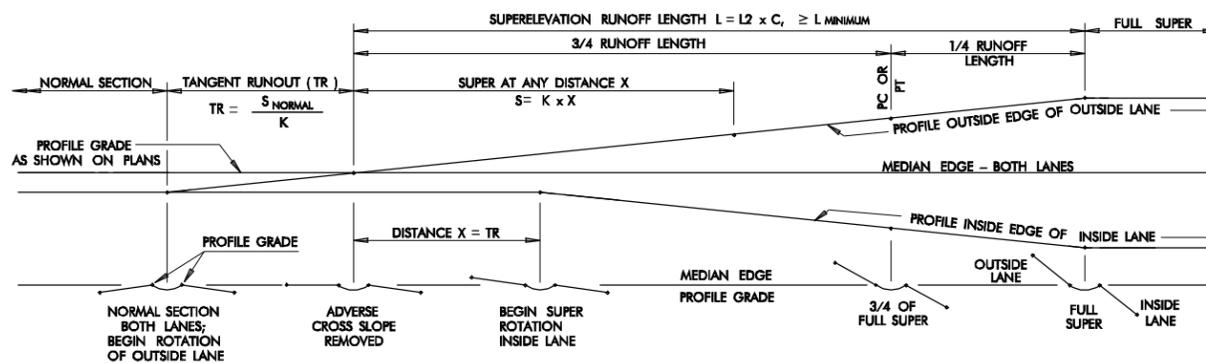
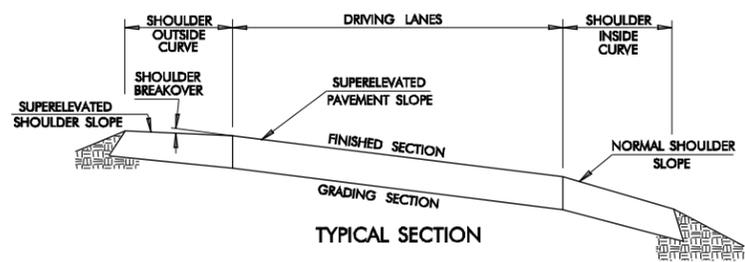


CROWNED PAVEMENT REVOLVED ABOUT CENTERLINE (UNDIVIDED HIGHWAY)



SUPERELEVATION OF TRAVELWAY REVOLVED ABOUT EDGE (DIVIDED HIGHWAY, MEDIAN < 12 METERS)



SHOULDER TREATMENT THROUGH SUPERELEVATED CURVE

SHOULDER BREAKOVER SHALL NOT EXCEED 7.0%, CALCULATED AS ALGEBRAIC DIFFERENCE IN CROSS SLOPE OF PAVEMENT AND SHOULDER SURFACES. ROTATE OUTSIDE SHOULDER TO MAINTAIN DESIRABLE BREAKOVER.
 INSIDE SHOULDER REMAINS AT NORMAL CROSS SLOPE UNTIL PAVEMENT SUPER ELEVATED, THEN IS SUPERELEVATED AT SAME SLOPE AS PAVEMENT.
 CONTINUOUS OUTSIDE SHOULDER CROSS SLOPE SHOULD BE ≥ 1%, TO INSURE PROPER DRAINAGE.

MAXIMUM SUPERELEVATION RATE GUIDELINES
 (SEE CHAPTER 6 ODOT ROADWAY DESIGN MANUAL OR "A POLICY ON GEOMETRIC DESIGN OF HIGHWAYS AND STREETS", AASHTO 1994)

- e_{max} = 4.0% LOW SPEED URBAN STREETS WHERE ROADSIDE DEVELOPMENT PRECLUDES A HIGHER SUPERELEVATION RATE; IN RECOGNITION OF SAFETY CONSIDERATIONS, USE ONLY WHEN APPROVED BY THE ENGINEER
- e_{max} = 6.0% ELEVATED OR INTERMITTENTLY ELEVATED ROADWAYS (I.E. BRIDGES, BOXES), ROADWAYS WITH FREQUENT SLOW-MOVING VEHICLES, URBAN STREETS WHERE ROADSIDE DEVELOPMENT PRECLUDES HIGHER SUPERELEVATION RATE
- e_{max} = 8.0% DEPRESSED OR GROUND-LEVEL ROADWAYS; ROADWAYS ON STEEP OR LONG DOWNGRADES; ROADWAYS WHERE DRAINAGE CONSIDERATIONS ARE PRIMARY
- e_{max} = 10.0% LOW VOLUME GRAVEL-SURFACED ROADS

