

# 2012 Road School

## Queuing Analysis Issues

Presented by David Boruff



# Queuing Analysis Issues

## Queuing Analysis

Needed for ILCP waiver requests

Use Results to:

- Select the best MOT option/Closure schedule
- Plan Detour routes



# Queuing Analysis Issues

## Analysis Programs

Typically QUEWZ98

<http://mctrans.ce.ufl.edu/free/index.htm>

Y:\TrafficManagement\Work Zone Safety\QUEWZ98

Quickzone- consider for more complex analysis

<http://mctrans.ce.ufl.edu/featured/qzone/>



# Queuing Analysis Issues

## Hourly Traffic Volumes

### Primary Source:

Management Information Portal/Traffic Tab  
Weekday and Weekend counts available

### Alternative source:

Annual District Maintenance Waiver  
(*contact DTE or Work Zone Safety Section*)



# Queuing Analysis Issues

## Capacity

### Default Values

Short Term (< 1 week):

1600 passenger car equivalents/hr/lane

Long Term: 1750 pce/hr/lane

### Adjustments

Crossed over traffic, 1550 pce/hr/ln

### Narrow Lane Widths

10' – 10.5': reduce by 9%

9' – 9.5': reduce by 14%

Provide reasoning if other values are used



# Queuing Analysis Issues

## Capacity- Effective Lane Width

Concrete  
Patching  
~1350 pce)



# Queuing Analysis Issues

## Modeling Diversions

OK with a viable detour route

Decision to Detour- base on drivers being logical

Familiar drivers detour when it saves them time over waiting in queue

Unfamiliar drivers might detour when queue approaches a preceding exit



# Queuing Analysis Issues

## ANALYSIS #1

INPUT DATA SUMMARY: ROAD USER COST OUTPUT PAGE 1 OF 3  
CONCRETE PATCHING ON EB I-70, 1 MILE EAST OF MT COMFORT RD  
SATURDAY, w/o DIVERSIONS QUEWZ-98

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## Concrete Patching Example

### LANE CLOSURE CONFIGURATION:

TOTAL NUMBER OF LANES	
WESTBOUND	2
EASTBOUND	2
NUMBER OF OPEN LANES	
WESTBOUND	2
EASTBOUND	1
LENGTH OF WORK ZONE	0.50 MILES
EASTBOUND CAPACITY	
NORMAL	4800. (VPH)
RESTRICTED	1950. (VPH)
WORKING HOURS	1350. (VPH)

### TRAFFIC PARAMETERS:

PERCENTAGE TRUCK	0.
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### SCHEDULE OF WORK ACTIVITY:

HOURS OF RESTRICTED CAPACITY (LANE CLOSURE)	
BEGINNING	5 (5 AM)
ENDING	24 (MIDNIGHT)
HOURS OF WORK ZONE ACTIVITY	
BEGINNING	6 (6 AM)
ENDING	14 (2 PM)

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Assuming  
traffic won't  
detour





# Queuing Analysis Issues

## ANALYSIS #1

SUMMARY OF TRAFFIC CONDITIONS -- OUTBOUND DIRECTION PAGE 3 OF 3  
 CONCRETE PATCHING ON EB I-70, 1 MILE EAST OF MT COMFORT RD  
 SATURDAY, w/o DIVERSIONS QUEWZ-98

Concrete  
 Patching  
Example

Assuming  
 traffic won't  
 detour

HOUR	APPROACH VOLUME (VPH)	CAPACITY (VPH)	APPROACH SPEED (MPH)	WORK ZONE SPEED (MPH)	QUEUE LENGTH (MILES)
0- 1					
1- 2					
2- 3					
3- 4					
4- 5					
5- 6	364.	1950.	69.	67.	0.0
6- 7	413.	1350.	68.	65.	0.0
7- 8	709.	1350.	67.	61.	0.0
8- 9	987.	1350.	66.	57.	0.0
9-10	1156.	1350.	65.	55.	0.0
10-11	1433.	1350.	64.	30.	0.2
11-12	1491.	1350.	64.	30.	0.6
12-13	1508.	1350.	64.	30.	1.1
13-14	1645.	1350.	63.	30.	2.0
14-15	1343.	1950.	65.	30.	1.4
15-16	1551.	1950.	64.	52.	0.1
16-17	1844.	1950.	63.	54.	0.0
17-18	1876.	1950.	63.	54.	0.0
18-19	1832.	1950.	63.	54.	0.0
19-20	1682.	1950.	63.	55.	0.0
20-21	1097.	1950.	66.	60.	0.0
21-22	1010.	1950.	66.	61.	0.0
22-23	1000.	1950.	66.	61.	0.0
23-24	626.	1950.	68.	65.	0.0



