

# ***Chapter 6 – Traffic Control Cost Estimating***



## ***Traffic Control Plans Design Manual 2011***



## TABLE OF CONTENTS

6.0 – KEY POINTS OF THIS CHAPTER _____	6-1
6.1 – TCP COST ESTIMATOR _____	6-1
6.2 – TRAFFIC CONTROL PLAN PAY ITEMS _____	6-2
6.3 – QUANTITY CALCULATIONS _____	6-3
6.4 – TEMPORARY PROTECTION & DIRECTION OF TRAFFIC (TP&DT) – LUMP SUM ITEM _____	6-5
6.5 – TCP COST ESTIMATE _____	6-7

# CHAPTER 6 – TRAFFIC CONTROL COST ESTIMATING

Chapter

6

## 6.0 – KEY POINTS OF THIS CHAPTER

How to complete a Cost Estimate, including:

- ✓ Identifying Pay Items
- ✓ Managing Pay Items During Staging
- ✓ Calculating Quantities
- ✓ Assembling TP&DT Lump Sum Pay Item
- ✓ Calculation Methods

## 6.1 – TCP COST ESTIMATOR

ODOT has developed an Excel-based spreadsheet to help organize and manage traffic control devices, quantities, and costs. The use of the spreadsheet is not mandatory – simply another available tool in the TCP toolbox.

The “TCP Cost Estimator” is available on the ODOT Traffic Control Plans Unit website. The file is updated on a regular basis (approx. quarterly – unless a major error is found), so frequently check the TCP Unit website and download the latest version.

While the Cost Estimator is thorough, there are limitations. For **very** complex staging plans, it may be necessary to run through the process more than once to calculate quantities for a particular pay item.

In generating quantities, many of the calculations are rounded up to the nearest whole unit or the nearest factor of five. Some quantities include a percentage for the anticipated replacement of damaged devices. Some devices, however, require the TCP Designer to manually enter a percentage for replacement devices. Read all of the notes and comments within the Cost Estimator before completing an estimate. All of the adjustments mentioned above are based on historical observations and the dynamic and widely variable nature of this discipline.

**NOTE:** The first worksheet of the Cost Estimator is titled, “*INSTRUCTIONS – Read Me First*”. Read this before using the Cost Estimator for the first time. If you have any questions or find errors within the Cost Estimator, please contact the Traffic Control Plans Unit.

## 6.2 – TRAFFIC CONTROL PLAN PAY ITEMS

A number of traffic control devices are used to assemble a traffic control plan. TCP Designers will quickly become familiar with the more frequently-used devices. However, this chapter hopes to introduce a more extensive list of TCD, as well as information and practices available in calculating the quantity for these devices.

The TCP Cost Estimator includes a significant list of temporary traffic control devices currently being used by ODOT and most city and county agencies. Below, is an excerpt of the current list of temporary traffic control pay items used within ODOT highway construction contracts. Become familiar with the **name** for each item and their unit of measure.

Costs for the items fluctuate from one year to the next and from one agency to the next. Costs for each TCP pay item are adjusted annually in the early part of the year following the updated average annual pay item price report generated by the ODOT Highway Division's Estimating Unit.

