CI 43C TEORIA DE FLUJOS VEHICULARES

MODELOS LINEALES DE CAPACIDAD EN INTERSECCIONES REGULADAS POR SEÑAL DE PRIORIDAD

1.- FORMA GENERAL.

$$Q_s = X[Q_o + Z - Y \sum_{i \in I} \alpha_i \, qpi]$$

donde :

X,Y,Z : factores ligados a la geometría de la intersección.

I : conjunto de movimientos prioritarios para la corriente cuya capacidad se quiere estimar.

q_{p_i} : flujo del movimiento prioritario i.

α_i, Q_o : parámetros (Q_o representa flujo de saturación$\approx 1/\beta$ del caso de brechas).

2.- CARACTERISTICAS ESPECIALES.

a) Los qp_i, y por tanto Q_o y Q_s, se usan en unidades de vehículos equivalentes (veq). Para los vehículos pesados (buses, camiones, etc.) se usa factor de equivalencia 2.

b) Hay un modelo genérico pero algunos parámetros varían según el movimiento de que se trate (cambia la geometría de conflictos). El valor que se obtiene para Q_s representa entonces la capacidad de una cola (una pista) compuesta sólo por vehículos que realizan un determinado movimiento desde la rama secundaria.

3. VALORES DE LOS PARAMETROS.

Algunos de los valores que se entregan a continuación corresponden a estimaciones hechas en el Reino Unido y otros, al caso chileno (Schumilo y Coeymans, 1987).

a) Factores geométricos

$$Z = 14\, W_{BC}$$

donde : W_{BC} = ancho del bandejón central en la vía prioritaria, si existe (en m)

$$Y = 1 - 0{,}0291 W$$

donde : W = ancho de la vía prioritaria (m). Ver hoja aparte (1) que indica cómo se mide.

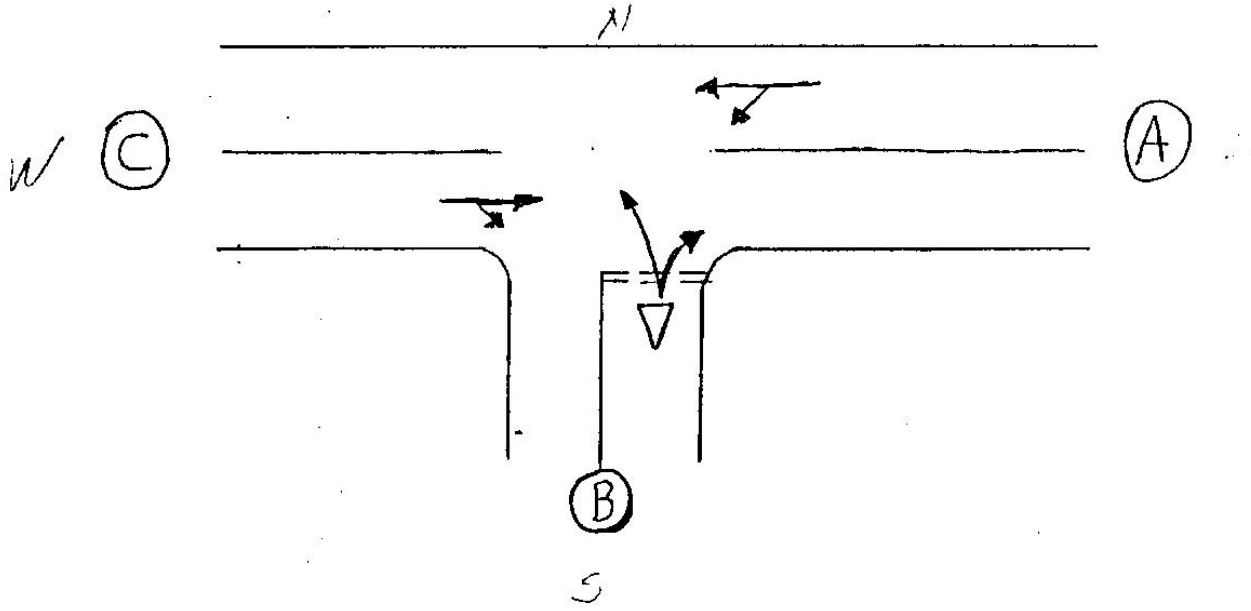
$$X = (1 + 0{,}099\,(w - 3{,}55))\,(1 + x_1\,(V_I - 120))\,(1 + x_2\,(V_D - 150))$$

donde : w = ancho de pista en la vía secundaria (m). Ver hoja aparte que indica cómo se mide. (2)

