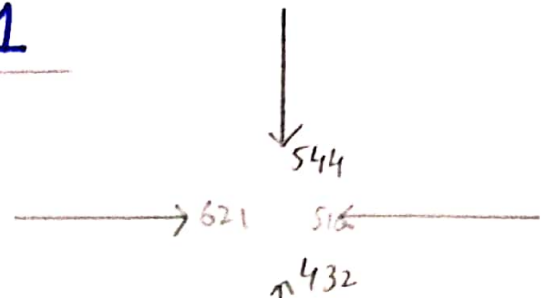


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ID	7802
SEMESTER:	SUMMER 2020
SECTION:	A
SUBJECT:-	TRANSPORTATION PLANNING and ENGINEERING
INSTRUCTOR:	Engr. HAMZA
Date:	19th AUG, 2020

QUESTION: 01Solution:

First of all determine yellow interval

$$Y = \frac{t + 1.4 S_{85}}{2a + (64.4 \times 0.014)}$$

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

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

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

$$y = 4.945$$

length of all red clearance interval

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

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

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

Now, length of standard vehicle usually taken as 18-20ft

$$\text{Now } ar = P / 1.47 S_{15} = 40 / 1.47 \times 30 = 0.91$$

Now Determine critical lane volume

$$V_c = 621 + 544$$

$$V_c = 1165 \text{ v/u/h}$$

Now Determining lost time

$$Y = y + ar = 4.94 + 1.134 = 6.075$$

$$l_2 = Y - e = 6.07 - 2.0 = 4.075$$

$$t_L = l_1 + l_2 = 2.0 + 4.07 = 6.075$$

Now we calculate

$$\text{total lost time per cycle} = L = 6.07 + 6.07 \\ = 12.145$$

⇒ Now Determination of cycle length.

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

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

$$= 94.26 \text{ sec} \approx 97 \text{ sec}$$

⇒ Effective Green time available = $97 - 12.14 = 84.865$

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

$$g_A = 45.235$$

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

$$g_B = 39.435$$

Now checking

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

Phase- I		EW Street
45.23s		

		NS- Street
	39.63s	
		Phase- 2

Since 2 lanes are provided

We have, $g_c = g_{TOT} \times \left[\frac{V_{cc}}{V_c} \right] = 84.86 \times \left[\frac{510}{1165} \right]$

$$g_c = 37.15 \text{ s}$$

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

We get

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

Checking

$$37.15 + 31.47 + 12.14 = 80.76$$

Now finding red interval

$$a_r = \frac{W+L}{1.47 S_{15}}$$

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

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

putting values

$$a_r = \frac{30 + 20}{1.47 \times 30} = 1.13 \text{ sec}$$

$$1.47 \times 30$$

$$d_r = \frac{P}{1.475_{15}}$$

putting values we get

$$d_r = \frac{40}{1.47 \times 30} = 0.915$$

Now finding lane critical volume
for second lane

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

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

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

Now we have loss time i.e same

$$\text{so } L = 12.14 \text{ s}$$

$$\rightarrow C_{des} \approx 97 \text{ sec}$$

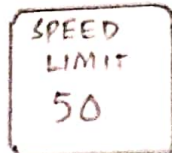
QUESTION: 02

TRAFFIC SIGNS: The MUTCD provides specifications and guidelines for use of different signs for different purposes. In general, traffic signs fall under the following category.

REGULATORY SIGN: Convey information concerning specific traffic regulation. Regulation may relate to speed limits, lane usage, parking, or a variety of other functions.

For example:

Speed Limit Sign: They are essential traffic control signs and indicate about safe same limit of a particular area.



TURN-PROHIBITION SIGN: This sign indicates that the turn is not allowed in a particular area.



