

# Engineering and Highways Division Report

## *Traffic Control In Construction*



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## **Synopsis**

### **Traffic Control Process Review at MDT**

Chief Engineer Gary Gilmore, P.E. asked the MDT Construction Bureau and FHWA to team-up and look at traffic control at MDT. Initially, the scope of the work only included a survey of other states to see what they were doing in traffic control estimation and payment, to convene a committee of District Construction Engineers to develop business processes that would aid in estimation of traffic control, and to develop a training course for traffic control. Since that time, the scope has grown to include a creation of a panel, headed by Bob Tholt (MDT) and including FHWA and Contractors, to address concerns raised by the contractors on current traffic control processes.

## **INTRODUCTION**

This report reviews the accomplishments in the area of traffic control since the issue was raised and acted upon in September 2000. Additionally, the report is intended to serve as background for future traffic control discussions between MDT, FHWA and Contractors.

The process undertaken considered a range of operational issues related to traffic control in MDT. They included: survey of 50 states on their traffic control process, creation of a database of traffic control information suggested by District Construction Engineers, analysis of projects with utilizing three different traffic control methods (current methods, lump sum and contractor's preference) with comments from the MDT field operations, and preliminary development of a project complexity model for traffic control,

## **INFORMATION SUMMARY**

1. Survey of other DOT's traffic control operations.

Gary Gilmore, in conjunction with Ted Burch of FHWA, instructed that a survey be prepared to assess the state-of—the-practice of traffic control in other states. A traffic control committee consisting of MDT and FHWA members was formed and among its first tasks was implementation of a survey of other states' approaches to traffic control. MDT staff emailed a short-answer survey to all 50 state's chief engineers. Formal responses were received from 35 state DOT's (Appendices A and B). Additionally, the findings from that survey were published in an article entitled: "*Work-Zone Traffic Control Survey of Contracting Techniques*"

(<http://www.tfhr.gov/pubrds/mayjun01/trafficcontrol.htm>) in the May/June issue of *Public Roads* magazine.

The survey process explored the following topics:

- Methods of Payment
- Unbalanced Bids
- Change Orders
- Estimated Quantities

Major findings of this survey:

- Nine of thirty-five states use “unit price” (per each device or per each day); eight use “lump sum” for all traffic control measures and devices; 15 use a combination of lump sum and unit price; and three states use up to three methods, including lump sum, unit price, pre-established unit price, and incidental cost to the project.
- Eighteen states had no evidence of unbalanced bids, in which the total bid is appropriate for the work to be done, but some unit prices are either abnormally high or low. Another ten states said that unbalanced bids are rare. According to these twenty-eight states, the absence of unbalanced bids is largely attributed to subcontracting work-zone traffic control.
- Of the states that reported evidence of unbalanced bids, some reasons for their occurrence are: frontloading of project payout, variation from traffic control plan, and inaccurate estimation of quantities. Some states with evidence of unbalanced bids reported that the amount of money is too small to pursue; therefore, no abatement is undertaken.
- In eighteen states, change orders are not required unless the scope of the project is changed. Nine states rarely see change orders. Some form of negotiation or written justification from the project engineer is required by the states that do not use change orders for traffic control adjustments. In the states that use change orders to adjust quantities or payments for traffic control devices, change orders are typically issued when the change is +/- 25% of the contract amount, when a value-engineering proposal is used, when an item has been omitted, or when the project time has been extended.
- Contractors estimate quantities for traffic control items in only ten of the thirtyfive responding states. All ten states are currently using a lump sum method of payment. Contractors in a few of the other responding states estimate quantities when proposing a phasing or sequencing change; when estimating the signs needed in addition to the state’s standard signs, when extra work occurs, and when implementing a value-engineering proposal.

## 2. Traffic Control database

Based on input from District Construction Engineers, a database was created to facilitate the ability of the districts and Helena to do traffic control estimation. The system is operational but only saw limited use this summer due to the deployment late in the construction season.

Highlights of the systems are:

- The Traffic Control Estimates database application provides the Traffic Control Engineer with current information on completed and ongoing projects.
- Queries can be performed using criteria maintained in the system to provide averages for use in predicting quantities for ongoing or future projects.
- Quantities information is available for traffic control devices, flagging and pilot cars.
- New projects are loaded from uniform project master table. This includes the project ID, location, district, project type, and roadway system
- Length, letting date, project manager, prime contractor, and contract time are loaded from the Construction Management System.
- The planned quantities and the unit costs are loaded from the Progress Estimate system.
- Information that has to be supplied manually are roadway type, average daily traffic, lump sum traffic control, terrain, existing PTW used for traffic flow, number of controlled and uncontrolled intersections, total amount of change orders and list of traffic control subcontractors.
- Total costs, average cost per mile of kilometer, and percentage of cost to total project costs are calculated.