V_I, V_D = visibilidad a izquierda y derecha, respectivamente (m). Ver hoja aparte sobre cómo medirla. (3)

x_1, x_2 = parámetros que dependen del movimiento en estudio.

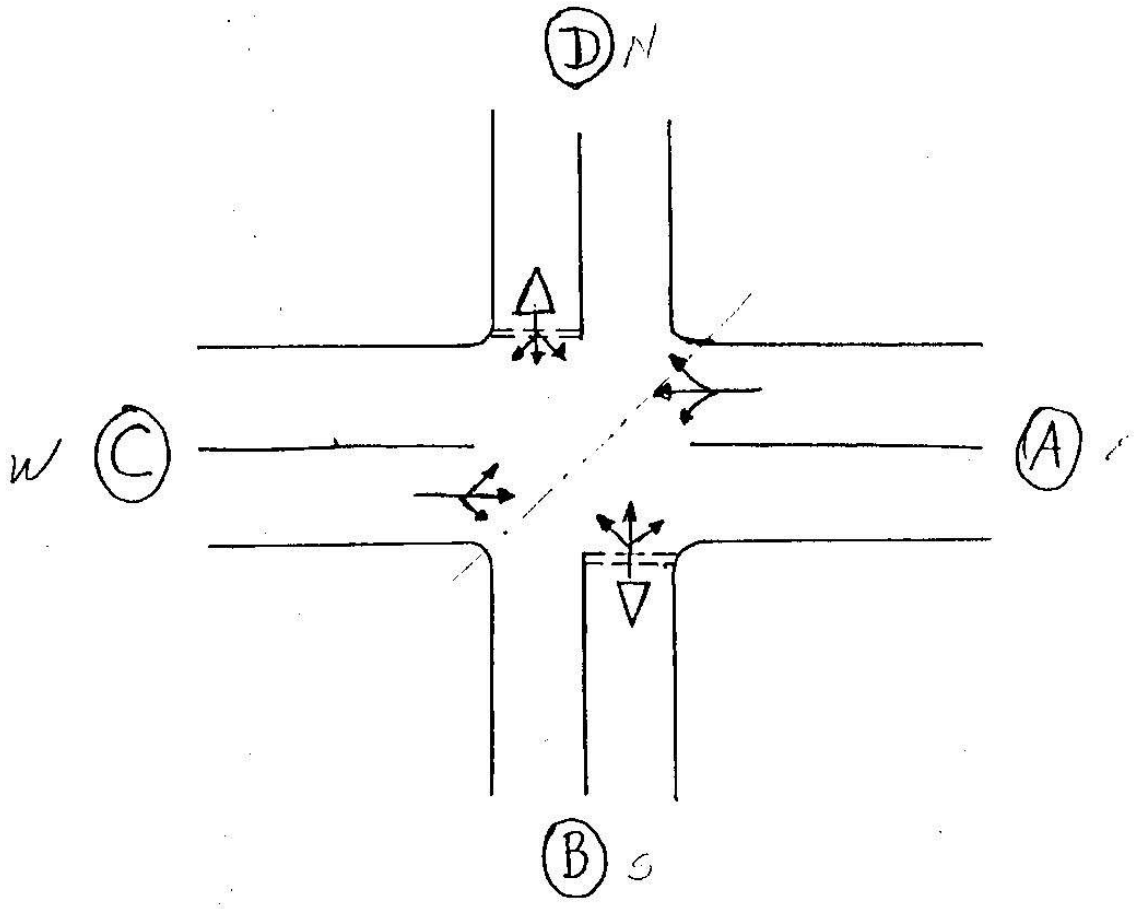
b) Parámetros para intersección en T.



