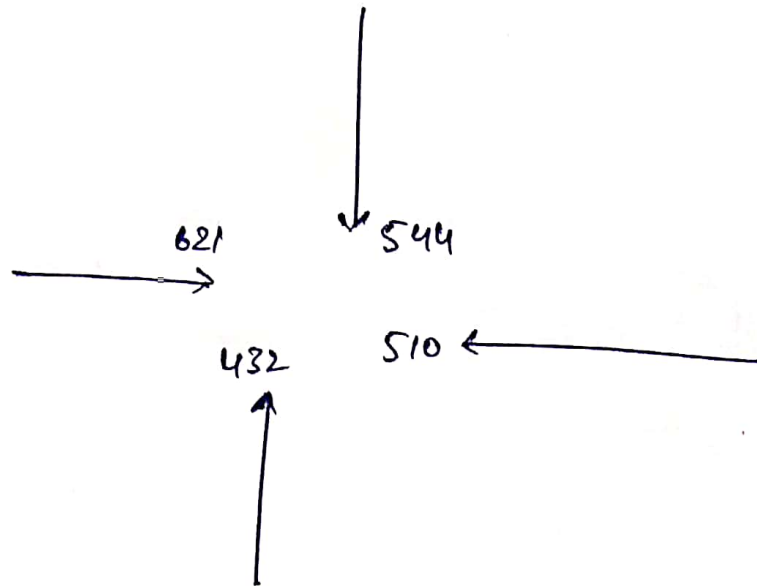


Name : Shahzeb - Khan

Solution



Determine yellow interval

$$y = t + \frac{1.47 S_{85}}{2a + (64.4 \times 0.01G)}$$

$$S_{85} = 35 + 5 = 40 \text{ mph}$$

$$S_{15} = 35 - 5 = 30 \text{ mph}$$

$$y = 2.0 + \frac{1.47 (40)}{2(10) + (64.4 \times 0.01 \times 0)}$$

$$y = 4.94 \text{ s}$$

→ length of all red clearance interval

$$S_{85} = 35 + 5 = 40 \text{ mph}$$

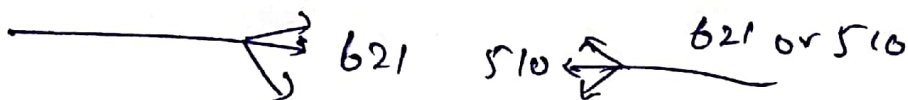
$$S_{85} = 35 - 5 = 30 \text{ mph}$$

$$d_r = \frac{w + L}{1.47 S_{15}} = \frac{30 + 20}{1.47 \times 30} = 1.134 \text{ sec}$$

length of stand vehicles usually taken 18-20 ft

$$d_r = \frac{P}{1.47 S_{15}} = \frac{40}{1.47 \times 30} = 0.91$$

→ Determine critical lane volume



$$V_{CA} = 621 \text{ truck/h}$$

$$544 \text{ or } 482$$

$$V_{CA} = 544 \text{ truck/h}$$

$$V_C = 621 + 544$$

$$V_C = 1165 \text{ truck/h}$$

Determination of lost time

$$Y = y + ar = 4.94 + 1.34 = 6.07_s$$

$$L_2 = Y - e = 6.07 - 2.0 = 4.07_s$$

Total lost time per cycle = $L = 6.07 + 6.07$

$$L = 12.14_s$$

⇒ Determination of cycle length

$$C_{des} = \frac{L}{1 - \left[\frac{V_e}{1615 \times PHF \times V/C} \right]}$$

$$C_{des} = \frac{12.14}{1 - \left[\frac{1165}{1615 \times 0.92 \times 0.90} \right]}$$

$$C_{des} = 94.26 \approx 95 \text{ sec}$$

⇒ Effective Green time available = $97 - 12.14$
 84.86_s

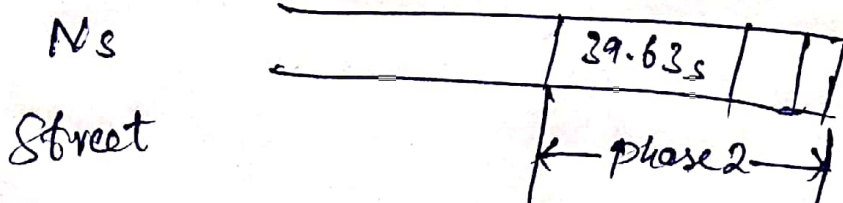
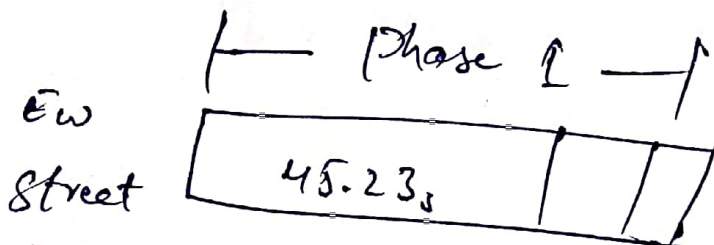
$$g_A = g_{Total} \times \left[\frac{V_{CA}}{V_c} \right] = 84.86 \times \left[\frac{621}{1165} \right]$$

