PERIODICA POLYTECHNICA SER. CIVIL ENG. VOL. 36, NO. 1, PP. 17-35 (1992)

PROCESS FOR THE DETERMINATION OF THE CAPACITY AND SERVICE LEVEL OF A COMPLEX JUNCTION DIRECTED BY TRAFFIC SIGNS

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Received: December 5, 1991

Abstract

The process determines the number of the vehicles waiting in the minor direction, their average delay and the service level for a complex junction directed by traffic signs. The basic volume of the traffic to be transmitted from the subordinate direction can be read from the diagram (curve) originating in the survey results.

This basic volume should be corrected by correction factors depending on the speed; on the number of the main road lanes; on the way of traffic control and on the hindrance. The number of the waiting vehicles as well as the average delay suffered by the vehicles moving in the minor direction. The process is also appropriate to define the lane number necessary on the waiting section in the minor direction and their arrangement. Also a computer program was prepared for the execution of the computing.

Keywords: traffic junction capacity, traffic service level.

Introduction

The manner of the determination of the capacity of complex junctions directed by traffic signs in Hungary is foreseen by branch standard 'Public Road Design.' The essence of the process there published is as follows:

- the magnitude of the limit time interval necessary to the execution of the intended motion of vehicles arriving from the minor direction are to be sought out from a table, after which
- the number of the vehicles transmissible from the minor direction can be read from a graph in function of the selected limit time interval and of the traffic favoured by priority.

This process includes numerous simplifications. That is why it seemed necessary to develop this method. Related to this problem group, Mr. István Fi with a Dutch co-author published a paper within the frames of the Department Highway.

Symbols applied:

F, V/h	:	privileged traffic (priority traffic)
f, pcu/h	:	traffic of the controlled (minor) direction
f_m, pcu/h	:	modified traffic of the controlled direction
c_a, pcu/h	:	basic volume of the traffic transmissible from the controlled direction
c_m, pcu/h	:	modified value of the traffic transmissible from the controlled direction
$c'_{m'}$	:	modified value of the traffic transmissible at the control of the waiting length
N	:	average number of waiting vehicles
N_m	:	competent number of waiting vehicles
b_i	:	Factor in consideration of the 85% occurrence probability
L, m	:	necessary length of the waiting section
t_v, s	:	average delay
C_R, pcu/h	:	capacity reserve

1. Conditions for the Method's Application

The calculation can be applied when the following conditions are fulfilled:

- The complex junction be situated on the outskirts;
- The traffic be directed by traffic signs as 'Yield' or 'Stop!';
- The complex junction be of narrow or stretched type.

The method does not make any difference between crossings or junctions.

The definition of the number of vehicles transmissible from the minor direction is conditioned by the fact that the traffic of the vehicles travelling on the priority road (main road) should not be disturbed by the vehicles arriving from the minor road. Vehicles turning left from the main road are obliged to give way to the traffic coming from the opposite direction of the main road (passing straight on, or turning right). At the same time, way must be given

- to all vehicles passing on the main road, those entering the complex junction from the minor road
- further according to the right-hand rule, to the traffic coming from the opposite direction of the byroad (passing straight on or turning right by the vehicle turning left from the byroad).

2. Operations to be Executed during the Calculation

The operations to be executed are as follows:

- Definition of the layout arrangement of the examined traffic junction
- Definition of the traffic technical arrangement;
- For those turning left from the main road, definition of the traffic to be given priority;
- For each of the bydirectional traffic flows, definition of the traffic to be given priority;
- Definition of the number of vehicles transmissible from each minor direction, in function of the priority traffic; (Determination of the basic value, followed by the necessary corrections);
- Definition of the competent number of the waiting vehicles, of the necessary waiting length and of the average delay for each minor direction;
- Definition of the capacity reserve and of the service level for each minor direction.
- Summarizing and evaluation of the results.

3. Layout and Traffic Technical Arrangement

First of all,

- the way of the traffic control;
- the number of the traffic lanes and their use by lanes (the use of each lane);
- the length of the waiting sections should be determined.

These are the initial data for the calculation. Must be further known

- the slope conditions;
- the bend radii;
- the junction angles;
- the visibility distances.

The number of the vehicles transmissible from the minor direction must be corrected depending on the above data and related to the basic situation. The speed of the vehicles passing on the main road is influenced by the layout arrangement, too. This effect must be taken into consideration by the correction of the vehicle number transmissible from the minor direction.

Inasmuch there are parallel motions in the minor direction, the same limit time interval can be utilized at the same time by those passing in parallel direction.