Movim.	x_1	x_2	Q_o	α_{A-B}	α_{A-C}	α_{C-A}	α_{C-B}
B - A	0,0009	0,0	796	0	0	0,364	0,167
B - C	0,0009	0,0006	661	0,559	0,259	0,364	0,167
A - B	0,0009	0,0	745	0	0	0,364	0,364

c) Parámetros para intersección en cruz.

Suponiendo ambas calles de doble sentido, hay 8 movimientos secundarios : B - A, B - C, B - D, A - B, D - A, D - B, D - C y C - D. Pero hay simetría, por lo que basta indicar la expresión para los 4 primeros.

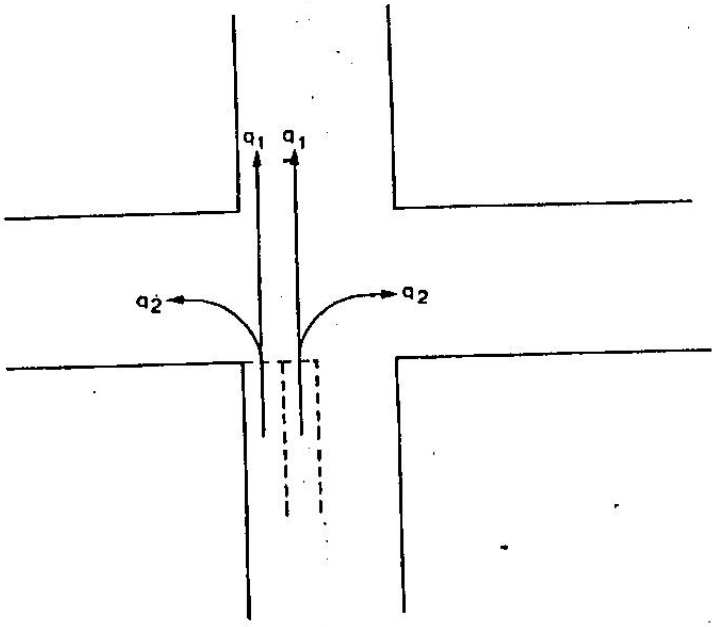


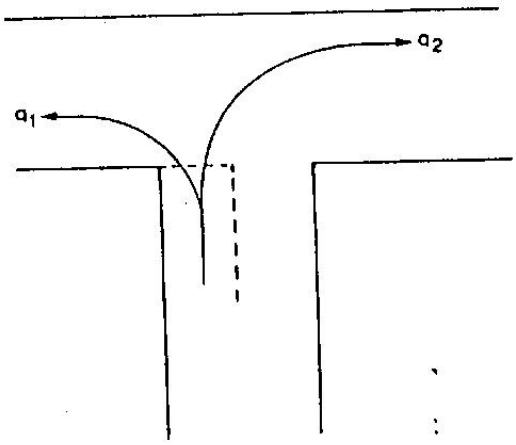
Mov.	X_1	X_2	Q_0	α_{A-C}	α_{A-B}	α_{A-D}	α_{C-A}	α_{C-B}	α_{C-D}	α_{D-A}
B-A	0,0009	0	796	0	0	0	0,364	0,167	0	0
B-D	0,0009	0,0006	723	0,259	0,559	0,259	0,364	0,167	0,364	0
B-C	0,0009	0,0006	661	0,259	0,559	0	0,364	0,167	0,364	0,182
A-B	0,0009	0	745	0	0	0	0,364	0,364	0,260	0

6.8.23 Where one lane is shared by a stream of traffic wishing to make one of two movements illustrated in Figure 6.8.10, capacity of the shared lane can be found from an equation of the form

$$\frac{q_1+q_2}{\mu_{combined}} = \frac{q_1}{\mu_1} + \frac{q_2}{\mu_2}$$

Where q_1 and q_2 are the flows and μ_1 and μ_2 the capacities of the individual movements and $\mu_{combined}$ is the capacity of the shared lane. When calculating μ_1 and μ_2 the same value of lane width is used (see paragraph 6.8.27).