SUPERELEVATION NOMENCLATURE

- S = SUPERELEVATION RATE (CROSS SLOPE) OF ROADWAY, (PERCENT)
- S_{NORMAL} = SUPERELEVATION RATE (CROSS SLOPE) OF ROADWAY IN A NORMAL CROWN SECTION, (PERCENT)
- S_{FULL} = FULL SUPERELEVATION RATE ATTAINED IN HORIZONTAL CURVE, (PERCENT)
- K = TRANSITION RATE, S / L_{FULL}
- X = LINEAR DISTANCE ALONG SUPERELEVATION RUNOFF LENGTH MEASURED FROM S=0 TOWARD S=S_{FULL}, (PERCENT)
- G = CHANGE IN GRADE, (PERCENT)
- L_{MINIMUM} = MINIMUM SUPERELEVATION RUNOFF LENGTH REGARDLESS OF THE CALCULATED LENGTH L₂, (METERS)
- L = SUPERELEVATION RUNOFF LENGTH (METERS); THE DISTANCE NEEDED TO ACCOMPLISH THE CHANGE IN CROSS SLOPE FROM A SECTION WITH ADVERSE CROWN (CROSS SLOPE) REMOVED TO A FULLY SUPERELEVATED SECTION, OR VICE VERSA
- L₂ = RUNOFF LENGTH FOR TWO LANE ROADWAY, (METERS)
- C = RATIO OF RUNOFF LENGTH FOR MULTILANE ROADWAY TO RUNOFF LENGTH FOR TWO LANE ROADWAY
- W = PAVEMENT WIDTH, FROM PROFILE GRADE POINT TO FAR EDGE OF PAVEMENT, (METERS)
- RS = RELATIVE SLOPE: SLOPE OF THE OUTSIDE TRAVELWAY PROFILE GRADE LINE, RELATIVE TO THE PROFILE GRADE LINE AS SHOWN ON THE PLANS, ACROSS ONE TRAVEL LANE OF PAVEMENT
- TR = TANGENT RUNOUT (METERS); LENGTH NEEDED TO ACCOMPLISH THE CHANGE IN CROSS SLOPE FROM A NORMAL SECTION WITH ADVERSE CROSS SLOPE REMOVED, OR VICE VERSA

SUPERELEVATION RUNOFF LENGTH FOR MULTILANE ROADWAYS

L = L ₂ x C, L ≥ MINIMUM		
TOTAL NO. OF LANES	C	
	PREFERRED	MINIMUM
2	1.0	1.0
3	1.5	1.2
4	2.0	1.5
5	2.5	1.8
6	3.0	2.0
7	3.5	2.3
8	4.0	2.5

NOTE: FOR DIVIDED HIGHWAY WITH WIDE MEDIAN (≥ 12 METERS), TREAT EACH DIRECTION AS SEPARATE ROADWAY.

SUPERELEVATION RUNOFF LENGTH FOR RAMPS & ROADWAYS WITH WIDE MEDIANS (≥ 12 METERS)

L = $\frac{S_{FULL} \times W \times 100}{G}$, ≥ L _{MINIMUM}		
DESIGN SPEED V (km/h)	MAXIMUM RELATIVE SLOPE	MAX GRADE DIFFERENCE G _{MAX} (%) (G _{MAX} = RS x 100)
30	1:131	0.76
40	1:141	0.71
50	1:152	0.66
60	1:167	0.60
70	1:182	0.55
80	1:200	0.50
90	1:218	0.46
100	1:233	0.43
110	1:250	0.40
120	1:263	0.38

GENERAL NOTES

- ALL CONSTRUCTION METHODS SHALL BE IN ACCORDANCE WITH 1999 METRIC STANDARD SPECIFICATIONS.
- THIS STANDARD DRAWING PROVIDES BASIC GUIDELINES FOR SUPERELEVATION DEVELOPMENT FOR OPEN ROADWAY CONDITIONS ONLY. FOR SUPERELEVATION DESIGN CRITERIA, INCLUDING: SUPERELEVATION OF LOW SPEED URBAN STREETS; TURNING ROADWAYS AND INTERSECTION CURVES; SUPERELEVATION RATE TABLES WHERE e_{max} = 4.0% AND e_{max} = 10.0%; CONSULT THE 1994 AASHTO "A POLICY ON GEOMETRIC DESIGN OF HIGHWAYS AND STREETS" AND THE ODOT ROADWAY DESIGN MANUAL.
- FOR CURVES WITH SPIRALS, RUNOFF LENGTH IS EQUAL TO SPIRAL LENGTH, WITH FULL SUPERELEVATION REACHED AT S.C. OR C.S. OF CURVE.
- ALL GRADE BREAKS IN SUPERELEVATION TRANSITION SECTIONS SHALL BE ROUNDED TO OBTAIN SMOOTH EDGE OF PAVEMENT PROFILES SUBJECT TO APPROVAL OF THE ENGINEER. SUGGESTED MINIMUM ROUNDING DISTANCES:

DESIGN SPEED (km/h)	30	40	50	60	70	80	90	100	110	120
ROUNDING DISTANCE (m)	6	8	9	11	13	15	17	19	21	23

CHECK RAMP GRADES AND SUPERELEVATION TRANSITIONS AT RAMP TERMINALS DURING STAKING AND MAKE ADJUSTMENTS AS REQUIRED TO OBTAIN SMOOTH PROFILES FOR BOTH EDGES OF THE RAMP PAVEMENT. CROSSOVER CROWN LINE BREAKOVER SHALL NOT EXCEED 5.0% (CALCULATED AS THE ALGEBRAIC DIFFERENCE IN CROSS SLOPES OF ADJACENT PAVEMENTS), WITHOUT THE APPROVAL OF ODOT ENGINEER.

APPROVED BY ROADWAY ENGINEER	DATE
OKLAHOMA DEPT. OF TRANSPORTATION DIVISION STANDARD (METRIC)	
SUPERELEVATION	
1999 SPECIFICATIONS	SUEL1-2 OOM
ALL DIMENSIONS ON THIS SHEET IN MILLIMETERS UNLESS OTHERWISE NOTED.	
	R-114AM