REVISED ON 3/03

TC-5.01

CURVE WIDENING TABLES

SU DESIGN VEHICLE

COMPONENT	SIZE
OVERALL WIDTH (u)	8.0 ft
WHEELBASE (L)	20 ft
FRONT OVERHANG (A)	4 ft

LATERAL CLEARANCE

LANE WIDTH	CLEARANCE (C)
9 ft	1.5 ft
10 ft	2 ft
11 ft	2.5 ft
12 ft	3 ft
16 ft	5 ft

ADJUSTMENT FACTORS

NUMBER OF LANES ROTATED n_1	ADJUSTMENT FACTOR (b_w)
1	1.00
1.5	0.8333
2	0.75
2.5	0.70
3	0.6667
3.5	0.6425

RELATIVE GRADIENTS

DESIGN SPEED V_D MPH	MAXIMUM RELATIVE GRADIENT (rg)	MIN. TRANSITION LENGTH IN FEET RURAL CONDITIONS WITH PAVEMENT WIDENING AND REVERSE CURVES FOR ALL CONDITIONS	
		URBAN	RURAL
20	0.74	100	60
25	0.70	100	80
30	0.66	100	100
35	0.62	120	120
40	0.58	120	120
45	0.54	140	140
50	0.50	160	160
55	0.47	180	180
60	0.45	180	180
65	0.43	200	200
70	0.40	220	220

DEFINITIONS

A - FRONT OVERHANG OF DESIGN VEHICLE FROM APPROPRIATE TABLE.

bw - ADJUSTMENT FACTOR FROM TABLE.

C - LATERAL CLEARANCE OF DESIGN VEHICLE FROM APPROPRIATE TABLE.

E - SUPERELEVATION RATE FROM APPROPRIATE TABLE.

F_A - CALCULATED WIDTH OF OVERHANG FOR DESIGN VEHICLE.

L - WHEELBASE OF DESIGN VEHICLE FROM APPROPRIATE TABLE.

LS - LENGTH OF SPIRAL OR SUPERELEVATION TRANSITION LENGTH.

M - MULTIPLE LANE FACTOR.

N - NUMBER OF LANES.

n_1 - NUMBER OF LANES ROTATED (FROM TABLES).

Pw - PAVEMENT WIDTH.

R - RADIUS OF CURVE.

rg - RELATIVE GRADIENT FROM APPROPRIATE TABLE.

U - CALCULATED TRACK WIDTH OF DESIGN VEHICLE.

u - TRACK WIDTH OF DESIGN VEHICLE FROM APPROPRIATE TABLE.

V_D - DESIGN VELOCITY.

w - CALCULATED WIDENING.

W - PAVEMENT WIDTH

W_C - CALCULATED TOTAL CURVE WIDTH.

W_n - WIDTH OF LANE.

Z - CALCULATED EXTRA WIDTH ALLOWANCE.

GENERAL DESIGN CONSIDERATIONS

1. WHERE PAVEMENT WIDENING IS REQUIRED, THE APPROPRIATE WIDENING IS ADDED TO THE LANE WIDTH WHEN CALCULATING THE TRANSITION LENGTH (LS).
2. THE COMPUTED TRANSITION LENGTH (LS) IS ROUNDED UP TO THE NEAREST FOOT.
3. WHEN THE TRANSITION LENGTH (LS) IS CALCULATED, IT MUST BE COMPARED WITH THE MINIMUM VALUE LISTED IN THE APPROPRIATE COLUMN ON THE RELATIVE GRADIENT TABLE.
4. CROWN RUNOFF IS ALWAYS ACHIEVED OUTSIDE OF THE TRANSITION.
5. NO PAVEMENT WIDENING IS REQUIRED FOR URBAN ROADWAYS.
6. NO PAVEMENT WIDENING IS REQUIRED FOR RURAL ROADWAYS WITH A CURVE RADIUS GREATER THAN 2865 FEET.
7. NO PAVEMENT WIDENING IS REQUIRED FOR RURAL ROADWAYS WITH 12 FOOT WIDE LANES AND A CURVE RADIUS GREATER THAN 881 FEET.
8. PAVEMENT WIDENING IS APPLIED ONLY WHEN CALCULATED WIDENING (w) IS EQUAL TO OR GREATER THAN 2 FEET.
9. WHEN CALCULATING WIDENING (w) FOR MULTI-LANE RURAL ROADWAYS, WIDENING IS FIRST CALCULATED USING THE SINGLE LANE WIDTH FOR "W".
10. AN ALTERNATE METHOD FOR MULTI-LANE UNDIVIDED PAVEMENTS (48'). THE LS IS 1.5 TIMES (M=1.5) THE CORRESPONDING LENGTH FOR TWO LANE HIGHWAYS; AND FOR SIX LANE UNDIVIDED PAVEMENTS (72'), THE LS IS TWO TIMES (M=2) THE CORRESPONDING LENGTH FOR TWO LANE HIGHWAYS.
11. CALCULATED WIDENING IS ROUNDED UP TO THE NEAREST 0.1 FOOT.

FORMULAS USED TO CALCULATE TRANSITION LENGTH (LS) AND WIDENING (w)

NO WIDENING REQUIRED

$LS = b_w(W_n E/rg)$

$LS = M(WE/rg)$ (ALT. MULTI-LANE)

WIDENING REQUIRED

$LS = b_w[E\ n_1(W_n + w/N)/rg]$

$LS = m[E(W + w/N)/rg]$ (ALT. MULTI-LANE)

$$U = u + R - \sqrt{R^2 - L^2}$$

$$F_A = \sqrt{R^2 + A(2L + A)} - R$$

$$Z = (V_D/\sqrt{R})$$

$$W_C = N(U + C) + F_A + Z$$

$$w = W_C - 2W_n$$

FOR SOLVED PROBLEMS USING THIS METHODOLOGY, SEE THE EXAMPLES ON PAGE 802.23

METHODOLOGIES FOR CALCULATING TC-5.01 VALUES