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3 Sight Distance (SD)

3.1 Objectives

1. describe various types of sight distance
2. determine sight distance requirements for stopping and passing maneuvers

3.2 key component of SD

1. PRT: the perception-reaction time required to initiate a maneuver (pre-maneuver phase)
2. MT: the time requried to safely complete a maneuver

driver's eye - 3.5ft high
Hazard - 2ft high

3.3 Sight Distance Types

1. stopping sight distance (SSD)
2. decision sight distance (DSD)
3. passing sight distance (PSD)
4. intersection sight distance (ISD)

3.4 SSD - stopping sight distance

SSD is a key input for geometric design, including horizontal and vertical alignment

PRT includes: recognize an object + decide a stop + react and prepare to apply the brake
Deceleration rate: $11.2 ft/sec^2$, 10th percentile deceleration rate, by AASHTO

$SSD = D_{p-r} + D_b$

D_{p-r}: in ft, perception-reaction distance

D_b: in ft, braking distance

$D_{p-r} = 1.47 \times 2.5s \times v = 3.675v$

D_{p-r}: in ft, perception-reaction distance

v: in mi/h, design speed

$$D_b = \frac{(v_0)^2 - (v_f)^2}{30(\frac{a}{g} \pm G)}$$

D_b: in ft, braking distance

v_0: in mi/h, design speed

v_f: in mi/h, final velocity

a: 11.2 ft/sec^2, deceleration rate, by AASHTO, in [10, 15]

g: 32.2 ft/sec^2

f = a/g: 0.35 by ASSHTO, coefficient of friction, 0.7 for dry roads, 0.3-0.4 for wed roads

G: grade, e.g. down grade: -0.06

3.5 SSD on vertical curve

crest curve:
- Driver eye height: 3.5ft
- Height of object in readway: 2.0ft

sag curve:
- headlight height: 2ft
- headlight beam angle: 1 degree (departure from horizontal, suggest changing to 0.75 degree)

3.6 DSS - decision sight distance

3.7 Terms

3.8 Rules

3.9 Formulas

3.10 Reference