

HCM 2010: TWO-LANE HIGHWAYS



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OUTLINE

- ◆ Background
- ◆ Characteristics of two-lane highways
- ◆ Classification of two-lane highways
 - ◆ Classes I, II, III
- ◆ Methodology
- ◆ Input data
- ◆ LOS criteria

BACKGROUND

- ◆ One lane per direction of travel
- ◆ Passing maneuvers
 - ◆ Occur in the opposing travel lane
 - ◆ Limited by the availability of gaps in the opposing traffic stream and sufficient sight distance
- ◆ As demand flows, geometric restrictions increase, opportunities to pass decrease
- ◆ Passing capacity decreases as passing demand increases
 - ◆ Thus, operating quality often decreases precipitously as demand flow increases, even at relatively low v/c ratios
 - ◆ Few two-lane highways operate at flow rates approaching capacity

CHARACTERISTICS OF TWO-LANE HIGHWAYS

- ◆ Serve a variety of functions
 - ◆ Efficient mobility – consistent high speed operations and infrequent passing delays
 - ◆ Accessibility – to remote or sparsely populated areas
 - ◆ Scenic and recreational – enjoy environment without traffic interruptions/delays
 - ◆ Small towns and communities – maintain speed close to posted speed limits
- ◆ Given the diverse functions
 - ◆ Analysis methodology must be flexible to incorporate driver expectations depending on the function
 - ◆ Divided into three classes for analysis

CLASSIFICATION OF TWO-LANE HIGHWAYS

- ◆ Three classes based on functions
 - ◆ First two address rural two-lane highways
 - ◆ Class I: motorists expect to travel at high speeds
 - Major intercity routes, primary connectors of major traffic generators, daily commuter routes
 - ◆ Class II: access routes to class I facilities
 - Scenic or recreational routes, or passing through rugged terrain, usually serve relatively short trips
 - ◆ Class III: serve moderately developed areas
 - Often have reduced speed limits reflecting higher activity level

CLASS I HIGHWAYS



(a) Examples of Class I Two-Lane Highways

CLASS II HIGHWAYS



(b) Examples of Class II Two-Lane Highways

CLASS III HIGHWAYS



(c) Examples of Class III Two-Lane Highways

METHODOLOGY

1. Input data
2. Estimate free-flow speed
3. Demand adjustment for average travel speed (ATS)
4. Estimate ATS
5. Demand adjustment for percent time-spent following (PTSF)
6. Estimate PTSF (Classes I and II)
7. Estimate percent of free-flow speed (PFFS) (for Class III)
8. Determine LOS and Capacity

INPUT DATA

Required Data	Recommended Default Value	Relevant Modes
<i>Geometric Data</i>		
Highway class	Must select as appropriate	Auto
Lane width	12 ft	Auto, bicycle
Shoulder width	6 ft	Auto, bicycle
Access-point density (one side)	Classes I and II: 8/mi, Class III: 16/mi	Auto
Terrain	Level or rolling	Auto
Percent no-passing zone ^a	Level: 20%, rolling: 40%, more extreme: 80%	Auto
Speed limit	Speed limit	Bicycle
Base design speed	Speed limit + 10 mi/h	Auto
Length of passing lane (if present)	Must be site-specific	Auto
Pavement condition	4 on FHWA 5-point rating scale (good)	Bicycle
<i>Demand Data</i>		
Hourly automobile volume	Must be site-specific	Auto, bicycle
Length of analysis period	15 min (0.25 h)	Auto, bicycle
Peak hour factor	0.88	Auto, bicycle
Directional split	60/40	Auto, bicycle
Heavy vehicle percentage ^b	6% trucks	Auto, bicycle
Percent occupied on-highway parking	0%	Bicycle

Notes: ^a Percent no-passing zone may be different in each direction.

LOS CRITERIA

LOS	<u>Class I Highways</u>		<u>Class II Highways</u>	<u>Class III Highways</u>
	ATS (mi/h)	PTSF (%)	PTSF (%)	PFFS (%)
A	>55	≤35	≤40	>91.7
B	>50–55	>35–50	>40–55	>83.3–91.7
C	>45–50	>50–65	>55–70	>75.0–83.3
D	>40–45	>65–80	>70–85	>66.7–75.0
E	≤40	>80	>85	≤66.7