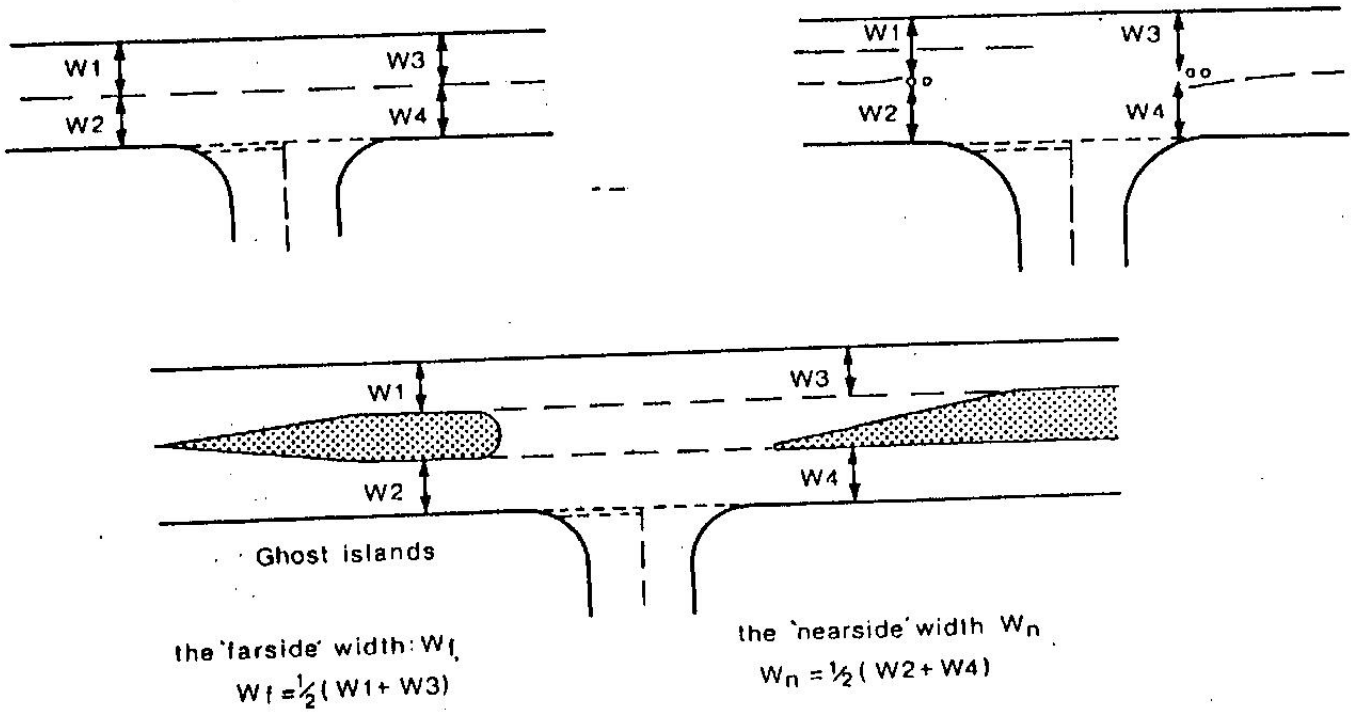




6.8.24 The measurement of the geometric features used in the geometric term, X, of the capacity formulae are illustrated in the following figures:

6.8.25 Major road width, W

The four parts of Figure 6.8.11 show the main components of major road width.



