## 4.3 ROTARY INTERSECTION DESIGN ELEMENTS

*a. Design speed*

The design speed of a rotary governs the various elements such as radii and weaving length.

Current Indian practice is to design rotaries in rural areas for a speed of 40 K.P.H and those in urban areas to a speed of 30 K.P.H.

*b. Radius at Entry*

The radius at entry is determined by the design speed, super elevation and coefficient or friction.

A range of 20-35 m is found to be suitable for rural design and a range of 15-20 m is suitable for urban design.

*c. Radius at exit*

The exit radius should be higher than the radius of rotary island so that it favours a higher speed by drivers. The general practice is to keep the radius of exit curves 11/2 to 2 times the radius of the entry curves.

*d. Radius of the central island*

The radius of the central island is governed by the rotary design speed and theoretically it should be equal to the radius at entry. In practice the radius of the central island may be kept slightly larger than that of the curve at entry. The value of 1.33 times the radius of entry curve is probably adequate for this purpose.

*e. Weaving lengths*

The weaving length determines the ease with which the traffic can merge and diverge.

**Minimum Length of Weaving Section**

| Design speed(K.P.H) | Minimum weaving length(m) |
|---|---|
| 40 | 45 |
| 30 | 30 |

*f. Width of Carriageway at Entry and Exit*

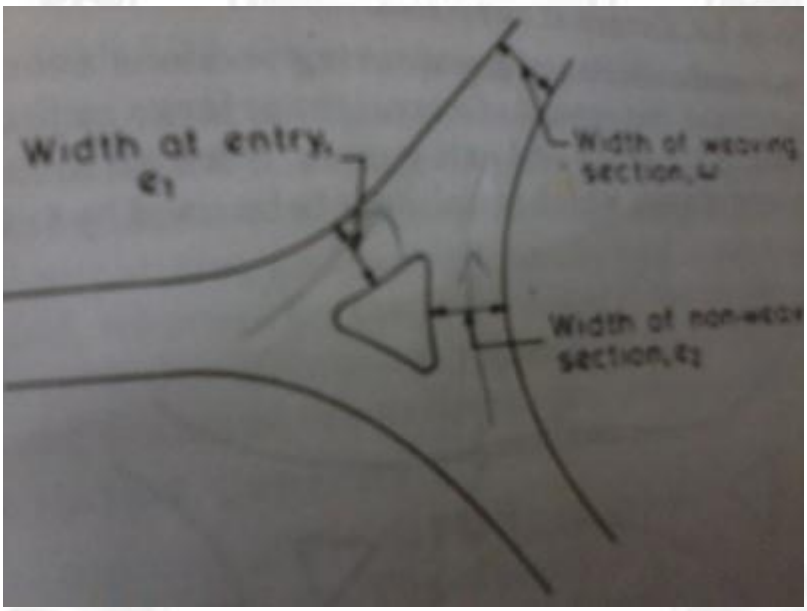
The carriageway width of the intersection legs is governed by the design year traffic entering and leaving the intersection. As per I.R.C minimum width of carriage way of 10m both entry and exit.

*g. Width of Rotary Carriageway*

The width of the non-weaving section should be equal to be widest single entry into the rotary andshould generally be less than the width of the weaving section.

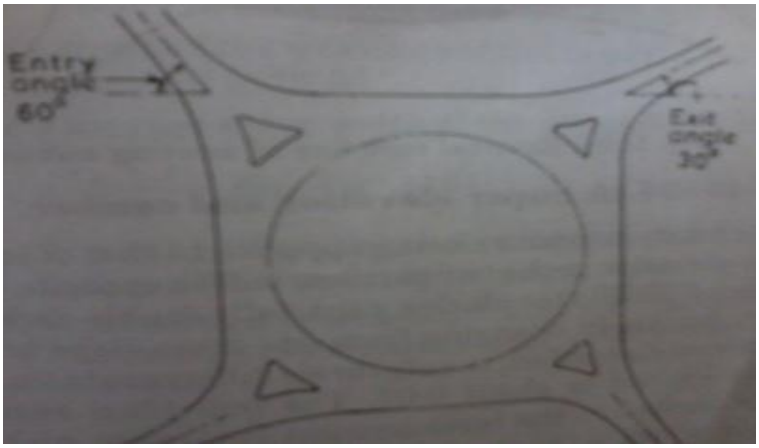
W= (e1 + e2)/2 + 3.5

The entry angles should be larger than exit angles and it is desirable that the entry angles should be about 60 degree, if possible, the exit angles should be small, even tangential.




*h. Entry and Exit Angles*

Entry angles should be larger than exit angles and it is desirable that the entry angles should be about60◦ and exit angle 30◦ is shown in fig.