By means of a close guidance of the traffic lanes, the intersection points can be stretched. This is characteristic of the stretched traffic junctions. In such cases, the calculation should be made for each sub-junction separately. It must be constantly controlled, if setting-up section of appropriate length between the sub-junctions is at disposal.

4. Traffic

Traffic transmissible within an hour is the steady base of the calculations.

For the examination of each minor motion, the priority traffic (both in the main direction and in the bydirection) should be always considered in vehicle/hour, while the subordinate, transmissible traffic (both in the main direction and in the bydirection) always in pcu/hour. The different kinds of vehicles should be reduced to pc units according to *Table 1*.

Table 1
Passenger Car Equivalent for minor direction of complex junctions by traffic signs

Kind of vehicle	Equivalent (E-factor)
Passenger cars	1.0
Small- and medium-weight trucks	1.4
Heavy trucks	1.8
All vehicles*	1.1

*Is the composition of the vehicles unknown, this value can be recommended as approximation

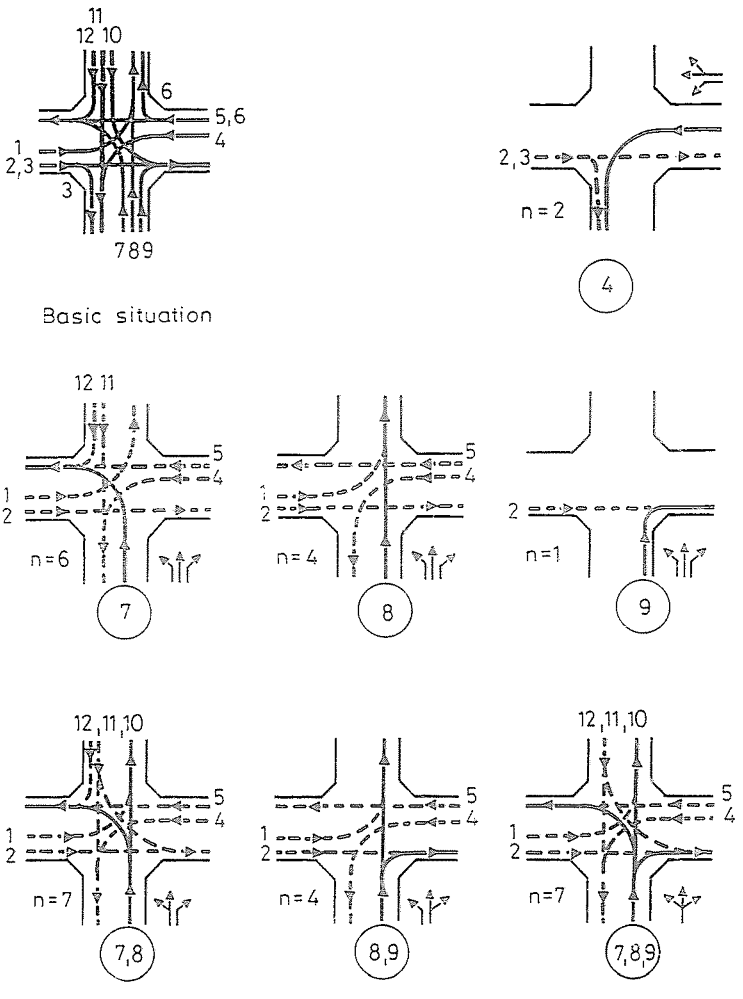
Correction factors to be considered for the slope conditions

Kind of vehicle	Slope conditions			
	-4%	-2%	+2%	+4%
Passenger cars	0.80	0.90	1.20	1.40
Small and medium-weight trucks	0.64	0.79	1.36	2.00
Heavy-weight trucks	0.61	0.78	1.50	3.00
All vehicles summarized	0.82	0.91	1.27	1.55

(Interpolation between values is permitted)

Is the junction situated on a slope, the equivalents valid for the horizontal should be multiplied by correction factors considering the slope conditions for reduction to vehicle unit.

Definition of the priority traffic is shown by *Fig. 1*.



a)

Fig. 1a. Crossing

5. Basic Value of the Traffic Transmissible from the Controlled Direction and its Correction

The basic value c_a (pcu/hour) of the traffic transmissible from the controlled direction in function of the priority traffic F (vehicle/hour) is shown by *Fig. 2.* (The dotted section of the curve emerges from extrapolation and not from measurement results.) The figure is valid if:

1. The average speed on the main road is 60 km/h;

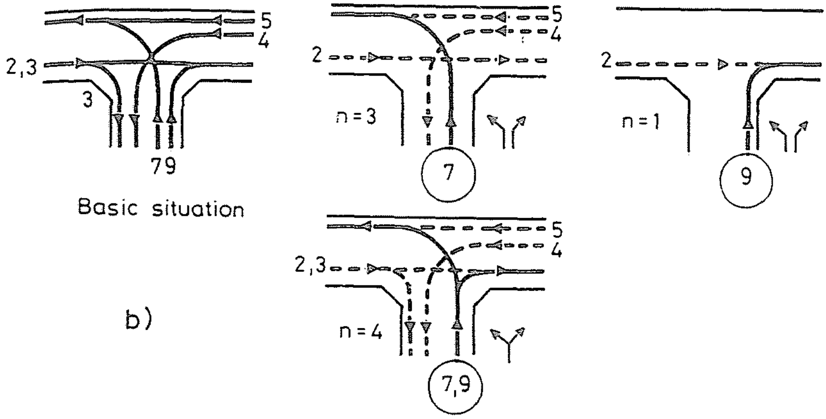


Fig. 1b. Junction

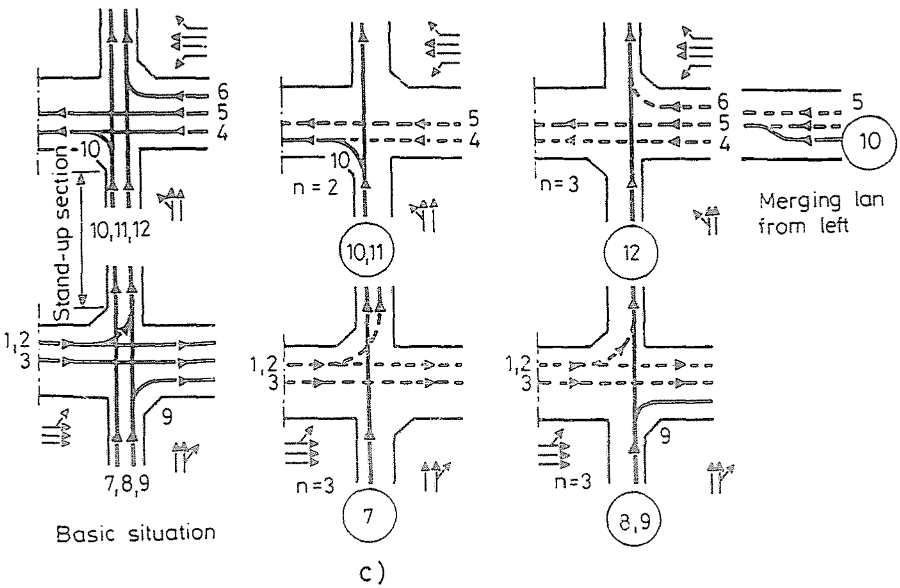


Fig. 1c. Stretched type complex junction

2. The number of the traffic lanes on the main road is two;
3. The traffic is directed by the traffic sign 'Yield';
4. The vehicles obliged to give way are passenger cars;
5. The motion is crossing;
6. The junction is horizontally situated;

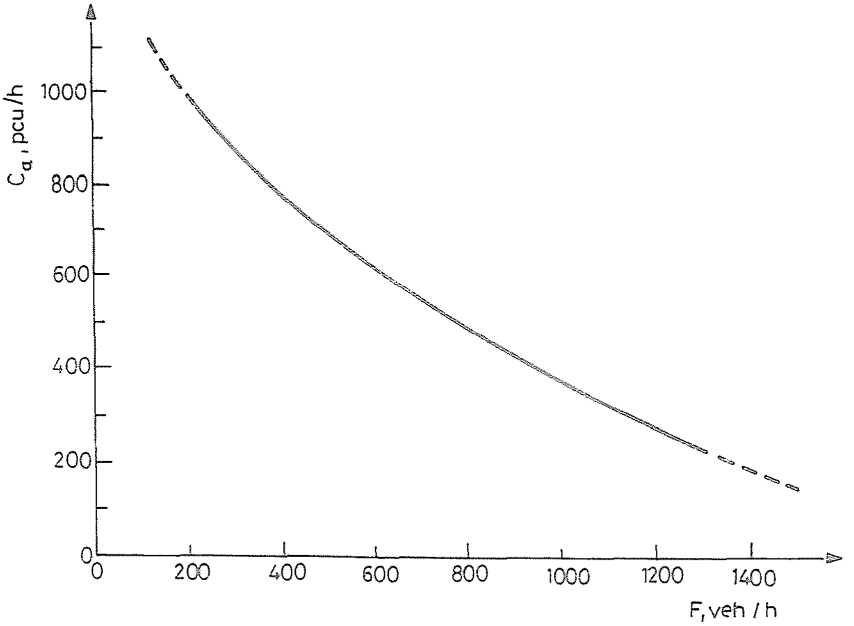


Fig. 2. Basic value c_a of the traffic transmissible from the minor direction in function of priority traffic 'F'

7. The visibility distance is appropriate;
8. The priority traffic consists of one single stream.

Deviation from the above enumerated validity conditions (except paras 4 and 6) are taken into consideration by modification of the basic value (by correction factors), resulting in c_m (modified).