$$g_A = 45.23_s$$

$$g_B = g_{Total} \times \left[\frac{V_{CB}}{V_c} \right] = 84.86 \times \left[\frac{544}{1165} \right]$$

$$g_B = 39.63_s$$

Check $45.23 + 39.63 + 12.14 = 97 \text{ sec}$



Since two lanes are provided

$$g_c = g_{005} \times \left[\frac{V_{CC}}{V_c} \right] = 84.86 \left[\frac{510}{1165} \right]$$

$$g_c = 37.15$$

$$g_D = g_{005} \times \left[\frac{V_{CD}}{V_c} \right] = 84.86 \times \left[\frac{432}{1165} \right]$$

$$g_D = 31.47 \text{ sec}$$

Check :

$$37.15 + 31.47 + 12.14 = 80.76 \text{ sec}$$

$$\text{Error} = 97 - 80.76$$

$$16.24 \text{ sec}$$

→ Now for Red interval

$$S_{85} = 35 + 5 = 40 \text{ mph}$$

$$S_{15} = 35 - 5 = 30 \text{ mph}$$

$$a_1 = \frac{W+L}{1.47 S_{15}} = \frac{30+20}{1.47 \times 30} = 1.73 \text{ sec}$$

$$a_2 = \frac{D}{1.47 S_{15}} = \frac{40}{1.47 \times 30} = 0.91 \text{ sec}$$

→ Lane critical volume for second lane

$$V_{c2} = 510 \text{ tvu/hr}$$

$$V_{cD} = 432 \text{ tvu/hr}$$

$$V_c = 510 + 432 = 942 \text{ tvu/hr}$$

* Determination of loss time in same

So $L = 12.14 \text{ s}$

→ $C_{des} = 97 \text{ sec.}$

Question #02: Discuss and Draw different types of traffic signs.

Traffic Signs:

The MUTCD provide specification and guideline for the use of literally hundreds of different purposes. In general traffic signs fall into one of three major categories:

- 1- Regulatory signs
- 2- Warning signs
- 3- Guide signs

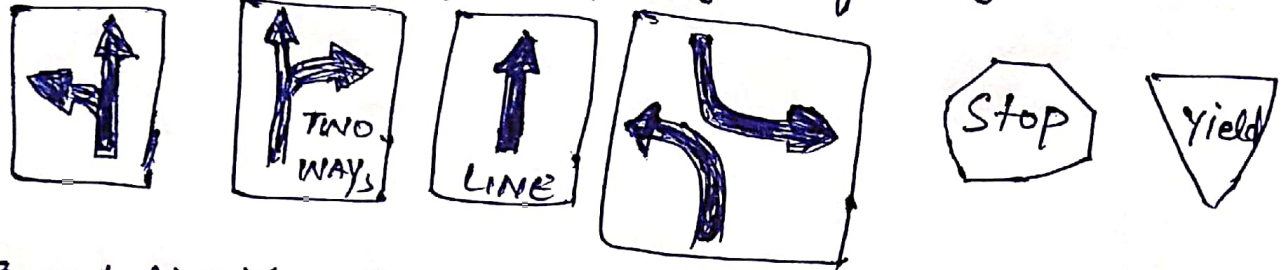
1 Regulatory Signs:-

Regulatory Sign convey information

Concerning specific traffic regulations. Regulations

may relate to right-of-way, speed limit, lane usage, parking, or a variety of other functions.

Regulatory signs Affecting Right-of-way

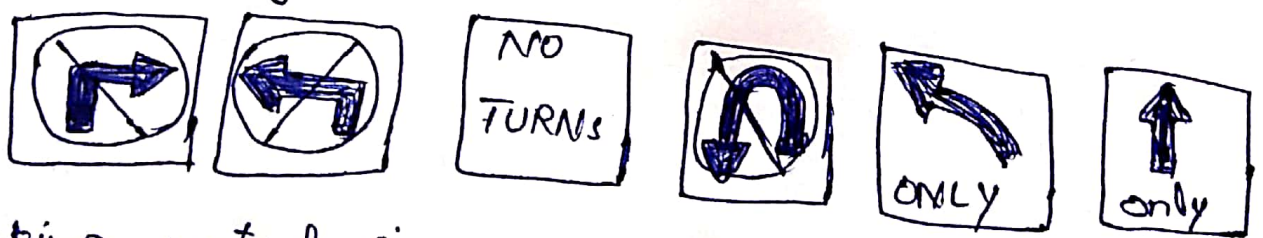


Speed limit signs

Speed ~~restriction~~ ^{limit} sign



Turn - ~~restriction~~ signs.

