Module 2-6

Traffic Loading Evaluation

Objectives

Recognize importance

Describe relative damaging effects of axle load and configuration

Describe forecasting procedures

Appreciate WIM / AVC technology

Introduction

Traffic - significant effect on design

Historically poor forecasting practices

Increased axle loads, higher tire pressures, and new axle configurations

Heavier Loads

Tractor-Trailer Combinations

Tire-Axle Configurations

Definitions

Load equivalency factor (LEF)
Truck factor
ESAL
Weigh-in-motion (WIM)
Automatic vehicle classification (AVC)

Estimation Process

Traffic data collection (axle weights/counts)
Permanent weigh stations
Portable scales
WIM /AVC installations
Conversion to ESALs

WIM Pad

Estimation Process

WIM / AVC notes

- Calibration needed
- Axle weights / counts
- Vehicle classification

Conversion (for Design)

Rigorous
Approximate

- Initial year ESAL
- Growth rate

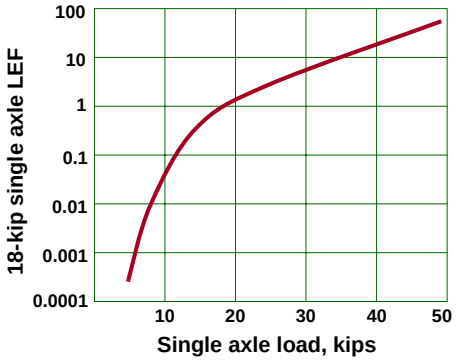
Initial Year ESAL

$$ESAL_1 = ADT \times 365 \times TKS \times DD \times LD \times TF$$

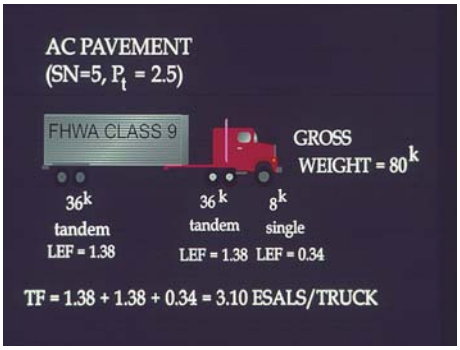
Load Equivalency Factor Concept

$$LEF = \left[\frac{X_i}{X_j}\right]^Z$$

Relative Damaging Effect of Axle Load



Example ESAL Calculation



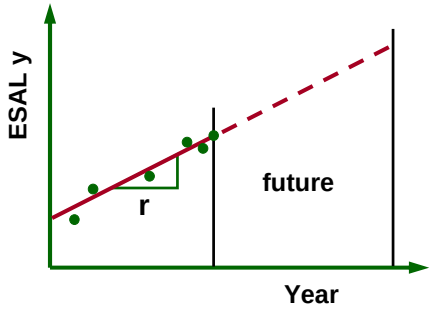
Key Points About LEF

- Axle weight and type are critical
- Truck weight is less critical

Truck Factor

- TF = Mean ESAL per truck
- Tabular computation
- Increasing with time
- State vs. local

Growth Rate (r)



Summary

Importance

Significant factors

Forecasting procedures

WIM / AVC technology