ITEM #	PAY ITEM	Unit	Quantity	Unit Cost	TOTAL
0225-010000A	<b>Temporary Protection &amp; Direction of Traffic</b>	LS	All	N/A	\$ -
0225-010200J	Temporary Signs	ft <sup>2</sup>	0	\$ 17.50	\$ -
0225-010400E	Temporary Barricades, Type II	Each	0	\$ 50.00	\$ -
0225-010500E	Temporary Barricades, Type III	Each	0	\$ 115.00	\$ -
0225-010800F	Temporary Guardrail, Type 2A, Reflectorized	ft	0	\$ 20.00	\$ -
0225-011000F	Temporary Guardrail, Type 3, Reflectorized	ft	0	\$ 60.00	\$ -
0225-011200F	Temporary Guardrail, Type 4 Reflectorized	ft	0	\$ 80.00	\$ -
0225-011300E	Temporary Guardrail End Pieces, Type B	Each	0	\$ 500.00	\$ -
0225-011500E	Temporary Guardrail Terminals, Non-Flared	Each	0	\$ 2,150.00	\$ -
0225-011700E	Temporary Guardrail Transition	Each	0	\$ 2,000.00	\$ -
0225-011900E	Temporary Bridge Connections	Each	0	\$ 1,500.00	\$ -
0225-012600F	Temporary Concrete Barrier, Reflectorized	ft	0	\$ 22.00	\$ -
0225-012700F	Temporary Concrete Barrier, Reflect, Narrow Base	ft	0	\$ 60.00	\$ -
0225-013100F	Temporary Concrete Barrier, Tall, Reflectorized	ft	0	\$ 30.00	\$ -
0225-013200F	Moving Temp. Concrete Barrier	ft	0	\$ 5.50	\$ -
0225-013300E	Temporary Impact Attenuator (Barrel arrays)	Each	0	\$ 3,000.00	\$ -
0225-013600E	Moving Temporary Impact Attenuator (Barrel arrays)	Each	0	\$ 750.00	\$ -
0225-014150E	Repair Temp. Impact Attenuator (per Sand Module)	per Sand Module	0	\$ 250.00	\$ -
0225-013400E	Temporary Impact Attenuator, Narrow Site System	Each	0	\$ 6,500.00	\$ -
0225-013700E	Moving Temp. Impact Attenuator, Narrow Site System	Each	0	\$ 1,250.00	\$ -
0225-014140E	Repair Temp. Impact Attenuator, Narrow Site System	Each	0	\$ 5,500.00	\$ -
0225-013800E	Truck Mounted Impact Attenuator (TMA)	Each	0	\$ 10,000.00	\$ -
0225-014130E	Repair Temp. Impact Attenuator, Truck-Mounted	Each	0	\$ 10,000.00	\$ -
0225-014000F	Temporary Glare Shields	ft	0	\$ 15.00	\$ -
0225-014100F	Moving Temporary Glare Shields	ft	0	\$ 4.00	\$ -
0225-014110F	Temporary Reflective Barrier Panels	Each	0	\$ 20.00	\$ -
0225-014200E	Surface Mounted Tubular Markers	Each	0	\$ 50.00	\$ -
0225-014300E	Replace Surface-Mount Tubular Markers	Each	0	\$ 40.00	\$ -
0225-014500E	Temporary Plastic Drums	Each	0	\$ 45.00	\$ -
0225-014700E	Temporary Delineators	Each	0	\$ 35.00	\$ -
0225-014800E	Temporary Reflective Pavement Markers	Each	0	\$ 3.50	\$ -

### 6.3 – QUANTITY CALCULATIONS




In developing the cost estimate for a Traffic Control Plan, there are two important tasks to focus on:

- A complete list of TCP pay items (and accompanying Special Provisions)
- Adequate quantities for those pay items

Having both the right type of TCD and sufficient quantities, helps avoid the need for inconvenient and often costly Contract Change Orders (CCO). Therefore, carefully compare the contents of their Special Provisions and plan sheets (if applicable), as well as the list of appropriate Standard Drawings, to the list of pay items in the TCP Cost Estimator. And, in confirming the complete list of devices, ensure that an adequate quantity has been provided in the TCP – including a small percentage as a contingency or to account for damage by traffic, vandalism, etc.

#### TEMPORARY SIGNS

One of the more important pay items is the quantity for Temporary Signs. Since every project will include some amount of temporary work zone signing, forgetting the pay item is not likely. However, not generating a proper quantity is very easy to do. Below is an excerpt from the list of Temporary Signs that are included on the “Temporary Signs” workbook within the Cost Estimator.

