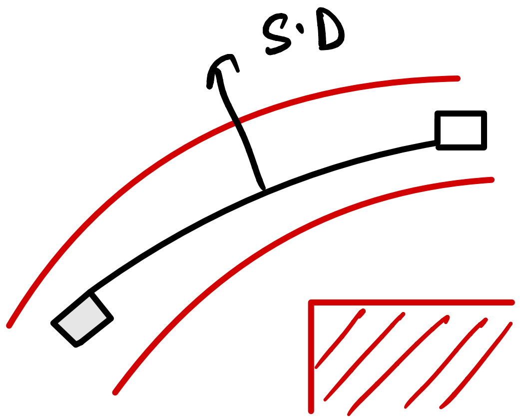
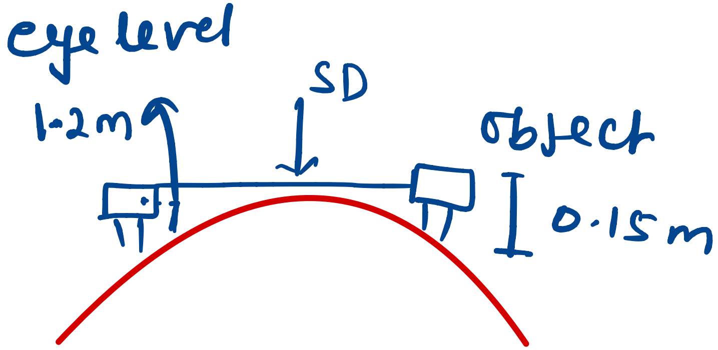
② Sight Distance element :-

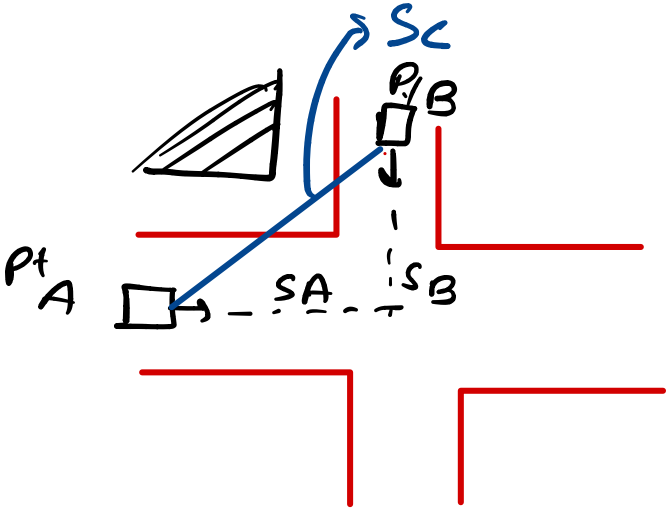
it is the actual distance along the road surface over which a driver has the visible of moving object.



Horizontal curve



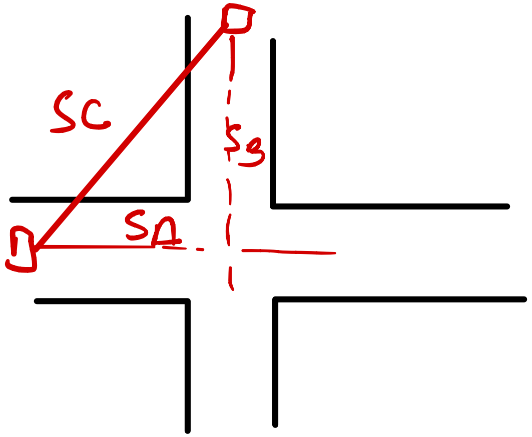
vertical curve



ⓒ

Q- Singnt distance

(a) S_A (b) S_B (c) $S_A + S_B$ (D) $\sqrt{R_A^2 + R_B^2} = S_C$



Type of sight distance :-

① Stopping sight distance (SSD) / absolute min sight distance

② Over taking "

③ ISD = 2 X SSD

④ Head light S.D.