## 3. Analysis of traffic control methods.

The final number of traffic control devices needed for a work-zone project and the final bill for those devices often vary from the initial estimates of the required number and charges for the devices. The variance is usually an increase in the quantity and the price that adds to the state's total contract cost. To that end, the department has undertaken an evaluation of projects under different methods of estimation and payment (Appendices C and D). The results of the analysis will help MDT determine the appropriate method(s) available.

- The Special Provision for TC complete bidding:

### TRAFFIC CONTROL - DEVICES

The Traffic Control - Devices item will be bid competitively on this contract.

In the event that the actual quantities required for Traffic Control - Devices exceeds the plan quantity on the project, the price paid per unit for all quantities over the plan quantity will be the lesser of the unit price bid or \$0.80. A change order will be written if the actual quantities exceed the planned quantity.

Quantity	Unit Price	Designation	
150,000.00	\$0.700	North Main St-Helena	Kevin Christensen
150,000.00	\$0.700	Lyndale Overpass-Helena	Kevin Christensen
350,000.00	\$0.790	Sula-N & S	Tom Benedik
40,000.00	\$0.850	Three Forks-West	Terry Held
100,000.00	\$0.010	Superior-Tarkio	Dan Ham
70,000.00	\$0.010	Clinton-East	Dan Hamm
170,000.00	\$0.720	Coalwood-South	Bob Swanson
220,000.00	\$1.00	Silver Star-N & S	John Starcevich
150,000.00	\$0.85	Pleasant Valley	Jim Roberts

- Lump Sum

Quantity	Unit Price	Designation	
0.260	\$ 127,491.800	Milligan Canyon	Dean Harris
0.390	\$127,491.800	Boulder Hill	Dean Harris
0.350	\$6,250.000	1997 Great Falls Elec	Randy Aafedt
0.650	\$6,250.000	1996- D3 — Signals	Randy Aafedt
1.000	\$1 17,500.000	Geraldine - S.E.	Harold Woodhouse
1.000	\$180,000.000	Big Horn Inter E & W	David Sloe
0.990	\$ 126,000.000	Midvale Ck - E Glacier	Mark Beckdedahl
1.000	\$8,000.000	Madison River 58 Km S Ennis	Bill Brazil
1.000	\$10,000.000	Indian Creek Bridge	Bill Brazill
1.000	\$25,000.000	Belt Cr 1.5km Se Neihart	Harold Woodhouse
1.000	\$2,675.000	2000-D3-Dur Pave Marking	Mike Klette
0.620	\$ 100,000.000	Kootenai River — Libby	Gary Kalberg
1.000	\$ 153,800.000	Kootenai R- 3.7km NW Troy	Gary Kalberg
1.000	\$ 186.700	2001-D5-Dur Pave Marking	Ron Tilzey
1.000	\$ 125,000.000	South Frontage Road Rel	Tom Shupak
1.000	\$36,500.000	Yellowstone-Carters Br	Dan Gravage
1.000	\$5,000.000	Pipe-S of Clyde Park	Tom McCormick
1.000	\$ 100.000	D1 -Non-Inter Guardrail	Dan Ham
1.000	\$100.000	D2 Non-Inter Guardrail	John Starcevich
1.000	\$2,400.000	2001 -D3-Dur Pave Marking	Mike Klette
1.000	\$5,040.000	Bitterroot R —Woodside	Tami Hembree
1.000	\$45,000.000	Bridge Deck Columbia Falls	Gary Kalberg
1.000	\$1,500.000	Sweet Grass Rest Area	Mark Beckdedahl
1.000	\$20,000.000	Di-Bridge Deck Seal	Sheila Sullivan

#### 4. Best Practices

*'Best practices related to traffic control'* refer to examples and cases that illustrate the good use of work zone operations in developing cost-effective strategies for project traffic control (Appendix E). In collecting the information, MDT is illustrating what other states are doing and ways that these best practices have been adapted and applied.

