# 241 Lane Closure Analysis

# 241.1 General

See FDM 240 for requirements and criteria concerning lane closures.

# 241.2 Lane Closure Excel Program

An Excel file is available to assist in the preparation of the Lane Closure Worksheet. The program can be found at the Department's TTC Resources web page: <u>TTC Resource</u> <u>Download Library</u>. The Excel worksheet is based on the methods presented in this chapter; Districts may require alternate methods.

The Excel worksheet also illustrates two examples: a widening project and a resurfacing project.

# 241.3 Lane Closure Symbols and Definitions

The following symbols and definitions provide detail and guidance on the variables to be entered into the Input Data Sheets. The number provided in the circle corresponds to the circled number found on the Lane Closure Worksheet in *FDM 241.5*.

- 1 ATC Actual Traffic Counts. Use current traffic counts. Traffic counts can be obtained from the Office of Planning, or you may need to get traffic counts done. The designer needs hourly traffic volumes with a total traffic volume for a 24-hour period (see *Figure 241.7.1*).
- 2 P/D Peak Traffic to Daily Traffic Ratio. Highest hourly volume divided by the total 24-hour volume. Convert the percentage to a decimal on the Lane Closure Worksheet (see *Figure 241.7.1*).
- D Directional Distribution of peak hour traffic on multilane roads. This factor does not apply to a two-lane roadway converted to two-way, one-lane. The directional distribution can be obtained from the Office of Planning.
- PSCF Peak Season Conversion Factor. Many counties in Florida have a significant variance in seasonal traffic. Use the PSCF for the week in which the actual traffic count was conducted. The <u>Transportation</u> <u>Statistics Office</u> has tables showing Peak Season Conversion Factors for every county in Florida. These tables are found in the <u>Florida Traffic</u>

<u>Online</u> mapping application by selecting "Traffic Reports" from the toolbar on the right side of the screen.

(5) RTF Remaining Traffic Factor is the percentage of traffic that will not be diverted onto other facilities during a lane closure. Convert the percentage to a decimal on the Lane Closure Worksheet. This is an estimate that the designer must make on his own, or with help from the Office of Planning. Range: 0% for all traffic diverted to 100% for none diverted.

- 6 G/C Ratio of Green to Cycle Time. This factor is to be applied when lane closure is through or within 600 ft. of a signalized intersection. The Office of Traffic Engineering has timing cycles for all traffic signals.
- (7) V Peak Hour Traffic Volume. The designer calculates the peak hour traffic volume by multiplying the actual traffic count, times peak to daily traffic ratio, times directional factor, times peak seasonal factor, times remaining traffic factor. This calculation will give the designer the expected traffic volume of a roadway at the anticipated time of a lane closure.
- (8) C Capacity of a 2L, 4L 6L, or 8L roadway with one lane closed, and the remaining lane(s) unrestricted by lateral obstructions. The capacity of a 4L, 6L, or 8L roadway is based on lane closure in only one direction.
- (9) RC Restricting Capacity of the above facilities by site specific limitations detailed in the Temporary Traffic Control plans which apply to travel lane width, lateral clearance and the work zone factor. The work zone factor only applies to two lane roadways (see the tables in *FDM 241.6* to obtain the Obstruction Factor and Work Zone Factor).
- (10) OF Obstruction Factor which reduces the capacity of the remaining travel lane(s) by restricting one or both of the following components: Travel lane width less than 12 ft. and lateral clearance less than 6 ft. (see Obstruction Factor Table in *FDM 241.6*).
- (1) WZF Work Zone Factor (WZF) is directly proportional to the work zone length (WZL). The capacity is reduced by restricting traffic movement to a single lane while opposing traffic queues. The WZF and WZL only apply to a two lane roadway converted to two way, one lane (see the Work Zone Factor Table in *FDM 241.6*).
- (12) TLW Travel Lane Width is used to determine the obstruction factor (see the Obstruction Factor Table in *FDM 241.6*).

(13) LC Lateral Clearance is the distance from the edge of the travel lane to the obstruction. The lateral clearance is used to determine the obstruction factor (see the Obstruction Factor Table in *FDM 241.6*).