The correction factors are shown by *Table 2.* If it is necessary to apply — according to the actual situation — several correction factors at the same time, these should be multiplied.

Table 2

Factors modifying the basic value in consideration of the actual conditions

	Speed on the main road (km/h)			
	50	60	70	80
Correction factor	1.08	1.00	0.92	0.85

	Lane number on the main road	
	2 lanes	2x2 lanes*
Correction factor	1.00	0.85

*Valid only for the half cross-section (for two one-way traffic lanes)

	Mode of the traffic direction	
	Yield!	Stop!
Correction factor	1.00	0.85

	Kind of the motion						
	Turning left from the main road	From the minor road					
		Turning right			Crossing	Turning left	
		With accele-rating lane	Without accele-rating lane $R > 15$ m $\alpha > 60°$	Without accele-rating lane $R < 15$ m $\alpha < 60°$		With junction lane	Without junction lane
Correction factor	1.15	1.40	1.30	1.15	1.00	(0.50)	0.90

	Visibility	
	Appropriate	Reduced
Correction factor	1.00	0.75

	Obstruction 'n' number of priority traffic streams*						
	1	2	3	4	5	6	7
Correction factor	1.00	1.00	0.90	0.81	0.73	0.66	0.59

*'n' should be stated on the base of *Fig. 1*.

If it is possible to pass from any waiting lane in the minor direction towards not only one, but two or even three directions, the most unfavourable correction factor valid without restriction should be applied for this reduced kind of motion.

It should be remarked relating to the correction factors:

ad 1. In case of high speed on the main road, c_m modified is less than in case of a lower speed.

ad 2. In case of 2×2 traffic lane cross-section-arrangement, main roads c_m modified is less at the intersection of one of the directions (2 lanes) than in case of two-lane roads. For roads having 2×2 traffic lanes, the calculation can be made only for junction types, where the 2×2 lanes are not intersected at the same time.

ad 3. In case of the application of the traffic sign 'Stop!', every vehicle is starting from a stationary position. That is why c_m modified would be less than in case of a traffic sign 'Yield!' This correction factor need not be applied for the determination of the number of vehicles turning left from the main direction.

ad 4. If the vehicle subordinated is not a passenger car, the reduction to vehicle unit is shown by *Table 1.* It is obvious, by how much E is less on a slope than on a rise. Multiplicator E must be applied only for the traffic of subordinate motions.

ad 5. The subordinate motions in different directions utilize the intervals disponible in the priority traffic differently. That is why there is a difference in c_m modified related to the crossing.

The correction factor considering the kind of motion in case of turning right from the byroad also depends on the layout arrangement. Where an acceleration lane (junction lane) exists, c_m modified is more than in lack of it. The acceleration lane (junction lane) can be applied in this case only when two lanes are going parallel towards one direction. When the cornering radius or the junction angle is adequate, c_m modified will be more than in case of their inadequacy.

In case of turning left from the bydirection — when there is a junction lane on the main road next to the lane passing straight on, – the junction motion should be calculated separately, and only that one traffic stream should be considered as 'F' into which the bydirection traffic is joining. (See *Fig. 1/c* 'Junction lane from left').

ad 6. The slope conditions should be considered by the correction of multiplicator 'E' (See *Table 1.*)

ad 7. The inadequate visibility diminishes c_m modified.

ad 8. Is priority traffic 'F' put together of several traffic streams, in case of a traffic disposing of the same priority c_m modified would be less than if 'F' consisted of only one traffic stream.

It is assumed namely for the determination of c_m modified that every interval would be utilized by the minor direction vehicle in order to put through its intended motion in the priority traffic. Is nevertheless 'F' put together of several streams, the drivers of the controlled vehicles watch simultaneously more streams, consequently, the full utilization would not be possible. Let us call this phenomenon obstruction. In this case 'F' is put together of two kinds of streams, especially

- of those having priority on every other vehicle. These are the vehicles passing straight on along the main road, as well as the vehicles turning right.
- of those priority streams that have been already obliged to yield priority to other streams. Such are all traffic streams turning left from the main road and entering the junction coming from the byroad.

If these streams are included in the priority traffic, basic value c_a should be reduced by the correction factor to be found in *Table 2.* The definition of '*F*' is shown by *Fig. 1.* This figure shows the priority streams and their *n* number belonging to each minority traffic stream in the case of crossing, junction and stretched type junction.

