TC-5

CURVE WIDENING TABLES

SU DESIGN VEHICLE

COMPONENT	SIZE
OVERALL WIDTH (u)	8.5 ft
WHEELBASE (L)	20 ft
FRONT OVERHANG (A)	4 ft

LATERAL CLEARANCE

LANE WIDTH	CLEARANCE (C)
8 ft	1 ft
9 ft	1.5 ft
10 ft	2 ft
11 ft	2.5 ft
12 ft	3 ft
16 ft	5 ft

IGRDS HA.TBL TABLES

EFFECTIVE WIDTHS

NUMBER OF LANES	EFFECTIVE WIDTHS (W)						EFFECTIVE WIDTH FACTOR (f)
	8 ft LANES	9 ft LANES	10 ft LANES	11 ft LANES	12 ft LANES	16 ft LANES	
1	8.0	9.0	10.0	11.0	12.0	16.0	1
1.5	9.6	10.8	12.0	13.2	14.4	19.2	1.2
2	12.0	13.5	15.0	16.5	18.0	24.0	1.5
3	16.0	18.0	20.0	22.0	24.0	32.0	2
4	32.0	36.0	40.0	44.0	48.0	64.0	4
5	40.0	45.0	50.0	55.0	60.0	80.0	5
6	48.0	54.0	60.0	66.0	72.0	96.0	6
7	56.0	63.0	70.0	77.0	84.0	112.0	7
8	64.0	72.0	80.0	88.0	96.0	128.0	8

RELATIVE GRADIENTS

DESIGN SPEED V_D MPH	RELATIVE GRADIENT (rg)		MIN. TRANSITION LENGTH IN FEET 2 SECOND RULE	
	UP TO 3 LANES	4 OR MORE LANES	URBAN	RURAL
20	0.75	1.14	100	60
25	0.71	1.07	100	80
30	0.67	1.00	100	100
35	0.63	0.93	120	120
40	0.58	0.86	120	120
45	0.54	0.81	140	140
50	0.50	0.75	160	160
55	0.47	0.69	180	180
60	0.45	0.67	180	180
65	0.41	0.62	200	200
70	0.40	0.60	220	220

DEFINITIONS

A - FRONT OVERHANG OF DESIGN VEHICLE FROM APPROPRIATE TABLE.

C - LATERAL CLEARANCE OF DESIGN VEHICLE FROM APPROPRIATE TABLE.

E - SUPERELEVATION RATE IN DECIMAL FROM APPROPRIATE TABLE OR CALCULATED PER AASHTO METHOD 5.

F_A - CALCULATED WIDTH OF OVERHANG FOR DESIGN VEHICLE.

L - WHEELBASE OF DESIGN VEHICLE FROM APPROPRIATE TABLE.

U - CALCULATED TRACK WIDTH OF DESIGN VEHICLE.

Lr - LENGTH OF SPIRAL OR SUPERELEVATION RUNOFF SECTION.

Lt - LENGTH OF TANGENT RUNOUT SECTION.

M - MULTIPLE LANE (2 +) FACTOR.

N - NUMBER OF LANES.

Pw - PAVEMENT WIDTH.

R - RADIUS OF CURVE.

rg - RELATIVE GRADIENT FROM APPROPRIATE TABLE.

u - TRACK WIDTH OF DESIGN VEHICLE FROM APPROPRIATE TABLE.

V_D - DESIGN VELOCITY.

w - CALCULATED WIDENING.

W - EFFECTIVE WIDTH FROM APPROPRIATE TABLE.

W_C - CALCULATED TOTAL CURVE WIDTH.

W_n - WITDH 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 SUPERELEVATION RUNOFF SECTION (Lr).
2. THE COMPUTED TRANSITION LENGTH (Lr) IS ROUNDED UP TO THE NEAREST TWENTY FOOT INCREMENT. COMPUTED LENGTHS THAT FALL ON THE TWENTY FOOT INCREMENT ARE NOT ROUNDED.
3. WHEN THE SUPERELEVATION RUNOFF SECTION (Lr) IS CALCULATED, IT MUST BE COMPARED WITH THE MINIMUM VALUE LISTED IN THE APPROPRIATE COLUMN ON THE RELATIVE GRADIENT TABLE.
4. TANGENT RUNOUT SECTION (Lt) 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" AND THE ANSWER (w) IS THEN MUTIPLIED BY THE MULTIPLE LANE FACTOR (M). FOR FOUR LANE UNDIVIDED PAVEMENTS (48'), THE Lr IS 1.5 TIMES (M=1.5) THE CORRESPONDING LENGTH FOR TWO LANE HIGHWAYS; AND FOR SIX LANE UNDIVIDED PAVEMENTS (72'), THE Lr IS TWO TIMES (M=2) THE CORRESPONDING LENGTH FOR TWO LANE HIGHWAYS.
10. CALCULATED WIDENING IS ROUNDED UP TO THE NEAREST 0.1 FOOT.

FORMULAS USED TO CALCULATE TRANSITION LENGTH (Lr) AND WIDENING (W)

$Lr = (100WE)/rg$ (NO WIDENING REQUIRED)

$Lr = [100(W + w/2)E]/rg$ (WIDENING REQUIRED)

$Lr = M[100(Pw/N + w/N)E]/rg$ (MULTI-LANE WIDENING REQUIRED)

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

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

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

$$W_C = N(U + C) + F + Z_A$$

$$w = W_C - 2W_n$$

FOR SOLVED PROBLEMS USING THIS METHODOLOGY, SEE THE EXAMPLES ON PAGE 801.19.

METHODOLOGIES FOR CALCULATING TC-5 VALUES