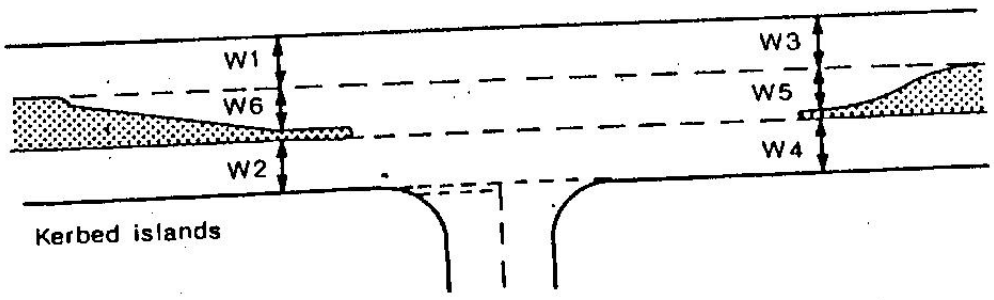


FIG. 6.8.11 MAJOR ROAD WIDTH

6.8.26 Lane width for non-priority streams, w

Where there are clear lane markings the width is measured directly. The average of measurements taken at 5m intervals over a distance of 20m upstream from the give-way point is used. Any measurement exceeding 5m is reduced to 5m before the average is taken. Where lane markings are unclear (or absent), measurements are taken as illustrated in Figure 6.8.12 and the lane width calculated according to:

$$w = (a + b + c + d + e)/5$$

6.8.27 Where the width of minor road is insufficient to accommodate separate lanes for left and right turning vehicles, measurements a to e are made across the shared lane from the kerbline to the centre line of the minor road.