#### 5. Complexity Model

Project complexity analysis should play an important role in Traffic Control engineering. Potential exists to develop an innovative model based on project complexity for appropriate traffic control estimation. First the information describing the project defines the general parameters of the model. Simple overlays or very defined bridge deck work may lend themselves to lump sum, while moving operations of a major rehabilitation or reconstruction promote use of something other than lump sum estimation. In order to avoid conflict with methods where "one size fits all" a third method should be developed and deployed. This third method may be called a hybrid whereby certain elements of estimation could be paid for on a lump sum basis and others on a per device basis. Again, complexity levels of the project would dictate the appropriateness of the method.

Appendix A

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**Traffic Control Survey and Responses from Other  
States**

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**Appendix A**

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**Traffic Control Survey and Responses from Other States**

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State	Question 1: What method(s) of payment do you use for traffic control devices?	Question 2: Do you see unbalanced bids involving traffic control?	Question 3: How do you address the potential for unbalanced bids involving traffic control devices?	Question 4: How do you address cost containment?
<b>Alabama: FHWA</b>	Contract unit price per Unit.	Very seldom.	The key is to have a MOT plan that works for each of the phases of work in addition to having an accurate number of devices.	By developing a MOT that can be used by the contractor to build the job in an efficient manner, without disregarding the safety of travelers and the project personnel.
<b>Arizona DOT</b>	<p>Signs, lights, barricades are paid per day for each. Striping is paid per linear foot. Flagging and pilot cars are paid by the hour.</p> <p>There have been a few projects where ADOT pre-established the unit price.</p> <p>Lump Sum has been used on small projects requiring minimal traffic control.</p>	No, at least not to the extent that is detrimental to the department.	Traffic control is addressed no differently than other bid items; the specifications state that the bidder may be disqualified for this practice.	<p>Have not yet been able to address cost containment but aware of it and will attempt to address it in the future. Constantly address the need for accurate estimates from the designer.</p> <p>Have used lane rental on several projects and have to minimize the impacts/restrictions to the traveling public; this has assisted in containing traffic control costs.</p>
<b>Arkansas: DOT</b>	Unit	No	Has not been a problem.	Prepare maintenance of traffic plan during design and included in plans.
<b>Colorado: DOT</b>	<p>Devices are paid by each.</p> <p>TC Supervisor and Inspector are paid by the day. Flagging and Pilot Car are paid by the hour.</p>	No, but a price is negotiable and cost data book is checked.	Monitored by Bid Collusion Management Unit, which uses a computer program to check any unbalanced bids for rejects or re-bids,	This is a difficult situation when the Contractor tells the Project Engineer that his proposal will cost extra but the increase in safety to the traveling public is essential. The Project Engineer must rely on his experience or that of our Traffic Engineers to make informed decisions.
<b>Connecticut: DOT</b>	Devices are paid for on an each basis. Arrow Boards are paid for by the day. Lump Sum item for maintaining, correcting, and removing all the various traffic item. Signs are paid for by square foot/meter. Trafficpersons item which adds a certain amount of money to the	Very rarely do we get unbalanced bids since Trafficpersons is a no bid item, It is very difficult to estimate the number of hours during design, so if the contractor feels the quantity of hours is wrong, he will bid low on this item and increase another item accordingly	Have not had any problems with unbalanced bids with traffic control devices since they represent such a low percentage of the contract and are generally a sub-contract item.	Not addressed on traffic control devices since they represent such a low percentage of the contract cost.