SIGN NAME / LEGEND	Sign Number	Width in.	Height in.	Size ft <sup>2</sup>	Quantity	Area
YOUR TAX DOLLARS AT WORK Project Identification sign	 CG20-8	96	48	32		-
YOUR TAX DOLLARS AT WORK (Urban) ID sign w/ "ODOT" Rider	 CG20-8	48	66	22		-
PUTTING OREGON BACK TO WORK Project Identification sign	 CG20-8s	96	48	32		-
PUTTING OREGON BACK TO WORK (Urban) ID sign w/ "ODOT" Rider	 CG20-8su	48	66	22		-
KEEPING OREGON ON THE MOVE (Rider)	 With CG20-8 or CG20-8s	96	12	8		-
<del>OTIA Project - (Sign deleted, Spring 2008 - Do not use)</del>		96	48	32		-
ROAD WORK AHEAD	W20-1	48	48	16		-
ROAD WORK AHEAD - (Smaller)	W20-1	36	36	9		-
BRIDGE WORK AHEAD	CW21-10	48	48	16		-
BRIDGE WORK AHEAD - (Smaller)	CW21-10	36	36	9		-
ROAD WORK NEXT XX MILES	CG20-1	60	24	10		-
INTERMITTENT ROAD WORK NEXT XX MILES	CG20-13	60	36	15		-
ON RAMP (Rider)	W13-4	36	36	9		-
FINES DOUBLE (Rider)	R2-6	36	36	9		-
FINES DOUBLE (Rider) - (Smaller)	R2-6	24	24	4		-
END ROAD WORK	CG20-2a	48	24	8		-
Workers (Symbol)	W21-1a	48	48	16		-
Flagger (Symbol Sign)	CW23-2	48	48	16		-
BE PREPARED TO STOP	W3-4	48	48	16		-
SHOULDER WORK	W21-5	48	48	16		-
SHOULDER WORK (Smaller)	W21-5	36	36	9		-
LEFT (RIGHT) SHOULDER CLOSED	W21-5aL (or R)	48	48	16		-
LEFT (RIGHT) SHOULDER CLOSED (Smaller)	W21-5aL (or R)	36	36	9		-
Right Lane Drop (Symbol)	W4-2R	48	48	16		-
Right Lane Drop (Symbol - Smaller)	W4-2R	36	36	9		-
RIGHT LANE CLOSED AHEAD	W20-5	48	48	16		-
RIGHT LANE CLOSED AHEAD (Smaller)	W20-5	36	36	9		-



From the “TCP Cost Estimate” work sheet:

ITEM #	PAY ITEM	Unit	Quantity	Unit Cost	TOTAL
0225-010000A	<b>Temporary Protection &amp; Direction of Traffic</b>	LS	All	N/A	\$ -
0225-0102000J	Temporary Signs	ft <sup>2</sup>	0	\$ 17.50	\$ -
0225-0104000E	Temporary Barricades, Type II	Each	0	\$ 50.00	\$ -
	<b>Temporary Barricades, Type III</b>	Each	<b>2</b>	\$ 115.00	<b>\$ 230.00</b>
0225-0108000F	Temporary Guardrail, Type 2A, ReflectORIZED	ft	0	\$ 20.00	\$ -
0225-0110000F	Temporary Guardrail, Type 3, ReflectORIZED	ft	0	\$ 60.00	\$ -
0225-0112000F	Temporary Guardrail, Type 4 ReflectORIZED	ft	0	\$ 80.00	\$ -
0225-0113000E	Temporary Guardrail End Pieces, Type B	Each	0	\$ 500.00	\$ -
0225-0115000E	Temporary Guardrail Terminals, Non-Flared	Each	0	\$ 2,150.00	\$ -
0225-0117000E	Temporary Guardrail Transition	Each	0	\$ 2,000.00	\$ -
0225-0119000E	Temporary Bridge Connections	Each	0	\$ 1,500.00	\$ -
0225-0126000F	Temporary Concrete Barrier, ReflectORIZED	ft	0	\$ 22.00	\$ -
0225-0127000F	Temporary Concrete Barrier, Reflect, Narrow Base	ft	0	\$ 60.00	\$ -
0225-0131000F	Temporary Concrete Barrier, Tall, ReflectORIZED	ft	0	\$ 30.00	\$ -
0225-0132000F	Moving Temp. Concrete Barrier	ft	0	\$ 5.50	\$ -
0225-0133000E	Temporary Impact Attenuator (Barrel arrays)	Each	0	\$ 3,000.00	\$ -
0225-0136000E	Moving Temporary Impact Attenuator (Barrel arrays)	Each	0	\$ 750.00	\$ -
0225-0141500E	Repair Temp. Impact Attenuator (per Sand Module)	per Sand Module	0	\$ 250.00	\$ -
0225-0134000E	Temporary Impact Attenuator, Narrow Site System	Each	0	\$ 6,500.00	\$ -
0225-0137000E	Moving Temp. Impact Attenuator, Narrow Site System	Each	0	\$ 1,250.00	\$ -
0225-0141400E	Repair Temp. Impact Attenuator, Narrow Site System	Each	0	\$ 5,500.00	\$ -
0225-0138000E	Truck Mounted Impact Attenuator (TMA)	Each	0	\$ 10,000.00	\$ -
0225-0141300E	Repair Temp. Impact Attenuator, Truck-Mounted	Each	0	\$ 10,000.00	\$ -
0225-0140000F	Temporary Glare Shields	ft	0	\$ 15.00	\$ -
0225-0141000F	Moving Temporary Glare Shields	ft	0	\$ 4.00	\$ -
0225-0141100F	Temporary Reflective Barrier Panels	Each	0	\$ 20.00	\$ -
0225-0142000E	Surface Mounted Tubular Markers	Each	0	\$ 50.00	\$ -
0225-0143000E	Replace Surface-Mount Tubular Markers	Each	0	\$ 40.00	\$ -
	<b>Temporary Plastic Drums</b>	Each	<b>12</b>	\$ 45.00	<b>\$ 540.00</b>
0225-0147000E	Temporary Delineators	Each	0	\$ 35.00	\$ -