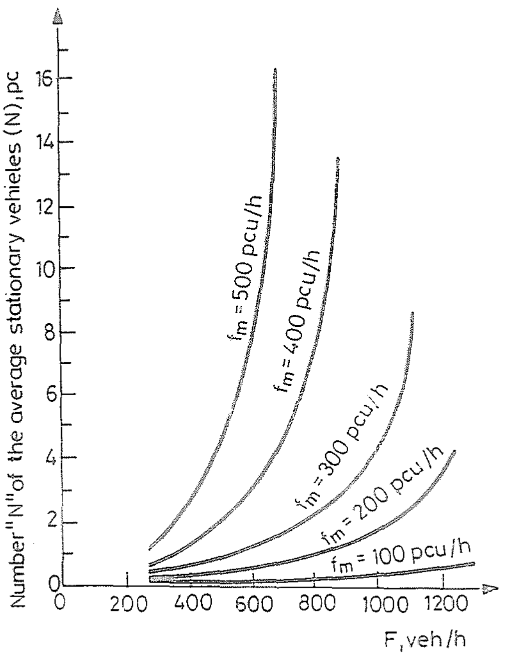


Fig. 3. Number '*N*' of the average stationary vehicles in function of the traffic '*F*' in the main direction and of traffic 'f_m' in the minor direction (See Note 4 in Chapter 7)

6. Number of Stationary Vehicles

The competent stationary vehicle number N_m (pc) can be defined as follows:

- The average number of stationary vehicles 'N(pc)' can be stated from *Fig. 3*, with a one-figure accuracy,
- Followed by the multiplication of this value by factor b shown by *Table 3*

$$N_m = N \cdot b$$

Table 3
Values of factor 'b' in function of traffic 'F' in the main direction and of traffic 'f_m' in the minor direction. (See Note 4 in chapter 7)

f_m	F [vehicle/hour]										
[pcu/h]	300*	400	500	600	700	800	900	1000	1100	1200	1300**
0–100	3.1	3.0	2.9	2.8	2.8	2.8	2.8	2.8	2.8	2.6	2.4
100–200	3.0	2.9	2.8	2.7	2.7	2.7	2.7	2.6	2.6	2.4	
200–300	2.9	2.8	2.7	2.6	2.6	2.6	2.5	2.5	2.4		
300–400	2.8	2.7	2.6	2.5	2.5	2.5	2.5	2.4			
400–500	2.7	2.6	2.5	2.4	2.4	2.4	2.4				

*If $0 < F < 300$, factor 'b' is identical with that associated with value $F = 300$

**If $F > 1300$, factor 'b' is 2.4

7. Length of the Waiting Section

The necessary $L(m)$ length of the waiting section is the sixfold of the competent stationary vehicle number

$$L = N_m \cdot 6\,(\mathrm{m})\,.$$

This length must be rounded up to the integer multiple of the 6 m basic length.

Note:

1. The average number of stationary vehicles 'N(pc)' is specified in function of the 'F' (vehicle/hour) traffic of the main direction and the f_m (pcu/hour) of the byroad. Between the curves f_m = 100, 200, 300, 400

and 500 shown by *Table 3*, the appropriate f_m value should be stated by interpolation. (If $f_m > 500$, the order of the traffic direction ought to be re-examined.)

2. Factor b shown by *Table 3* allows for the fact that in 85% of all cases the number of the stationary vehicles is less.
3. A passenger car needs a 6 m long waiting length.
4. Traffic f_m shown by *Table 3* and by *Fig. 3* can be stated out of the competent 'f' traffic in the subordinate direction as follows:

$$f_m = f \cdot \frac{c_a \text{ basic value}}{c_m \text{ modified}} .$$

Factor (c_a basic value/c_m modified) is considering the actual conditions.

'L' need not be calculated when

- $t_v < 10$ s (see Chapter 9) and when
- C_R is negative (see Chapter 10).

8. Control of the Dimension of Stretching in Case of Stretched Complex Junctions

In case of stretched complex junctions it is necessary to control the adequacy of the stretching for the waiting length can be namely competent for stating the number of the vehicles transmissible from the minor direction. During the control

- N_m(pc) disponible stationary vehicle number should be stated as follows

$$N_m = \frac{L}{6} .$$

- Further should be stated the average number of the stationary vehicles N(pc):

$$N = \frac{N_m}{b} ,$$

  where $b = 2.5$.
- Afterwards the f_m traffic in the minor direction can be read on *Fig. 3* in function of N(pc) and of the respective F (vehicle/hour).
- Number c_m' of transmissible vehicles will be the multiplication of f_m with the correction factors (see *Table 2*).