State	Question 1: What method(s) of payment do you use for traffic control devices?	Question 2: Do you see unbalanced bids involving traffic control?	Question 3: How do you address the potential for unbalanced bids involving traffic control devices?	Question 4: How do you address cost containment?
	Flagging and drums are paid by lump sum.			
<b>Iowa: DOT</b>	One Lump Sum bid item for all traffic control, except for the following bid items which are separate items: Flaggers and Pilot Cars - set price by DOT Temporary Traffic Signals - separate Lump Sum item Temporary Barrier Rail linear foot	No	No problems with unbalanced bids.	Haven't had problems with traffic control cost escalation, due to Lump Sum pricing.
<b>Kansas: DOT</b>	On large project items are paid on an each per day basis for signs, arrow boards, and changeable message signs. Flaggers are paid for by the hour at a fixed rate of \$10 per hour.  On small projects and where the traffic control setup is the same each day, then traffic control is bid as a Lump Sum.	When traffic control is bid as a Lump Sum, it is rarely bid over 10% of the contract amount due to the way it is paid. Prices are usually within 5-6% of the contract amount.  With each per day bid, occasionally prices are unbalanced low because it is so competitive. We recently added an item Initial Setup which is a lump sum to be bid no higher than 25% of all traffic control on the contract.	See question 2. Any other unbalanced bids in traffic control are handled on a case by case basis.	KDOT views traffic control as necessary and very important. If the unit prices bid by the low bidder are reasonable the contract will be awarded, unless there are other problems. Once the contract is awarded, we pay for the required traffic control. The cost containment, if any, is handled in the field, paying for items they accept.
<b>Kentucky: FHWA</b>	Lump sum for flagging, devices, and traffic coordinator, Signs are paid by m2	Not had a significant problem with unbalanced bids but there is a tendency to overbid the item of lane closure.	Unbalanced bids are just tolerated.	Resident Engineer must agree to any overrun of items.
<b>Louisiana: DOT</b>	Use 1 item, Temporary Signs and Barricades paid at lump sum for providing temporary construction signs are barricades. This item covers any sign or barricade required by the MUTCD that the project engineer requires the contractor to install. We have a series of individual items that pay for temporary pavement markings.	No	N/A	Do not.
<b>Maine: DOT</b>	One option is to pay by items used (barrels, flaggers, barricades, signs, etc.) by unit prices (each, hr, sf.). The second option is pay lump sum for the	Lump sum is priced way over what the unit prices would come to by a few contractors.	Lump sum is only used for certain projects.	Lump sum is only used for certain projects.

State	Question 1: What method(s) of payment do you use for traffic control devices?	Question 2: Do you see unbalanced bids involving traffic control?	Question 3: How do you address the potential for unbalanced bids involving traffic control devices?	Question 4: How do you address cost containment?
	project to pay for the services.	accordingly.		
<b>Delaware: DOT</b>	Contract unit price bid per: each-day or each/day (arrow board, VMS, signs, drums, barricades, lights, drums). Flaggers are paid by the hour. Warning signs are paid by the day.	Yes	A bid analysis is done for the low contract bid and decide then whether to accept the bids as is or if there is a need to address certain items before awarding.  During the analysis we look at bids that exceed the engineers estimate by +/- 20%.	Proper MOT planning and estimating.  Flagging has fixed price.  Competitive bidding process.
<b>Georgia: DOT</b>	We use Lump Sum payment for traffic control, We usually pay for VMS and temporary concrete barrier by the unit cost.	Yes. Some up front costs are obviously put in the Lump Sum item,	Payment is spread out over life of project	As they are bidding Lump Sum this is not much of an issue with us.
<b>Idaho: DOT</b>	We were required to establish specific items for payment of traffic control by FHWA Region 10 a few years ago. The rental of each device is paid for by the each. m2 etc.; Miscellaneous Traffic Control Items are paid by the Lump Sum (including flashers, cones, delineators, etc.). An item of Traffic Control Maintenance by the Hour covers all moving and maintaining of devices. Concerning damaged devices, the insurance of an individual causing damage is responsible for damaged devices; but the Contractor must replace the rented devices for remainder of contract (meaning he or his insurance is responsible, if accident is not reported). The exception to this is the stick-down Flexible post item where all resetting or replacement is paid for.  Arrow panels are paid per hour of operation, as with other devices movement is in maintenance so trailer or truck are the contractors responsibility.	Yes, appears to be for a variety of reasons from up-front leading of project payout; variations in proposed traffic plan, to quantities not felt to be accurate.	Our only option is approval of TCPs and the use/pay for only those devices considered required and by trying to better estimate the quantities of devices needed.	Again only by review and approval of proposed plans, to assure need for all devices and by approving all maintenance hours.
<b>Indiana: FHWA</b>	Signs are paid by each. Arrow boards are paid by day.	No	The State uses a software program to assist in analyzing bids for unbalanced bid items.	By allowing alternates and the use of generic specifications.

