7-05 SUPERELEVATION AND CROSS SLOPE FOR INTERCHANGE RAMPS

Table 7-2 provides a suggested range of superelevation rates for various interchange ramp radii. Desirably, 6% superelevation should be used on all interchange ramps with radii of 430 ft. or less. For interchange ramps with radii greater than 430 ft., the use of the higher rate shown in the Table is preferred. Ramp alignment which precludes the attainment of superelevation without a reasonable transition distance should be avoided.

Table 7-2
Interchange Ramp Superelevation

Design Speed (mph)	Radius (feet)								
	150	230	310	430	600	1000	1500	2000	3000
25	4 - 6	3 - 6	3 - 6	3 - 5	2 - 4	2 - 3	2	2	2
30	---	6	5 - 6	4 - 6	3 - 5	3 - 4	2 - 3	2	2
35	---	---	---	6	5 - 6	4 - 5	3 - 4	2 - 3	2
40	---	---	---	---	---	5 - 6	4 - 5	3 - 4	2 - 3

Exceptions to the use of the full superelevation are at street intersections where a stop or reduced speed condition is in effect and, under some conditions, at ramp junctions. Edge of pavement profiles should be drawn at ramp junctions to assure a smooth transition.

The cross slope on tangent sections of ramps are normally sloped one-way at two percent, see Figure 5J.

The length of superelevation transition should be based on section 4-03.2.2. With respect to the beginning and ending of a curve on the ramp proper (not including terminals), see Table 4-4 for the portion of the runoff located prior to the curve. This may be altered as required to adjust for flat spots or unsightly sags and humps when alignment is tight. The principal criteria is the development of smooth-edge profiles that do not appear distorted to the driver.

See Section 7-06.2, "Ramp Terminals", for a discussion on development of superelevation at free-flow ramp terminals and the maximum algebraic difference in cross slope at crossover line.

desirable maximum difference at a crossover line is 4 to 5 percent.

Table 7-3

Maximum Differences in Cross Slope Rates at the Crossover Crown Line

Design Speed of Exit or Entrance Curve (mph)	Maximum Algebric Difference in Cross Slope at Crossover Line (Percent)
15 and 20	5 – 8
25 and 30	5 – 6
35 and over	4 – 5

7-06.3 Distance Between Successive Exits

At interchanges there are frequently two or more ramp terminals in close proximity along the through lanes. In some interchange designs, ramps split into two separate ramps or combine into one ramp. Guidelines for minimum distances between successive ramp terminals are shown in Figure 7-I.

7-06.4 Auxiliary Lane Lengths

The minimum length of acceleration and deceleration lanes on Freeways and Interstate highways are shown in Figures 7-C (with reference to Figure 6-O) and 7-D. The auxiliary lane lengths shown in Figure 6-N are applicable to land service highways. The lengths should be increased when the upgrade exceeds 3 percent on acceleration lanes and on deceleration lanes when the downgrade exceeds 3 percent. The publication *A Policy on Geometric Design of Highways and Streets*, AASHTO, 2001, lists the ratio of length of auxiliary lane on grade to length on level.

7-06.5 Curbs

Curbs should not be used on ramps except at the ramp connection with the local street to provide for the protection of pedestrians, for channelization and to provide continuity of construction at the local facility.

7-07 ADDITIONAL LANES

In order to ensure satisfactory operating conditions, additional lanes may be added to the basic width of traveled way.

Where an entrance ramp of one interchange is closely followed by an exit ramp of another interchange, the acceleration and deceleration lanes may be joined. This should be the general practice where the weaving distance is less than 2000 ft. Where interchanges are more widely spaced and ramp volumes are high, the need for an additional lane between the interchanges should be determined by an across-freeway-lane volume check. This check should include consideration of freeway grade and volume of trucks.

7-08 LANE REDUCTION

Lane reduction below the basic number of lanes is not permissible through an interchange. Where the reduction in traffic volumes is sufficient to warrant a decrease in the basic number of lanes, a preferred location for the lane drop is beyond the influence of an interchange and preferably at least one half mile from the nearest exit or entrance. It is desirable to locate lane drops on tangent alignment with a straight or sag profile so that there is maximum visibility to the pavement markings in the merge area.

7-09 ROUTE CONTINUITY

Route continuity refers to the provision of a directional path along and throughout the length of a designated route. The designation pertains to a route number or a name of a major highway.

Ideall y, the driver continuing on the designated route should travel smoothly and naturally in his lane without being confronted with points of decision. This means the chosen through lane(s) should neither terminate nor exit. It is desirable, therefore, that each exit from the designated route or entrance to the designated route be on the right, i.e., vehicular operation on the through route occurs on the left of all other traffic.

7-10 WEAVING SECTIONS

Weaving is created by vehicles entering and leaving the highway at common points, resulting in vehicle paths crossing each other. Weaving normally occurs within an interchange or between closely spaced interchanges.

Desirably on cloverleaf interchanges the distance between loop ramp terminals should not exceed 800 – 1000 ft. Where the weaving volumes require separations greater than the desirable, consideration should be given to providing a collector distributor road.

The *Highway Capacity Manual*, Transportation Research Board, 2000, should be consulted for further information on weaving.