigh 10 kips
Tandem Axle Load Distribution
Lightly Loaded Trucks

Maximum Weight in a Given Axle Weight Group (x 1,000 lbs)

Fraction of Tandem Axles in Weight Group
Tandem Axle Load Distribution
Heavily Loaded Trucks

Maximum Weight in a Given Axle Weight Group (x 1,000 lbs)
ESAL Comparison

Lightly Loaded = 0.186 (flexible)
Moderately Loaded = 0.355
Heavily Loaded = 0.666

Conclusion:
Not knowing the loaded/unloaded condition can equal a 3X error in life expectancy
MEPDG Input screen

Axle Load Distribution Factors

Axle Load Distribution
- Level 1: Site Specific
- Level 2: Regional
- Level 3: Default

View
- Cumulative Distribution
- Distribution

Axle Types
- Single Axle
- Tandem Axle
- Tridem Axle
- Quad Axle

Axle Factors by Axle Type

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Tools to gather Volume, Weight and Classification Data?
Tube counters
Weigh in Motion Station
Key Fact ………..

A small amount of good data is better than a large amount of poor quality data…..

Typically only 25% of WIM data is has been found to contain quality data.
Focus

• Information on most prevalent vehicles
• Overweight, permit vehicles
• Make it practical for design
  – Catalog traffic files
Questions ???