<b>State</b>	<b>Question 1: What method(s) of payment do you use for traffic control devices?</b>	<b>Question 2: Do you see unbalanced bids involving traffic control?</b>	<b>Question 3: How do you address the potential for unbalanced bids involving traffic control devices?</b>	<b>Question 4: How do you address cost containment?</b>
	project.			
<b>Maryland: DOT</b>	Depends on the nature of the contract and/or device: lump sum, incidental, per individual items, unit day.	For Lump Sum, contractors often add dollars to the MOT to get more up front.	We don't it is not a serious issue.	We don't it is not a serious issue.
<b>Massachusetts : DOT</b>  <b>FHWA</b>	Safety control for operations are paid for by Lump Sum. Safety signing for operations are paid for by square meter. Barricades are paid by each.  Unit day for Arrow Boards, Barrels, VMS Temporary Concrete Barriers - linear foot Temporary Impact Attenuators - each Lump Sum for Safety Controls (cones, delineators, floodlights, etc.)	Occasionally  No, traffic control devices in work zones are almost always provided by a subcontractor. In Mass, there are a handful of companies that do this work. Prices are very even and competitive.	By attempting to calculate realistic quantities for traffic control devices. With large quantity over or underruns. we will renegotiate the unit prices if we feel that the contractors unit prices are too high. However, we have had difficulties when the contractor refuses to negotiate in good faith.  N/A	Through the approval of the contractors construction procedures, schedule, and traffic management plan.
<b>Mississippi: DOT</b>  <b>FHWA</b>	Each type of traffic control device is paid for at the contract unit bid price, On some projects, required traffic control devices are shown on the plan sheets and the payment is included in the bid price for Maintenance of Traffic.  Lump sum Maintenance of Traffic Item included in all contracts plus individual pay items as appropriate, Pay Items for actual (physical) items such as signs, barrels, etc.	No.  Materially unbalanced bids are seen but mathematically unbalanced bids are not a significant problem.	It is handled the same as unbalanced bids involving other bid items.  Careful review of estimated quantities.	Not sure of the meaning of this question. The maximum number of authorized traffic control devices on the project at one time is the maximum number of devices paid for. Should devices be destroyed, they are replaced at no additional cost to the State.  N/A
<b>Nebraska: DOT</b>	Signs are paid by each. Flagging is paid by the day. Barriers are paid by the linear foot. Arrow panels are paid by the day.	No	N/A	Monitored daily by project Personnel.  Cease payment for some devices (barricades type II and II).
<b>New Hampshire: DOT</b>	Typically, one item Maintenance of Traffic includes construction signs	No more than any other item.		Competitive bid market.

<b>State</b>	<b>Question 1:</b> <i>What method(s) of payment do you use for traffic control devices?</i>	<i>Question 2:</i> <i>Do you see unbalanced bids involving traffic control?</i>	Question 3: <i>How do you address the potential for unbalanced bids involving traffic control devices?</i>	<b>Question 4:</b> <i>How do you address cost containment?</i>
	and warning devices, dust control, and miscellaneous sign relocations, maintenance of devices, etc. Flaggers are bid per hour Officers and officers with vehicles are allowances.			
<b>New Mexico: DOT</b>	Since the mid-70's, the New Mexico State Highway and Transportation Department has paid for traffic control devices by the unit: i.e. per barrel (drum), square foot of sign, per linear foot of sign post, etc. There has been a recent movement to have the contractors bid on traffic control by lump sum making the contractor responsible for developing traffic control plans in accordance with the MUTCD subject to approval by the District Traffic Engineer. So far, only relatively simple projects have gone lump sum for traffic control.	No unbalanced bids have been noted.	Not applicable.	Since the State has normally prepared TCPs and any changes suggested by the contractor are carefully scrutinized, costs are fairly well contained.
<b>Ohio: FHWA</b>	Lump Sum and unit bid. (Specs available at <a href="http://www.dot.state.oh.us/spec/814.htm">www.dot.state.oh.us/spec/814.htm</a> )	No	Has not been an issue. Existing specification has been in place since 1997.	Use of Lump Sum bid and requirements to follow MUTCD for proper installation.
<b>Oklahoma: DOT</b>          <b>FHWA</b>	Generally if the value of the traffic control is less than \$60,000, it is bid lump sum. Over that, we pay by the sign day for each sign and barricade and temporary striping by linear foot. Lump sum on projects where traffic control is below \$60,000.	Not very likely as in OK, almost always the sign provider is not the prime contractor. Do see unbalanced bids but they are such small amounts that they are not pursued.	Oklahoma maintains a historical database and prices are compared for the Engineers estimate and the bid also.	When paid by sign day, the overruns are automatic. In some cases (extreme weather) there are significant overruns. However, in the long haul we feel that the system is the most economical. If the contractor runs Out of time, we StOp payment for signs etc.
<b>Oregon: DOT</b>	Currently use contract lump sum amount for Temporary Protection and Direction of Traffic item and contract unit price per unit of measurement for traffic control device items, flaggers and pilot cars. We are currently combining our specifications with	Our history of tracking contract bid items has shown that the Temporary Protection and Direction of Traffic lump sum has the greatest fluctuation in bid amounts. However, since traffic control is usually a small percentage of the total contract amount,	We have a Cost Estimating unit that provides us with average unit cost based upon the area and type of project. Using these factors (location of project, type of facility, type of work, etc.) the unit costs are adjusted to help the engineers estimate reflect the probably bid submittals.	Our Cost Estimating group tracks bid item costs and reports any bid item cost trends that have increased or decreased over the year. In designing our staging and TCPs we look for ways to reduce the cost of traffic control. Some examples are