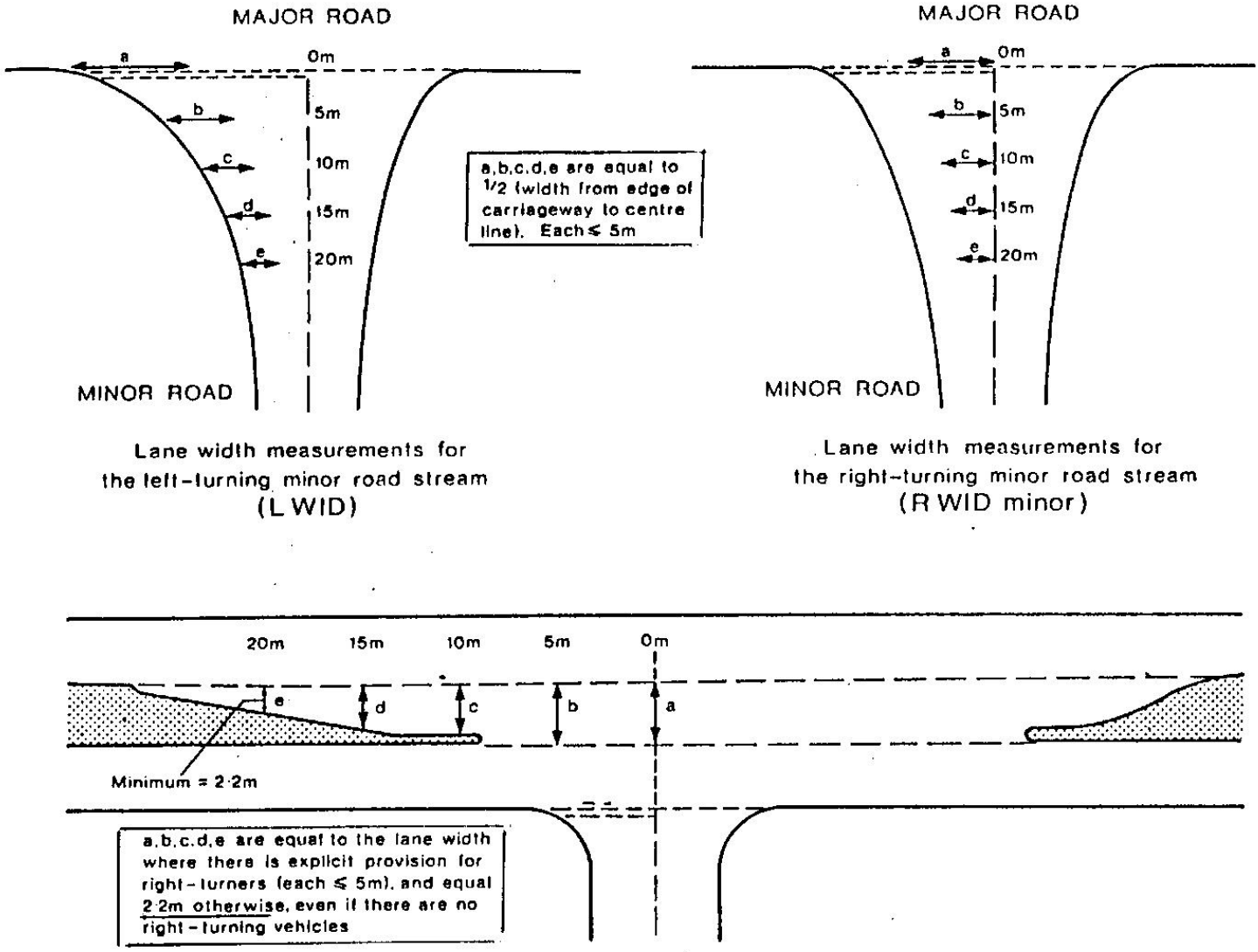
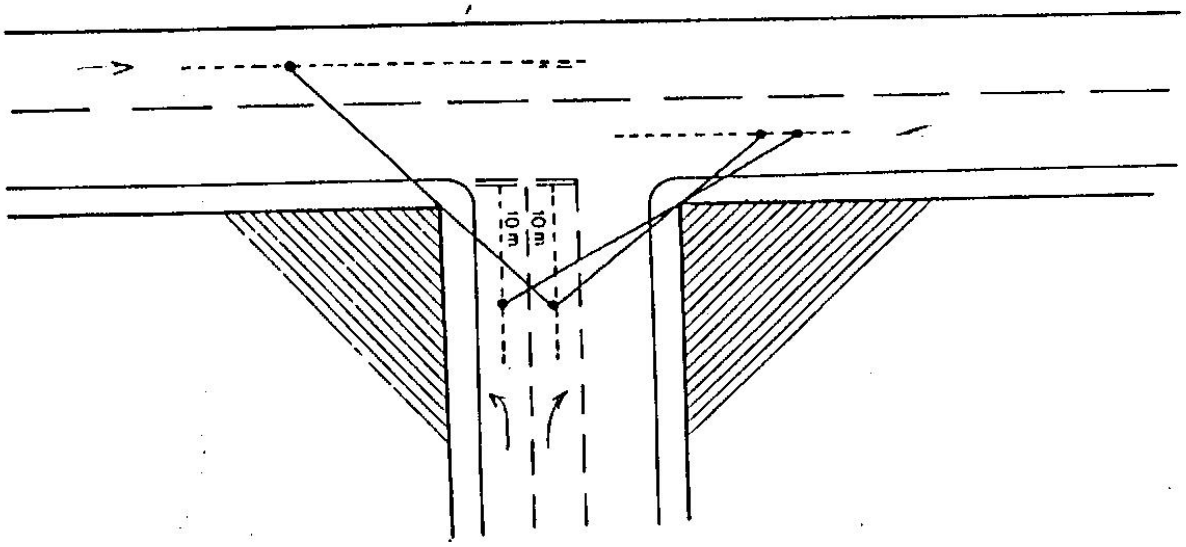


FIGURE 6.8.12 LANE WIDTH FOR NON-PRIORITY STREAMS

6.8.28 Visibility distances for the minor road streams, Vl and Vr minor

These are measured from points 10m back from the give-way line on lines bisecting each lane. Visibility to the left Vl is measured from the offside lane to a line bisecting the far major road carriageway. Visibility to the right, Vr, is an average of the measurements made from each lane to a line bisecting the near major road carriageway. See Figure 6.8.13. All measurements are made at a height of 1.05m above the carriageway surface. The user should note that Departmental Advice Note TA20/84 measures visibility from a point only 9m back from the give-way line. If this information is available for a junction it may be used.



Measurement of visibility distances (V_L and V_R)

FIGURE 6.8.13 MEASUREMENT OF VISIBILITY DISTANCES

6.8.29 Visibility distance for the major road right-turning stream, Vr major

One visibility measurement is made, from the mid-point of the right-turning lane, or the position assumed by vehicles waiting to turn right, towards the oncoming major road traffic, at a height of 1.05m.