↓

Distance visible to driver at night under head light

HSD = SSD

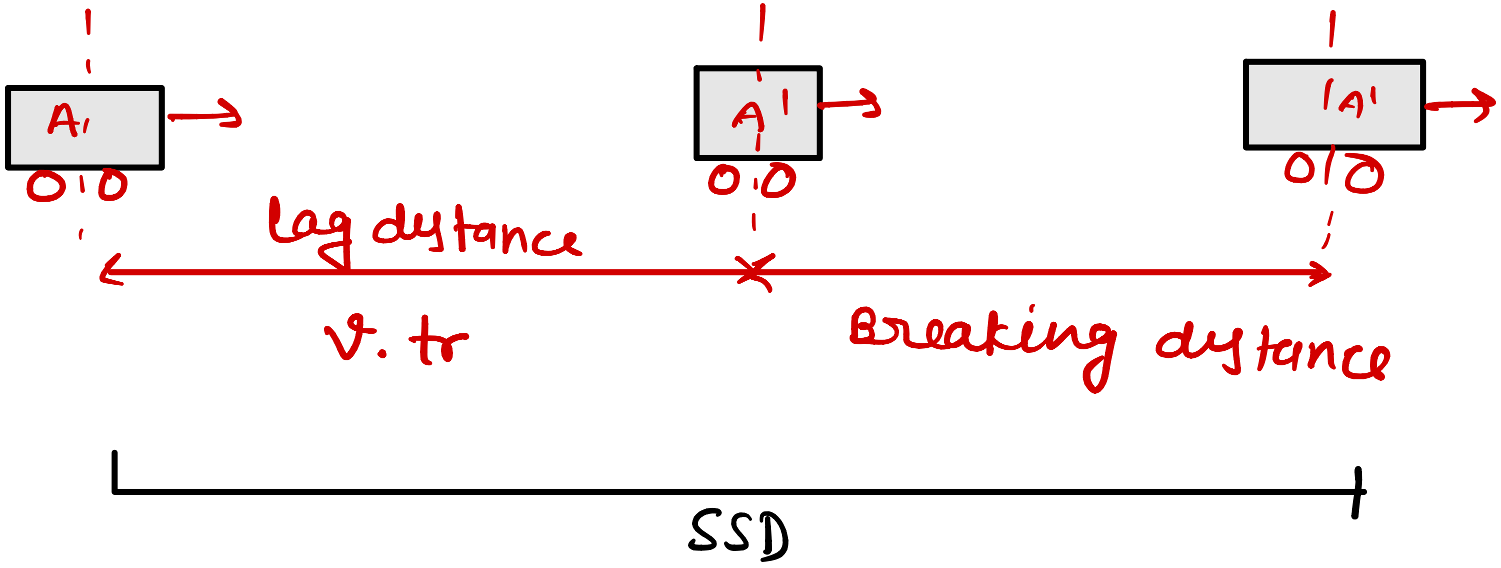
① **SSD:-** It is the min distance available on the highway at any spot such that the vehicle travelling at design speed could be safely stopped.

Factor affecting SSD -

① t_r = 2.5 sec

② Breaking eff. (For safe G.D assume that vehicle have only 50% break efficiency)