## 6.4 – TEMPORARY PROTECTION & DIRECTION OF TRAFFIC (TP&DT) – LUMP SUM ITEM

The TP&DT Lump Sum item – often misconstrued as being synonymous with the entire Traffic Control Plan (TCP) - is actually a single pay item comprised of several individual Traffic Control items that do not otherwise have their own pay item category, including monies that might be used by the contractor to pay for labor costs related to the installation, maintenance, cleaning and removal of various TCD as called for in the Specifications. It can be considered as a “miscellaneous” item.

On the following page is an excerpt from the Cost Estimator listing some of the items that would be accounted for under the Temporary Protection & Direction of Traffic lump sum item:

ITEM	Unit	Quantity	Unit Cost	TOTALS
Tubular/Conical Markers (See Worksheet Below)	Each	0	\$27.50	\$0.00
Tubular/Conical Marker MOVES (See Worksheet)	Each	0	\$0.50	
Temp. Concrete Barrier To & From Stockpile	ft	0	\$5.00	\$0.00
Remove Temp. Conc. Barrier from Project @ Con	ft	0	\$5.00	\$0.00
Move Concrete ("Zipper") Barrier Laterally	Each	0	\$300.00	\$0.00
Move "Zipper" Machine To/From Storage {Min}	Lump Sum	0	\$1,000.00	\$0.00
Guard Rail, Anchor Type 1	Each	0	\$450.00	\$0.00
Guard Rail, Anchor Type 1 Modify	Each	0	\$350.00	\$0.00
Guard Rail, Transition 2-Sides	Each	0	\$3,000.00	\$0.00
Pole Base Excavation Covers	Each	0	\$200.00	\$0.00
Pedestrian Work Zone Delineation Fence(Orange	ft	0	\$3.00	\$0.00
Temporary Chain Link Fence	ft	0	\$7.50	\$0.00
Falsework Illumination	ft	0	\$3.50	\$0.00
Incidental Flagging Hours	Hour	0	\$25.00	\$0.00
Blue Tubular Markers	Each	0	\$30.00	\$0.00
<b>Traffic Control Supervisor (TCS):</b>		Effective June 13, 2008, <b>DO NOT</b> include TCS quantities in TP&DT lump sum item! Use the "TCP COST ESTIMATE" worksheet for "TCS" quantities.		
ADDITIONAL TP&DT Materials & Devices				
ITEM	Unit	Quantity	Unit Cost	TOTALS
		0	\$0.00	\$0.00
		0	\$0.00	\$0.00
		0	\$0.00	\$0.00
		0	\$0.00	\$0.00
		0	\$0.00	\$0.00
		0	\$0.00	\$0.00
		0	\$0.00	\$0.00
			<b>SUBTOTAL =</b>	<b>\$0</b>
<b>TP&amp;DT based on 1% of Project Budget:</b>			x 1.0% =	<b>\$0</b>
<b>COMPARED TO ...</b>				
<b>TP&amp;DT Calculated from items above {\$5000 Minimum}:</b>				<b>\$5,000</b>
<b>** TP&amp;DT TOTAL =</b>				
** Typically, use the larger of the two amounts. However, staging complexity and project duration can affect TP&DT amounts. Therefore, if the difference is greater than 100%, consider using the average of the two amounts.				
<b>See Section 00225.90(a-2) for other items included in the TP&amp;DT lump sum Pay Item.</b>				

