# 1 Sight Distance (SD)

## 1.1 Objectives

1. describe various types of sight distance

2. determine sight distance requirements for stopping and passing maneuvers

## 1.2 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

## 1.3 Sight Distance Types

1. stopping sight distance (SSD)

2. decision sight distance (DSD)

3. passing sight distance (PSD)

4. intersection sight distance (ISD)

## 1.4 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**

## 1.5 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)

## 1.6 DSS - decision sight distance

## 1.7 Terms

## 1.8 Rules

## 1.9 Formulas

## 1.10 Reference