③ V ↑ , SSD ↑



$$SSD = v \cdot t_r + \frac{v^2}{2g\mu}$$

$v = m/s$

$t_r = 2.5\ s$

$$v\left(\frac{m}{s}\right) = (0.278\ kmph)v$$

$$SSD = 0.278\, V t_r + \frac{V^2}{254\mu}$$

$V = kmph$

$\mu = F$

$$\text{km/h} = \frac{1000}{3600} = \frac{5}{18} = 0.278$$

Breaking distance :-

change in KE = work done

$$\frac{1}{2}mv^2 - 0 = f\,W \times L$$

$$\frac{1}{2}mv^2 = f \times mg \times L$$

$$L = \frac{v^2}{2gf}$$

$$L = \frac{v^2}{2gf} = \frac{(0.278V)^2}{2 \times 9.81 \times f}$$

$$L = \frac{v^2}{254f}$$

* SSD on Gradient :-

$$SSD_{up} = vt + \frac{v^2}{2g(\mu + .01n)}$$

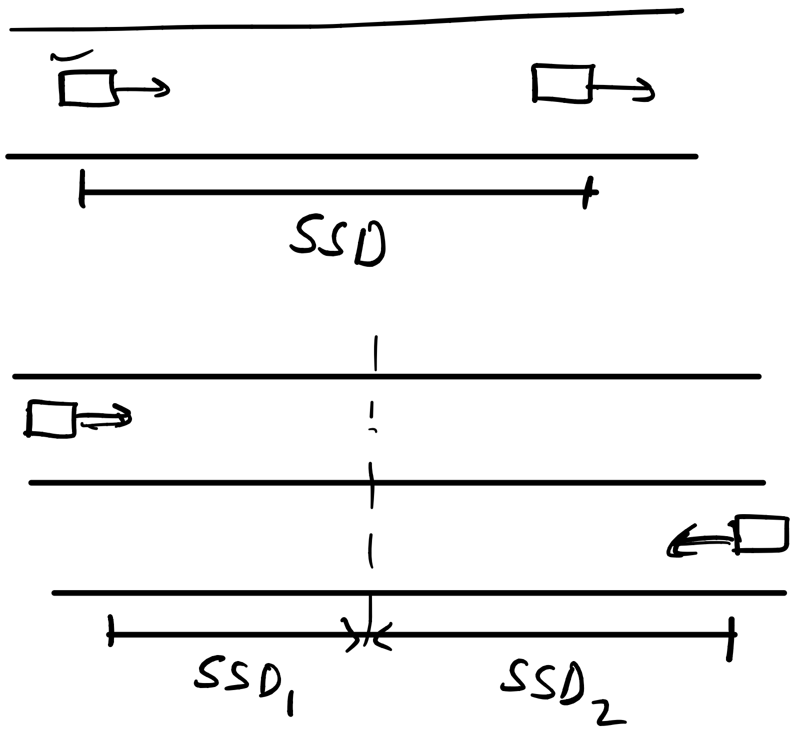
$$SSD_{down} = vt + \frac{v^2}{2g(\mu - .01n)}$$

$\mu \neq n\%$ $\quad \frac{n}{\omega}$

* $$SSD = 0.278Vt + 0.01V^2\eta$$

η = efficiency of Break

NOTE - 1



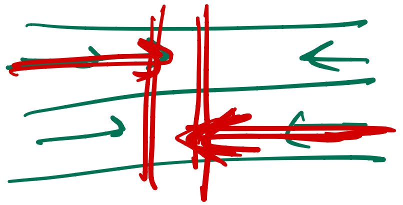
$$SSD = SSD_1 + SSD_2$$

Q- Cal. the SSD for design speed of 50 kmph for flat terrain

(a) Find out ISD

(b) Two way traffic on two lane

20mks



→ $$SSD = 0.278\,V t_r + \frac{V^2}{254 f}$$

$$= 0.278 \times 50 \times 2.5 + \frac{50^2}{254 \times 0.35} = \underline{62.87\,m}$$

(i) ISD = 2 × SSD
= 125.74 m

(ii) SSD = 62.87 m × 2
= 125.74 m

Q- Cal the min SSD required to avoid a head of collision of two car approaching from opposite dirn at 90 & 60 kmph coeff of friction 0.35 & Break efficiency 50% in both case

0.7 → 50% → 0.35

20

$SSD_1 = 0.278 \times 90 \times 2.5 + \frac{90^2}{254 \times .35} = 153.5m$

=

$SSD_2 = 0.278 \times 60 \times 2.5 + \frac{60^2}{254 \times .35} = 82.06$

$SSD = SSD_1 + SSD_2 = 235.56m$

Q- Determine the min non passing (SSD) sight distance that should be provided for a vehicle comming down 6% gradient using following data. V = 56 kmph, f = 0.5

$$SSD = 0.278Vt + \frac{V^2}{254(f - n\%)}$$ → 0.01n

$$= 0.278 \times 56 \times 2.5 + \frac{56^2}{254(0.5 - .06)} = 66.91 \text{ Ans}$$

Note. Upgradient 6% — 60.91

NOTE = $SSD_{\text{Down gradient}} > SSD_{\text{up gradient}}$