In the Cost Estimator, the calculated TP&DT Lump Sum item will be compared to an historical percentage of the total Project Construction Cost. Have the Construction budget number available as it must be entered into the spreadsheet. The Percentage amount is compared to the calculated Lump Sum amount. The larger of the two amounts will be used and carried forward into the Total TCP Cost Estimate. **However**, if there is a significant difference between the two values (> 100%), consider using the average of the two amounts.

## 6.5 – TCP COST ESTIMATE

The last worksheet in the TCP Cost Estimator is called the “TCP Cost Estimate” and summarizes all of the quantities generated for traffic control devices. Once all of the other preceding worksheets are complete, there are a few cells (in **yellow**) on this last worksheet that require inputs directly.

Before completing the Cost Estimate, revisit the entire workbook looking for any errors, oversights or omissions. In addition, the following items are worth noting:

- “Drums & Surf. Mounted Tubes” worksheet: Check for an appropriate percentage of replacement for the Drums and Surface-Mounted Tubular Markers, as appropriate.
- “Barrier & Guardrail” worksheet: You may prefer to calculate quantities for Barrier and Barrier Moves by hand in lieu of using this worksheet.
- “Attenuators & Barrier Panels”: Quantities for the three new “Repair Temporary Impact Attenuator” pay items should be discussed with Construction office staff.
- “TCP COST ESTIMATE” worksheet:
  - Striping & Removal Mobilization: Typically, quantities are added on projects in rural or remote locations where equipment transportation costs are higher. Quantities may also be added for projects with a significant number of stages requiring temporary striping or repeated striping if the project carries through the winter.
  - Temporary Illumination: A rare item and will involve an illumination design.
  - Temporary Signals & Portable Signals: Based on the staging plan, designs for signal installations will come from a Signal Designer. Approval to add a signal, even a temporary one, must come from the State Traffic Engineer.
  - Over-height Vehicle Warning Systems (OVWS) are rare. Quantities will likely not be more than two for any single project
  - Quantities for Flaggers and Pilot Cars should be discussed with Region Cost Estimating staff who, having reviewed the scope of work and the staging plans, will be able to confirm or modify estimated quantities for these pay items.
  - Flagger Station Lighting: Used to light each anticipated Flagger station. Seek advice from Construction offices to refine quantities.
  - Traffic Control Supervisor (TCS): Consult with Construction offices to arrive at quantities for this pay item. See Chapter 3 for additional warrants for TCS quantities.
  - Tow Trucks: A rare pay item, but useful on projects with limited widths and where continuous flow of traffic in a single lane is critical. MUST include “Unique” Special Provision language. Consult with Construction offices for use.

When submitting a TCP Cost Estimate to the Specification Writer, the “TCP COST ESTIMATE” worksheet is typically the only worksheet needed, but if sending electronically, the whole Excel file may be sent. Keep a copy of the entire workbook in both the electronic and hardcopy Project File.