<b>State</b>	<b>Question 1:</b> <b>What method(s) of payment do you use for traffic control devices?</b>	<b>Question 2:</b> <b>Do you see unbalanced bids involving traffic control?</b>	<b>Question 3:</b> <b>How do you address the potential for unbalanced bids involving traffic control devices?</b>	<b>Question 4:</b> <b>How do you address cost containment?</b>
	APWAs and the result will be three methods of payment. One method has already been mentioned, another method will be lump sum amount for all temporary work zone traffic control, and the other will be paid on an incidental basis.	unbalanced bids involving traffic control are rare.		selling up staging plans to minimize the number of traffic control devices or measures needed on a project, using temporary signals instead of 24-hour flagging at one-lane closures, and calling for the contractor to provide a Traffic Control Supervisor on certain projects to insure proper placement and use of the TCPs.
<b>Pennsylvania: DOT</b>          <b>FHWA</b>	Each project includes an item for Maintenance and Protection of Traffic During Construction. This item has a unit of measure of Lump Sum. In addition to the Lump Sum item, various other items and devices required for traffic control are included in the contract as separate pay items. These items are measured and paid for separately.  Lump sum is used for all traffic control except for items denoted as separate items. Experimenting with paying flaggers by the hour.	No  Not usually because traffic control is typically subbed out and the contract bid item is usually what the sub is paid.	N/A  All bids are reviewed for unbalancing prior to requesting concurrence in award.	Most contracts include contingency times for additional warning lights and additional traffic control signs, which enable the Department to receive bid prices that are binding if and when the work becomes necessary during the project. Otherwise, historical bid data is used to justify negotiated prices for extra work items when work is added during construction.  No special efforts to do so.
<b>Rhode Island: DOT</b>          <b>FHWA</b>	Flagpersons - man hour Water for dust control - thousand gallons Calcium Chloride for dust control - ton Temporary construction signs - square foot Drum barricade - barrel day Type II barricade - each Traffic Cones - each Arrow board - day Pavement markings - linear foot Arrow boards are paid by the day. Flaggers are paid by the hour. Drums are paid by the barrel days. Cones are paid by each.	There is an item Maintenance and Movement of Traffic Protection Devices which is bid Lump Sum and used to clean and move previously installed traffic control devices. The bids for this item often show significant variation between bidders and sometimes come in unbalanced. The other items for traffic control produce reasonable bids, most of the time.  Very infrequently.	As part of the design process the Departments Construction Section has input into both the design of the traffic control setup and the quantities involved. The process does not eliminate problems with item quantities, or changes to the sequence of construction requested by the contractor, but it does help weed out unrealistic assumptions made during the design process.  The designer is required to review the items involved to determine the potential for overruns. If there is a chance for  significant cost increase there is the option of rejecting bids and re-advertising.	The design process involves an evaluation by the Construction Section to provide for the most likely sequence of construction. This may include an estimate of the number of concurrent operations that can be expected for the project. The goal is to anticipate what the contractor will need. The traffic control is designed accordingly.  By sticking to the TCP as much as possible.

