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/

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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)*

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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

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Capacity- Effective Lane Width

Concrete Patching ~1350 pce)

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

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Concrete Patching <u>Example</u>

Assuming traffic won't detour

ANALYSIS #1

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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
-------------------------------------------------------------------
      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.

      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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Queuing Analysis Issues

Concrete Patching <u>Example</u>

Assuming traffic won't detour

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

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

Concrete Patching Example

Assuming traffic will detour

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

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

Concrete Patching <u>Example</u>

Assuming traffic will detour

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

HOUR	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.

Queuing Analysis Issues

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