

CIVL 6970 Geometric Design Notes

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Contents

1 Horizontal Curves

2 Vertical Curves

2.1 Terms

1. Centerline - ?
2. Tangents -
3. Vertical curves -
4. a profile view - ?
5. grade - + or - ratio, n feet in elevation per 100 feet distance

2.2 Goals

1. constraints of maximum grade and minimum lengths of VCs
2. conform to the existing terrain
3. balance earthwork
4. avoid placing the start of a horizontal curve at the bottom of a steep grade (due to high speed!)
5. ideally, vertical curves should be located within horizontal curves or on horizontal tangents

2.3 maximum grades - AASHTO Green book 2011

Road Type	Maximum Grade (%)
Freeways (based on design speed and terrain)	3% to 6%
Freeways (70 mi/h design speed, level terrain)	3%
Interstate System (regardless of terrain)	4%
Interstate System (with exception)	Up to 5% downgrades

Road Type	Design Speed	Maximum Grade (%)
Arterials	60 mi/h or greater (level)	3%
Arterials	40 mi/h (mountainous)	Up to 8%
Collectors	70 mi/h (level)	4%
Collectors	20 mi/h (mountainous)	Up to 14%
Local Roads and Streets	-	Up to 17% (mountainous terrain)

2.4 Minimum grades - AASHTO Green book 2011

Urban design - min grade is 0.5%, but 0.3% may be used

2.5 view profile

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