<b>State</b>	<b>Question 1: What method(s) of payment do you use for traffic control devices?</b>	<b>Question 2: Do you see unbalanced bids involving traffic control?</b>	<b>Question 3: How do you address the potential for unbalanced bids involving traffic control devices?</b>	<b>Question 4: How do you address cost containment?</b>
Tennessee:  DOT	Various. The lump sum item for Traffic Control includes furnishing flaggers, traffic cones and removing conflicting or incorrect pavement marking as required, until project completion. Portable Barrier Rail is measured by the linear meter (foot) for the initial installation at each site, including removing and relocating at the same site. Payment for flexible drums, delineators, warning lights, flashing arrow boards, signs, vertical panels, etc., is based on furnishing, erecting, relocating as may be applicable and maintaining these items until completion of construction. (See Subsections 712.09 and 712.10 in specs.)	This is not considered a problem.	By making the Contractor largely responsible for the erection, relocation, maintenance and removal of the traffic control devices. This permits our plan quantities of these items to be reasonably consistent with the quantities used.	As noted in Question 3, the quantities are reasonably contained. This promotes cost containment also. Normally, traffic control devices damaged by traffic to the extent they are not serviceable are replaced by the Contractor at the Contractors expense.
Texas: DOT	The traffic control devices are paid for on a monthly lump sum basis. This price is the same every month for the length of the contract. The traffic control devices include signs, barricades, drums, cones, vertical panels, flashing arrow boards and some flagging operations. The temporary pavement markings are paid for on a linear foot (meter) basis. Flagging operations and pilot cars for a one-way traffic control situation are paid for by the hour. (Standard specifications that are used for bidding purposes are attached.)	For our construction contracts, a Contractor bids the traffic control devices for the project and hires a sub-contractor to install and maintain the traffic control devices. Because there are multiple bid items on the contract, the contractor spreads the price for the traffic control over all the bid items.	We are not aware of unbalanced bids involving traffic control devices.	Because we pay for traffic control on a monthly basis instead of a per unit basis, we can estimate the total anticipated cost for the duration of the contract. We then divide this cost over the duration of the contract.
Utah: FHWA	Lump Sum method. Contractor is required to submit a traffic control plan and UDOT approves the plan after the project is awarded,	Unbalanced bids are not as common as they were before Utah changed to lump sum.	Lump sum method reduces the potential for unbalanced bids. By setting minimum bid amounts on some of the items (to reduce the padding the cost of other items) the potential is reduced.	N/A
Vermont: DOT  FHWA	Flaggers are paid by the hour. Traffic control devices by lump sum.  Traffic Control devices are paid as part of a lump sum bid for that item. Flaggers are paid by the hour. Uniformed officers are paid by the hour.	Hard to tell.  The subject has not been investigated, but nothing glaring has been noted with these items.	By designing it correctly.  With no indication that there is unbalancing, no special need is noted.	Not really done.  There are no special issues relative to cost containment in this state.



State	Question 1: What method(s) of payment do you use for traffic control devices?	Question 2: Do you see unbalanced bids involving traffic control?	Question 3: How do you address the potential for unbalanced bids involving traffic control devices?	Question 4: How do you address cost containment?
	Temporary pavement markings paid by the meter. Temporary barriers paid by the meter. Arrow boards are paid by each.			
<b>Virginia: DOT</b>	Flagger Service - hour Pilot Vehicle - hour Electronic Arrow - hour Group 2 Channeling Device day Traffic Barrier Service (type or standard) - meter or each Type III Barricade - each Impact Attenuator - each Temp. Signalization - lump sum Const. Pavement Markings - feet Eradication of markings - feet Pavement Marker - each	Yes, but only when the DOT has not done a proper job of establishing quantities, i.e. contract quantity is either very low or high in relation to what is really needed,	We have an established policy that allows us to review the bid with the contractor. We define an unbalanced bid as one in which the contractor bids one item unusually low and one unusually high to the detriment of the owner. If the review indicates this, we can reject the bid. However, if the item was bid either low or high due to the DOTs and the contractor has a reason, we may award or award with an agreement concerning overruns and underruns.	Good engineering and contract administration.
<b>Washington: DOT/FHWA joint survey</b>	Lump Sum for all devices except signs and labor on routine jobs. Drums - per each Barricades - per each TC labor and supervisor - per hour TC vehicle - per day Class A signs - per square foot. (Class B are incidental) Contractor Piloted TC - per hour Arrow Boards - per hour	Not very much. Difficult to tell on most contracts as bid prices seem to vary greatly on many items.	Try to emphasize good traffic control PS&E and accurate estimates with adherence to the approved TCPs.	Try to apply limits to length of work zones and require subs to coordinate work as much as possible in the same work zone. Also try to have relatively tight control on working days in an effort to maximize efficiency.
<b>Washington DC: FHWA</b>	Kept Lump Sum bid item Construction Lane Closing even when they added individual bid items such as: cones, barrels, signs, etc. which are paid for on an each or SF basis, Theoretically the individual items are supposed to cover material cost and the construction lane closing is supposed to cover moving, flagging, etc.	Not generally although we do not look very hard. Also, they tend to be a relatively minor cost so it is not worth reviewing them too closely.	Nothing other than the general standard spec. that says mathematically unbalanced bids (on any item) could be a basis for bid rejection.  Don't recall in 11 years any bid ever being declared mathematically unbalanced for anything.	We pay for the maximum number of items used at anyone time. It is up to the project engineer to make sure the contractor does not attempt to overuse an item for a short time just to inflate quantity.
<b>West Virginia: DOT</b>	Traffic Control Device - unit Temporary Pavement Marking - linear foot (meter) Flagging - hour Pilot Car and Driver - day	There are times where we get bids that are significantly lower than the Engineer s Estimate. This usually occurs when the contractor believes the quantity shown for a particular item might	Each case is viewed separately. We reviewed estimates of quantities for errors. We review the propose traffic control plan for constructability. We also looked at the overall cost of all items.	Any revisions to the quantities or revisions to the approved TCP are reviewed by the WVDOH. Contractor must have written approval before revising.