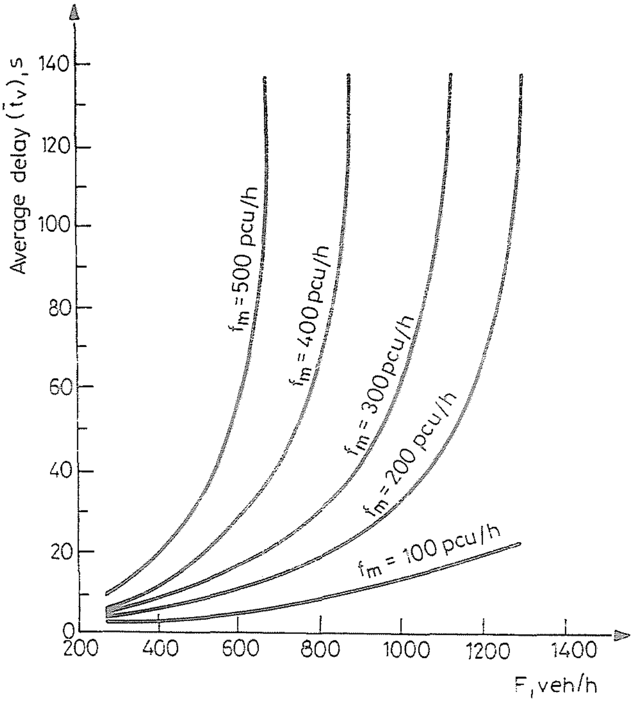


Fig. 4. Average time loss 't_v/s' in function of traffic 'F' in the main direction and of traffic f_m in the minor direction

9. Average Delay

It will be determined upon base of *Fig. 4*, where t_v(s) average delay can be read in function of traffic F (vehicle/hour) in the main direction and of traffic f_m (pcu/hour) in the bydirection.

Between the curves, f_m value should be stated by interpolation. (Is $f_m > 500$, the order of traffic direction ought to be reexamined.)

- Traffic f_m indicated in *Table 4* can be stated from competent traffic 'f' in the subordinate direction as follows:

$$f_m = f \cdot \frac{c_a \text{ basic value}}{c_m \text{ modified}} .$$

Factor c_a basic value/c_m modified takes the actual conditions into consideration.

- Is $t_v < 10$ s, L need not be calculated.
- Is C_R negative (see Chapter 10), t_v need not be calculated.

Table 4
Service level in function of the average delay suffered by the vehicles in the minor direction

Average delay by vehicle '$\bar{t}_v$'(s)	Service level
$\bar{t}_v < 10$	A
$10 < \bar{t}_v < 30$	B
$30 < \bar{t}_v < 50$	C
$50 < \bar{t}_v < 70$	D
$70 < \bar{t}_v < 90$	E
$90 < \bar{t}_v$	F

10. Capacity Reserve

It should be determined for each controlled traffic stream separately. When multidirectional minor motion starting from one waiting lane is permitted, it should be handled as one stream. Capacity reserve C_R is the difference of c_m modified number of transmissible vehicles and of transmissible traffic 'f'

$$C_R = c_m \text{ modified} - f .$$

The dimension of all data in the relation is

$$\text{pcu/hour} .$$

Is C_R negative, L and t_v need not be calculated. In this case namely L is constantly increasing and there is no value for t_v.

11. Service Level

This should be specified for every controlled traffic stream in function of the average delay. *Table 4* is specifying the service level in function of average delay t_v(s) suffered by vehicles in the minor direction. As delay depends on traffic 'F' in the main direction and on traffic 'f_m' in the bydirection, this relation is also shown by *Fig. 5*.
Note:

Traffic f_m shown by *Fig. 5* can be stated upon base of competent traffic 'f' in the minor direction as follows:

$$f_m = f \cdot \frac{c_a \text{ basic value}}{c_m \text{ modified}} .$$

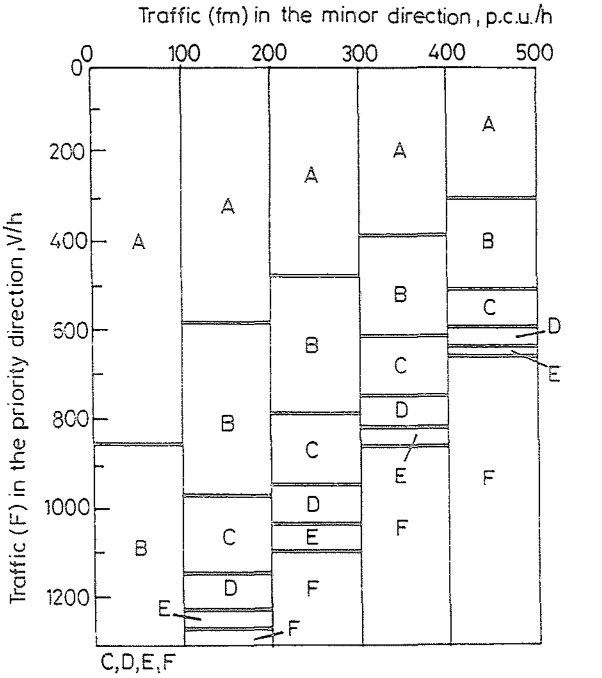


Fig. 5. Service level in function of 'F' and 'f_m'