#### 241.4 Lane Closure Worksheet Instructions

General Instructions are as follows:

- (1) *Lane Closure Symbols and Definitions* (see *FDM 241.3*) provide guidance on where to find the necessary information to fill out the lane closure worksheets.
- (2) Fill out the top part of the lane closure worksheet and complete the formulas to calculate the hourly percentage of traffic at which a lane closure will be permitted.
- (3) Transfer the calculated percentages to the graph on the *Lane Closures 24 Hour Counts* (see *Figure 241.7.1*).
- (4) Draw a line across the graph representing the percentage for both open road and signalized intersections (see *Figure 241.7.1*).
- (5) Plot the hourly percentages (hourly volume divided by total volume) on the graph. Any hourly percentage extending above the restricted capacity percentage lines for open road or signalized intersections indicates the potential for excessive delays.
- (6) Lane closures should be prohibited during the time periods shown to have a potential for excessive delays.

# 241.5 Lane Closure Worksheet

DATE:	
FINANCIAL PROJECT ID:	FEDERAL AID PROJECT NO.:
COUNTY:	DESIGNER:
NO. EXISTING LANES:	LOCATION:
SCOPE OF WORK:	
Calculate the peak ho	pur traffic volume (V)
V=ATC <u>1</u> X P/D <u>2</u> X D <u>3</u> X	( PSCF <u>4</u> X RTF <u>5</u> = <u>7</u>
Capacity (C) of an Existing 2-Lane – Co Capacity (C) of an Existing 4-Lane – Co Capacity (C) of an Existing 6-Lane – Co Capacity (C) of an Existing 8-Lane – Co	nverted to 2-Way, 1-Lane = 1400 VPH inverted to 1-Way, 1-Lane = 1800 VPH inverted to 1-Way, 2-Lane = 3600 VPH inverted to 1-Way, 3-Lane = 5400 VPH
Factors restrict TLW <u>12</u> LC <u>13</u> W	ing Capacity: ZLG/C6
Calculate the Restricted Capacity (RC) at the Lane Clo 8L Capacity (C) from the Table above by the Obstruct the Lane Closure is through or within 600 ft. of a signal RC (Open Road) = C $(8)$ X OF	sure Site by multiplying the appropriate 2L, 4L, 6L, or on Factor (OF) and the Work Zone Factor (WZF). If zed intersection, multiply the RC by the G/C Ratio. <u>(10)</u> X WZF <u>(11)</u> = <u>(9)</u>
If $V \le RC$ , there is no rest	$\underline{(9)} \times 6/C \underline{(0)} = \underline{(9)}$
If $V > RC$ , calculate the hourly percentage of $i$	ADT at which Lane Closure will be permitted
RC (Open Ro Open Road % =	ad) =%
(ATC <u>1</u> X D <u>3</u> X F	2SCF 4 X RTF 5)
Signalized % = Open Road % _	X G/C <u>6</u> =%
Plot 24 hour traffic to determine when Lane	Closure permitted. (See Figure 241.7.1)
NOTE: For Existing 2-Lar	ne Roadways, D = 1.00.
Work Zone Factor (WZF) appli	es only to 2-Lane Roadways.
For RTF < 1.00, briefly describe alternate route	

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### 241.6 Lane Closure Input Data

Lateral Clearance (I C)	Travel Lane Width (TLW) (feet)			
(feet)	12	11	10	9
6	1.00	0.96	0.90	0.80
4	0.98	0.94	0.87	0.77
2	0.94	0.90	0.83	0.72
0.0	0.86	0.82	0.75	0.65

#### Table 241.6.1 Obstruction Factors (OF)

#### Table 241.6.2 Work Zone Factors (WZF)

WZL (ft.)	WZF	WZL (ft.)	WZF	WZL (ft.)	WZF
200	0.99	2200	0.87	4200	0.78
400	0.97	2400	0.86	4400	0.77
600	0.96	2600	0.85	4600	0.77
800	0.95	2800	0.84	4800	0.76
1000	0.93	3000	0.83	5000	0.75
1200	0.92	3200	0.82	5200	0.75
1400	0.91	3400	0.81	5400	0.74
1600	0.90	3600	0.80	5600	0.73
1800	0.89	3800	0.80	5800	0.73
2000	0.88	4000	0.79	6000	0.72

#### Figure 241.6.1 Work Zone Length (WZL)

	Work Zone Length (WZL) for 2-Lane Roadways = Distance between opposing traffic queues				
	<				d
$\triangleleft$		$\triangleleft \triangleright$			$\triangleleft \triangleleft \triangleleft$
$\triangleright \triangleright \triangleright$	••••			••.	
ADVANCE WARNING AREA tells traffic what to expect ahead	TRANSITION AREA - moves traffic out of its normal path	BUFFER SPACE - provides protection for traffic and workers	WORK AREA	TERMIN traffic	IATION AREA - lets c resume normal driving

#### 241.7 24-Hour Counts



Figure 241.7.1 24-HR Counts – Example

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