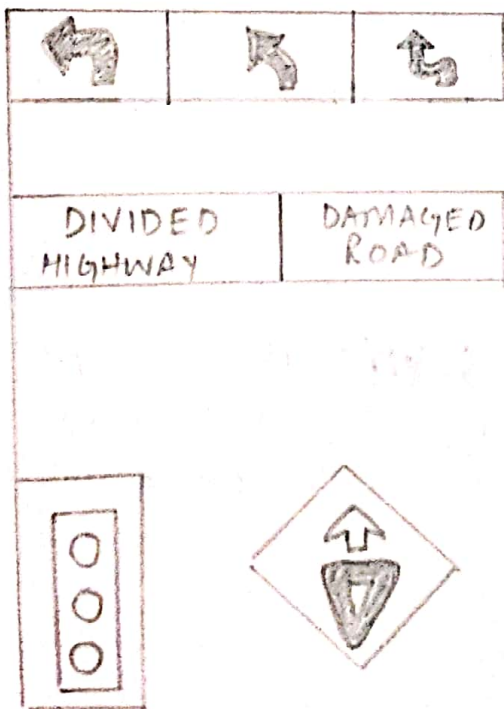
PARKING CONTROL SIGN: Indicating bus stops, whether parking is allowed or not and similar information.



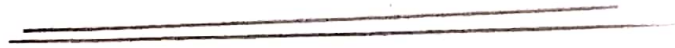
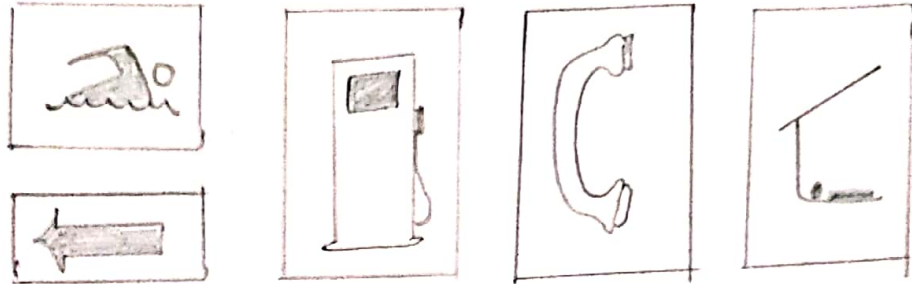
(2) WARNING SIGN:- They are used to inform drivers about upcoming hazards that they might not see or otherwise to discern in time and react to it safely.

Warning Signs Indicate:

1. changes in horizontal alignment
2. Intersections
3. Advance warning of control devices
4. Narrow roadways
5. Grades
6. Changes in highway design.



Guide Design: It provides information about route, destinations and services that drivers might seek.



QUESTION: 03

ROAD MARGINS: The portion beyond carriage-way and on roadway can be gradually called road margin is called road margin.

Elements of road margins include:

1. Shoulders
2. Parking lanes
3. Bus-Bays
4. Service roads
5. Cycle track.
6. Footpath
7. Guard rails.

1. **Shoulders**: They are provided along road edge with intention to accommodate stopped vehicle. It also serve as emergency lane for vehicle.
 - It provides lateral support for base and surface courses.
 - Width should be adequate to provide enough space for stopped vehicle
 - Desirable width of 4.6m for shoulders
 - Minimum width of 2.5m for 2 lane rural area.

2. Parking Lanes:

- provided in urban lane for side parking
- safe for vehicles moving on road so parallel parking is preferred
- Minimum width should be 3.0m in case of parallel parking.

3. Bus-Bays: Bus bays are provided by recessing the kerbs for bus stops.

- Aim is not to obstruct the movement of vehicle in carriage way.
- They should be atleast 75m away from intersection so that it's not affected by bus-bay.

4. Service Roads: It gives ^{access to} controlled highways like free ways and express ways. They run parallel highway and usually isolated by separator.

- Access to highway is provided at specific points.
- Aim is to avoid congestion in express-ways. so that speed of traffic not reduced in those lanes.

5. Cycle Track:

When the volume of cycle traffic is high in urban areas, cycle track is provided.

- Minimum width of 2 meter required
- Which may be increased by 1 meter for every additional track

6. Footpath: It is exclusive right^{of} way to pedestrians. especially in urban areas.

- Aim is to provide safety to pedestrians
- Minimum width requirement is 1.5m and might be increased.
- Footpath should be either as smooth as pavement or more smoother to force pedestrians to use footpath.

7. Guard Rails:

- provided at edge of shoulder when road is on embankment.
- Serve to prevent vehicles from turning out of embankment when height of embankment exceeds 3m.
- Guard stones painted in Black and white used.