Factor c_a basic value/c_m modified takes the actual conditions into consideration.

12. Utilization of the Process for Dimensioning

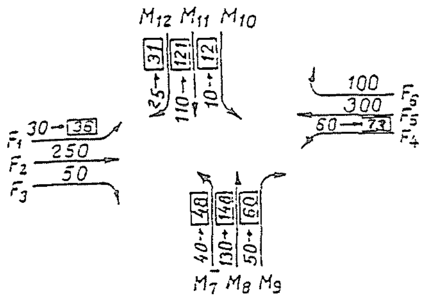
The process can be utilized actually for dimensioning, too. The process is staging the arrangement of the bay of the minor road line. Capacity reserve and service level will first be calculated supposing a separate waiting lane for each passing direction, then, assuming for both motion directions one waiting lane, finally placing all three motion directions in one waiting lane. One can select the most appropriate capacity reserve from the three kinds of variations.

13. Demonstration of the Calculation

Calculations performed for the case of crossing are shown by *Table 5.*

Table 5

Capacity calculation for crossing. Arrangement and competent data



— $v_{\text{main road}} = 60$ km/h
— Traffic direction: STOP
— Visibility is adequate
— Main road with two lanes
— There is no accelerating lane for turning right, $R > 15$ m $\alpha = 90°$

Symbol explanation:

Kind and traffic 'f' of motion*	M_9 50 → 60	M_{12} 25 → 31	F_4 60 → 73	F_1 30 → 36
F	F_2 250	F_5 300	$F_2 + F_3$ $250 + 50 = 300$	$F_5 + F_6$ $300 + 100 = 400$
c_a basic value	930	870	870	770
c_m modified	$0.85 \cdot 1.30 \cdot 930 = 1028$	$0.85 \cdot 1.30 \cdot 870 = 961$	$1.15 \cdot 870 = 1000$	$1.15 \cdot 770 = 886$
Capacity reserve C_R	$1028 - 60 = 968$	$961 - 31 = 930$	$1000 - 73 = 927$	$886 - 36 = 850$
$\frac{c_a \text{ basic}}{c_m \text{ modified}} \cdot f$	$\frac{930}{1028} \cdot 60 = 54$	$\frac{870}{961} \cdot 31 = 28$	$\frac{870}{1000} \cdot 73 = 64$	$\frac{770}{886} \cdot 36 = 31$
N	—	—	—	—
b	—	—	—	—
$L = 6 \cdot N \cdot b$(m)	—	—	—	—
Average delay (s)	< 10	< 10	< 10	< 10
Service level	A	A	A	A

*Each minor motion on a separate lane

Notes:

- For the arrangement
  - in the main direction the actual lane number should be specified;

Table 5
(continued)

Kind and traffic 'f' of motion*	130 → 148 M_8	M_{11} 110 → 121	40 → 48 M_7	M_{10} 10 → 12
F	$F_1+F_2+F_4$ $+F_5=30+250$ $+60+300=640$	$F_1+F_2+F_4$ $+F_5=30+250$ $+60+300=640$	$F_1+F_2+F_4$ $+F_5+M_{11}+M_{12}$ $=30+250+60$ $+300+110+25$ $=775$	$F_1+F_2+F_4$ $+F_5+M_8+M_9$ $=30+250+60$ $+300+130+50$ $=820$
c_a basic value	580	580	510	480
c_m modified	$0.85 \cdot 0.73 \cdot 580$ $= 360$	$0.85 \cdot 0.73 \cdot 580$ $= 360$	$0.85 \cdot 0.9 \cdot 0.66$ $\cdot 510 = 257$	$0.85 \cdot 0.9 \cdot 0.66$ $\cdot 480 = 242$
Capacity reserve C_R	$360-148=212$	$360-121=239$	$257-48= 209$	$242-12=230$
$\frac{c_a \text{ basic}}{c_m \text{ modified}} \cdot f$	$\frac{580}{360} \cdot 148=238$	$\frac{580}{360} \cdot 121=195$	$\frac{510}{257} \cdot 48=95$	$\frac{480}{242} \cdot 12=24$
N	1.0	0.8	0.3	—
b	2.6	2.7	2.8	—
$L = 6 \cdot N \cdot b$ (m)	(16) — 18	(10) — 12	(5) — 6	—
Average delay (s)	17	14	8	< 10
Service level	B	B	A	A

*Each minor motion on a separate lane

- in the minor direction a separate lane should be drawn up for each motion;
- Traffic should be specified
  - only in vehicle/h for vehicles passing straight on along the main direction and for those turning right,
  - both in vehicle/h and pcu/h for every other kind of motion.