# Queuing Analysis Issues

## ANALYSIS #2

SUMMARY OF TRAFFIC CONDITIONS -- EASTBOUND DIRECTION      AGE 3 OF 4  
 CONCRETE PATCHING ON EB I-70, 1 MILE EAST OF MT COMFORT RD  
 SATURDAY, with DIVERSIONS      QUEWZ-98

Concrete  
 Patching  
Example

Assuming  
 traffic will  
 detour

HOUR	APPROACH VOLUME (VPH)	CAPACITY (VPH)	APPROACH SPEED (MPH)	WORK ZONE SPEED (MPH)	QUEUE LENGTH (MILES)
0- 1					
1- 2					
2- 3					
3- 4					
4- 5					
5- 6	364.	1950.	69.	67.	0.0
6- 7	413.	1350.	68.	65.	0.0
7- 8	709.	1350.	67.	61.	0.0
8- 9	987.	1350.	66.	57.	0.0
9-10	1156.	1350.	65.	55.	0.0
10-11	1433.	1350.	64.	30.	0.2
11-12	1491.	1350.	64.	30.	0.6
12-13	1508.	1350.	64.	30.	0.9
13-14	1645.	1350.	63.	30.	1.0
14-15	1343.	1950.	65.	46.	0.5
15-16	1551.	1950.	64.	56.	0.0
16-17	1844.	1950.	63.	54.	0.0
17-18	1876.	1950.	63.	54.	0.0
18-19	1832.	1950.	63.	54.	0.0
19-20	1682.	1950.	63.	55.	0.0
20-21	1097.	1950.	66.	60.	0.0
21-22	1010.	1950.	66.	61.	0.0
22-23	1000.	1950.	66.	61.	0.0
23-24	626.	1950.	68.	65.	0.0

NOTE: TRAFFIC DIVERSION IS PREDICTED, SEE SUMMARY OF TRAFFIC VOLUMES



# Queuing Analysis Issues

## ANALYSIS #2

SUMMARY OF TRAFFIC VOLUMES -- EASTBOUND DIRECTION PAGE 4 OF 4  
 CONCRETE PATCHING ON EB I-70, 1 MILE EAST OF MT COMFORT RD  
 SATURDAY, with DIVERSIONS QUEWZ-98

HR	APPROACH VOLUME (VPH)	VOLUME REMAINING ON FREEWAY (VPH)	VOLUME DIVERTING FROM FREEWAY (VPH)
0- 1	676.	676.	0.
1- 2	559.	559.	0.
2- 3	309.	309.	0.
3- 4	337.	337.	0.
4- 5	399.	399.	0.
5- 6	364.	364.	0.
6- 7	413.	413.	0.
7- 8	709.	709.	0.
8- 9	987.	987.	0.
9- 10	1156.	1156.	0.
10-11	1433.	1433.	0.
11-12	1491.	1491.	0.
12-13	1508.	1390.	118.
13-14	1645.	1350.	295.
14-15	1343.	1343.	0.
15-16	1551.	1551.	0.
16-17	1844.	1844.	0.
17-18	1876.	1876.	0.
18-19	1832.	1832.	0.
19-20	1682.	1682.	0.
20-21	1097.	1097.	0.
21-22	1010.	1010.	0.
22-23	1000.	1000.	0.
23-24	626.	626.	0.

NOTE: THESE ESTIMATES ASSUME THAT TRAFFIC WILL DIVERT SUCH THAT  
 QUEUE LENGTHS NEVER EXCEED 1.00 MILE.

Concrete  
 Patching  
Example

Assuming  
 traffic will  
 detour



# Queuing Analysis Issues

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