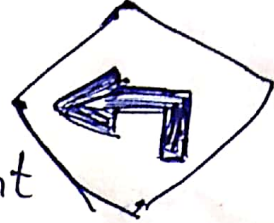


Parking control signs

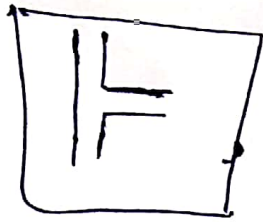


2 - WARNING SIGNS is used to inform drivers about upcoming hazards.

* Changes in horizontal alignment



* Intersection



* Advance warning control device

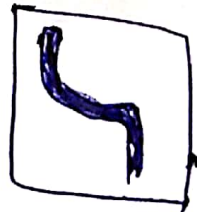


* Converging traffic lanes

* Narrow Roadways

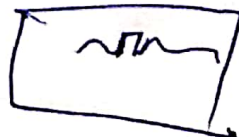


* Changes in highway design



* Grades

* Roadway Surface Condition

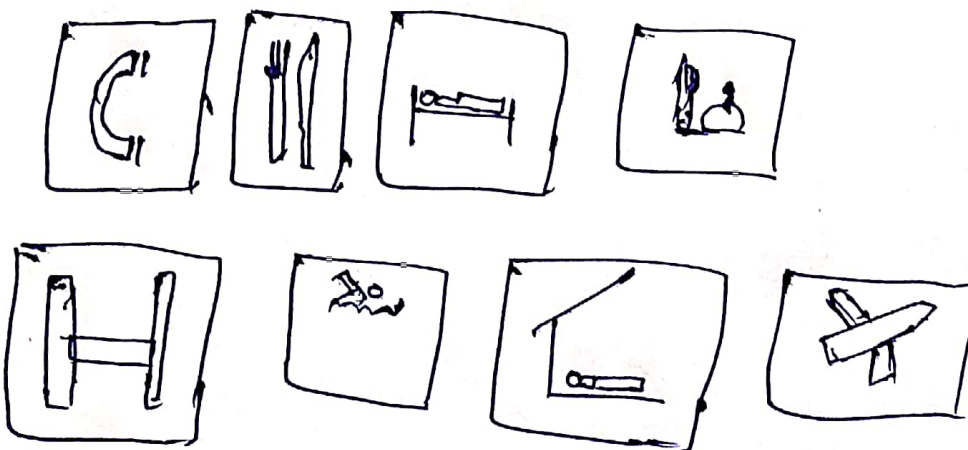


3. Guide Signs :-

Guide Sign provide information on routes destination, and service that drivers may be seeking.

- * Route marking and mileposts
- * Destination Sign
- * Recreational and Cultural - Interest Guide Signs.

* Service Guide Sign :



Question # 03: Discuss Road margins!

The portion of road beyond the carriage way can be generally called road margin. Various elements the form the road margins are given below

1. Shoulders:

Shoulders are provided along the road edge and intended for accommodation of stopped vehicles. Serve as an emergency lane for vehicles and provide lateral support for base and surface courses. The shoulder should be strong enough to bear the weight of fully loaded truck even in wet condition.

The shoulder width should be adequate for giving working place around a stopped vehicles. It is desirable to have a width of 4.6 m for the

Shoulder. A minimum width of 2.5m is recommended for 2-lane rural highways

2- parking lanes :-

Parking lanes are provided in urban lanes for side parking. parallel parking is preferred because it is safe for the vehicles moving on the road. The parking lane should have minimum of 3.0 m ~~with~~ width in the case of parallel parking

3- Bus-bays :-

Bus bays are provided by recessing the kerbs for bus stop. They are provided so that they do not obstruct the movement of vehicles in the carriage way. They should be atleast 75 meters away from the intersection so that the traffic

near the intersection is not affected by the bus bays.

4- Service roads :-

Service roads or frontage road give access to controlled highways like freeway and expressways. They run parallel to the highway and will be usually isolated by a separator and access to highway will be provided only at selected points.

These roads are provided to avoid congestion in the expressways and also the speed of the traffic in those lanes is not reduced.

5- cycle track :-

cycle tracks are provided in urban area when the volume of cycle traffic is high. minimum

width of "2" meter is required, which may be increased "1" meter for every additional track.

6 - Footpath :-

Foot paths are exclusive right of way to pedestrians, especially in urban areas. They are provided for the safety of the pedestrians when both the pedestrian traffic and vehicular traffic is high. Minimum width is 1.5 meter and may be increased based on traffic. The footpath should be either as smooth as the pavement or more smoother than that to induce the pedestrian to use the footpath.

7 - Guard rails :-

They are provided at the edge of the shoulder, usually when the road is on an embankment.

They are provided serve to prevent the vehicles from the running out of the embankment, especially when the height of the embankment exceeds 3m. Various design of guard rails are there. Guard stones painted in alternate black and white and usually used. They also give better visibility of causes at night under headlights of vehicles.