  Reduction in pcu/h should be performed upon base of *Table 1*.
- All data allowing selection of the correction factors are to be found in *Table 2* except the 'kind of motion'. The correction factor 'kind of motion' should be looked for at the preparation of the c_m modified line of the table containing the calculation.

Table 5
(continued)

Kind and traffic 'f' of motion**	130 → [148]; 50 → [60]; $M_8+M_9=$ 190 → [208]	$M_{11}+M_{12}=135$ → [152]; 25 → [31]; 110 → [121]	[43]; 40; [148] ← 130; 50 → [60]; $M_7+M_8+M_9=$ 200 → [256]	25; [31]; $M_{10}+M_{11}+M_{12}$ 145 → [164]; [12] ← 10; [121] ← 110
F	$F_1+F_2+F_4$ $+F_5=30+250$ $+60+300=640$	$F_1+F_2+F_4$ $+F_5=30+250$ $+60+300=640$	$F_1+F_2+F_4$ $+F_5+M_{10}+M_{11}$ $+M_{12}=30+250$ $+60+300+10$ $+110+25=785$	$F_1+F_2+F_4$ $+F_5+M_7+M_8$ $+M_9=30+250$ $+60+300+40$ $+130+50=860$
c_a basic value	580	580	500	460
c_m modified	$0.85\cdot 0.73\cdot 580$ $=360$	$0.85\cdot 0.73\cdot 580$ $=360$	$0.85\cdot 0.9\cdot 0.59$ $\cdot 550=226$	$0.85\cdot 0.9\cdot 0.59$ $\cdot 460=208$
Capacity reserve C_R	$360-208=152$	$360-152=208$	$226-256=-30$	$208-164=44$
$\frac{c_a \text{ basic}}{c_m \text{ modified}}\cdot f$	$\frac{580}{360}\cdot 208=335$	$\frac{580}{360}\cdot 152=245$	$\frac{500}{226}\cdot 256=566$	$\frac{460}{208}\cdot 164=362$
N	2.3	1.1	increasing	6.3
b	2.5	2.6	—	2.5
$L=6\cdot N\cdot b$ (m)	(35) — 36	(17) — 18	—	(95) — 96
Average delay (s)	24	17	—	63
Service level	C	B	F	F

**In case of contractions

- The 'kind of motion' and its 'f' traffic contains the minor direction to be examined. The traffic should be specified both in vehicle/hour and pcu/hour (framed). The calculation should be also performed for the cases
  'each of the minor motions on a separate lane' and 'contractions'.
- The priority traffic 'F' (vehicle/hour) has been defined in *Table 1*.
- The basic value of c_a can be read off *Fig. 2*.
- For c_m modified the correction factors should be looked for in *Table 2*. Also the correction factor considering the kind of motion should be applied here. The correction factor 'modalities of traffic direction' need not be applied for vehicles turning left from the main road. For a

contracted kind of motion, the most unfavourable correction factor valid without contraction should be applied.

- Capacity reserve C_R (pcu/h) is to be calculated upon base of relation

$$C_R = c_m - f(\text{ E/h}).$$

Every value has a pcu/h dimension.

- When determining 'N', 'b', 't_v' and the service level, traffic c_m has to be calculated out of the competent 'f' traffic of the subordinate direction as follows:

$$f_m = \frac{c_a \text{ basic value}}{c_m \text{ modified}}.$$

- 'N' has to be determined out of *Fig. 3*.
- 'b' has to be determined out of *Table 3*.
- When calculating 'L' the length obtained should be rounded up to the integer multiple of the 6 m basic length.
- The average delay t_v should be determined out of *Table 4*.
- The service level should be determined out of *Fig. 5*.
- Is the capacity reserve too large ($t_v < 10$ s, the service level 'A') then 'L' need not be calculated.
- Is the capacity reserve negative ($f > c_m$ modified, service level: F), then N is constantly increasing and L and t_v need not be calculated.

Computer Program

The computer program is elaborating the algorithm made known above. The result schedules agree with the construction of *Table 5*.

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