

HCS7 Freeway Merge Text Report

FREEWAY MERGE ANALYSIS

File Name: Merge1.xuf  
 Analyst: Jason Nelson  
 Agency: CDOT  
 Jurisdiction:  
 Date: 6/08/2020  
 Analysis Year: 2020  
 Time Period Analyzed: 6AM to 7AM  
 Project Description: US 285 & CR 43A  
 Units: U.S. Customary

LOS and Performance Measures

Density in On-Ramp (Merge) Influence Area, DR	6.1	pc/mi/ln
Level of Service, LOS	A	
Average Flow in Outer Lanes, vOA	-	pc/mi/ln
Average Speed in Ramp Influence Area, SR	64.4	mi/h
Average Speed in Outer Lanes of Freeway, SO	-	mi/h
Average Speed for On-Ramp (Merge) Junction, S	64.4	mi/h
Density Across All Lanes, D	8.8	pc/mi/ln

Step 1: Specify Inputs and Convert Demand Volumes to Demand Flow Rates

Freeway Data		
Number of Freeway Lanes	2	ln
Freeway Free-Flow Speed, FFS	75.4	mi/h
Segment Length	1500	ft
Multilane Highway or C-D Roadway?	Highway/CD Roadway	
Demand Volume, V	560	veh/h
Peak Hour Factor, PHF	0.94	

Ramp Data		
Number of Ramp Lanes	1	ln
Ramp Free-Flow Speed, SFR	35.0	mi/h
Ramp Side	Right	
Length of First Acceleration Lane, LA or LA1	1300	ft
Length of Second Acceleration Lane, LA2	-	ft

Junction Components	Freeway	Ramp	
Demand Volume, V	560	370	veh/h
Peak Hour Factor, PHF	0.94	0.94	
Percent Total Trucks	11.00	2.00	%
Percent SUTs	-	-	%
Percent TTs	-	-	%
Prop.Total Trucks, PT	0.1100	0.0200	
Heavy Vehicle PCE, ET	3.000	3.000	
Heavy Vehicle Adj., fHV	0.820	0.962	
Terrain Type	Rolling	Rolling	
Percent Grade	-	-	%
Grade Length	-	-	mi
Demand Adj.Factor, DAF	1.000	1.000	
Demand Flow Rate, v	727	409	pc/h

Step 2: Estimate the Approaching Flow Rate in Lanes 1 and 2

Estimating Flow in Lanes 1 and 2 for On-Ramps		
Adjacent Upstream Off-Ramp Equilibrium Distance, LEQ	-	ft
Adjacent Downstream Off-Ramp Equilibrium Distance, LEQ	-	ft
Prop. Freeway Veh. in Lanes 1 and 2, PFM	1.000	
Flow Rate in Lanes 1 and 2, v12	727	pc/h

Step 3: Estimate Capacity of Ramp-Freeway Junction and Compare Flow Rates

Capacity Checks

	Actual	Maximum	Violation?
vFO	1136	4132	No
vR	409	2000	No
vR12	1136	4600	No
	Freeway	Ramp	
Unadjusted Capacity, cmd	4400	2000	pc/h
Driver Population	Balanced Mix	All Familiar	
Driver Population CAF	0.939	1.000	
Weather Type	Non-Severe Weather	Non-Severe Weather	
Weather Type CAF	1.000	1.000	
Incident Type	No Incident	-	
Final Capacity Adj. Factor, CAF	0.939	1.000	
Adjusted Capacity, cmda	4132	2000	pc/h

Step 4: Estimate Density in Ramp Influence Area and Determine LOS

Demand Flow Rate on Ramp, vR	409	pc/h
Demand Flow Rate in Lanes 1 and 2, v12	727	pc/h
Length of Acceleration Lane, LA	1300	ft
Density in On-Ramp Influence Area, DR	6.1	pc/mi/ln
Density in On-Ramp Influence Area, DR	5.9	veh/mi/ln
Level of Service, LOS	A	

Step 5: Estimate Speeds in the Vicinity of Ramp-Freeway Junctions

Freeway Free-Flow Speed, FFS	75.4	mi/h
Ramp Free-Flow Speed, SFR	35.0	mi/h
Length of Acceleration Lane, LA	1300	ft
Driver Population	All Familiar	
Driver Population SAF	1.000	
Weather Type	Non-Severe Weather	
Weather Type SAF	1.000	
Final Speed Adjustment Factor, SAF	1.000	
Demand Flow Rate on Freeway, vF	727	pc/h
Demand Flow Rate in Lanes 1 and 2, v12	727	pc/h
Total Demand Flow Entering On-Ramp Infl. Area, vR12	1136	pc/h
Number of Outer Lanes on Freeway, NO	0	ln
Speed Index for On-Ramp, MS	0.242	
Average Speed in Ramp Influence Area, SR	64.4	mi/h
Average Flow in Outer Lanes, vOA	-	pc/h/ln
Average Speed in Outer Lanes of Freeway, SO	-	mi/h
Average Speed for On-Ramp Junction, S	64.4	mi/h
Density Across All Lanes, D	8.8	pc/mi/ln

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