*i. Capacity*

The capacity of a rotary is directly determined by the capacity of each weaving section. $Qp = (280\ w\ (1+(e/w))\ (1-(p/3))/\ 1 + (w/l)$

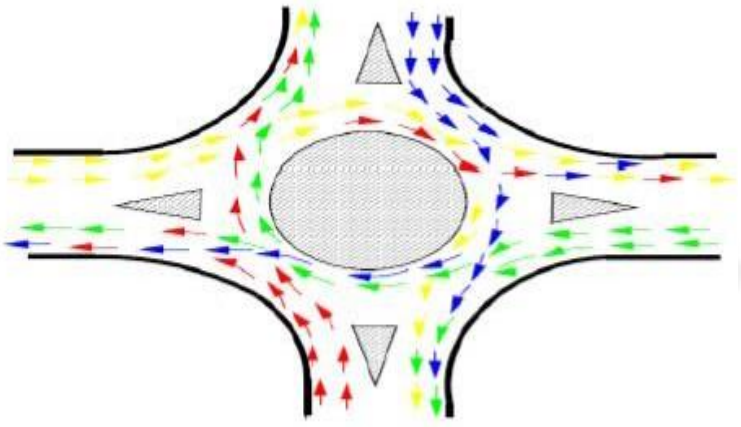
Where,

Qp = practical capacity of the weaving section of the rotary in passenger car units. W= width of the weaving section in meters (within the range of 6-18m)

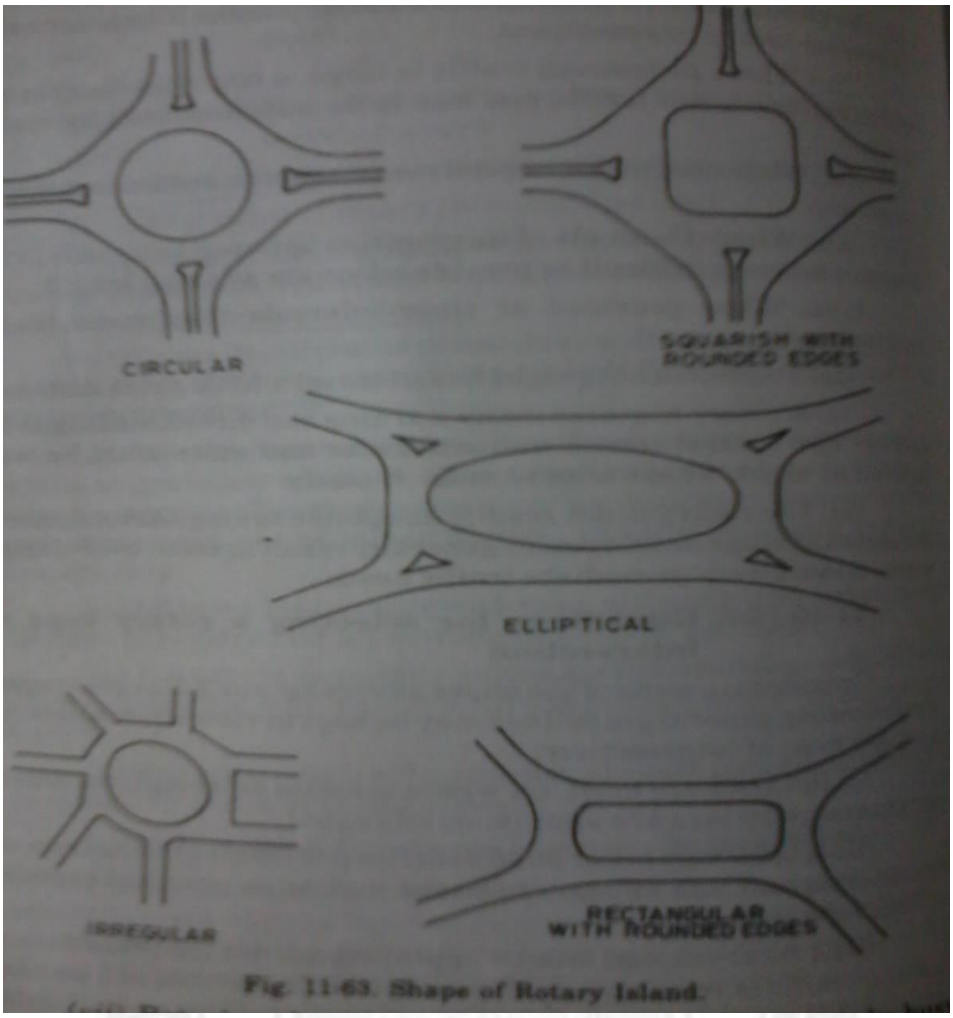
E = avg entry width of the rotary in meters = (e1+e2)/2

L= length of the weaving section between the ends of the channelization islands in meters.

P = proportion of weaving traffic, i.e ratio of sum of crossing streams to the total traffic on the weavingsection. = (b+c)/(a+b+c+d)



**Traffic operation of rotary**




**Shape of rotary Island**

Types of Grade – Separated Intersection Basically, two types are met with:

1. Grade – separated intersections without interchange.

2. Grade – separated intersections with interchange.

Interchange is a system whereby facility is provided for movement of traffic between two or more roadways at different levels in the grade separated junction. A structure without interchange is an over bridge or underpass or flyover, whereby the traffic at different levels moves separately without a provision for an interchange between them.

The different forms of a grade-separated junction can be considered under the number of legs the intersection serves. Thus, the interchanges can be classified as three-leg & multi leg, & these in turn can be sub-divided into various types as below:

**Three - leg interchange.**

1. T interchange
2. Y interchange
3. A partial rotary interchange

**Four leg interchange**

1. Diamond interchange
2. Half clover leaf interchange
3. Clover leaf interchange
4. Directional interchange
5. Rotary interchange.

**Multi – leg interchange**

1. Rotary interchange.