	Calcium Chloride for dust control - ton	not be used in the quantities shown.		
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<b>State</b>	<b>Question 1: What method(s) of payment do you use for traffic control devices?</b>	<b>Question 2: Do you see unbalanced bids involving traffic control?</b>	<b>Question 3: How do you address the potential for unbalanced bids involving traffic control devices?</b>	<b>Question 4: How do you address cost containment?</b>
<b>Wisconsin: DOT</b>	<p>Bid price for each device per day of usage except: Flexible Tubular Markers - bid price for each device furnished and installed Temporary Pavement Marking - bid price for each linear foot Flagging - incidental to the times of work in the contract</p> <p>Replacement of damaged devices is not paid for, except flexible tubular markers.</p>	Occasionally. Not normal, significant occurrence,	If there is an apparent unbalanced bid, it could be considered invalid and thrown out.	<p>Price competition among the several traffic control contractors that bid on state contracts.</p> <p>We seek to minimize change orders.</p>
<b>Wyoming: DOT</b>	Lump Sum and Traffic Control Devices (TCD) units by the each.	Yes, about 30% or less of the projects.	We have held several meetings with the traffic control industry to discuss the whys. The main reason is due to poor estimated quantities the traffic control bidders see they are not going to use the quantity. Also, the way the Contractor is going to build the project is dramatically different from how the State anticipated. We have not rejected any bids due to the unbalancing of bids.	On our projects which are bid by the each we have the problem that there is no incentive to remove the traffic control. The traffic control itself does not necessarily cost us more but rather the cost is in the Construction Engineering due to the Contractor not being efficient and the impact to the traveling public. We are using Lane Rental, windows and Lump Sum traffic control to reduce our overall costs and the impacts to the traveling public.

<b>State</b>	<b>Question 5: Under your method overpayment, do you see change orders modifying traffic control contract items where changes affect the original estimate by more than 10%?</b>	<b>Question 6: Do you allow for the contractor to estimate quantities for traffic control items? If yes, how well do you feel this is working? What are the advantages? Disadvantages?</b>	<b>Question 7: How do you estimate traffic control quantities/cost during project development?</b>	<b>Question 8: Other comments or suggestions?</b>
Alabama: FHWA	No	No	Based on sequencing of work, the designer computes the estimated quantities.	None.
<b>Arizona: DOT</b>	We do not require a Change Order to modify the original traffic control estimate no matter what amount it increases over the course of the project unless the scope of the work has changed requiring an increase or decrease in traffic control. A statement from the engineer accompanying the final estimate is all that is required.	No	Responsibility of the Traffic Designers; they are part of the project management team and work with the other designers to determine the traffic control necessary for the particular sequences of work and its duration. Durations are generally from historical data. Traffic control devices required are derived from the MUTCD and ADOTIs supplement.	We have had difficulties in developing accurate estimates for traffic control. We would appreciate any information you gather that may assist us in this and/or containing traffic control costs.
<b>Arkansas: DOT</b>	No	No	Develop TCP and compute quantities for that plan.	
<b>Colorado: DOT</b>	No, not normally. If we had 10% over the price, CDOT goes to negotiation with the contractor and use MCR (minor contract revision) or CMO forms,	Contractor develops MHI based on plan and the contractor schedule. We approve or disapprove, but usually we have more than enough.	Traffic Engineers in headquarters or the region with input from our construction folks determine the types and quantities of devices and anticipated hours of flagging, traffic control supervision, etc. Prices for our engineerUs estimate are set by our Cost Estimating Unit. Mostly based on experience,	Colorado Standard Specifications are located at: <a href="http://www.dot.state.co.us/constsoecs/1999book/spectoc.odf">www.dot.state.co.us/constsoecs/1999book/spectoc.odf</a> Traffic Control Devices are Section 630  A lump sum method can possibly be introduced on items that are well known such as cones or barrels.
<b>Connecticut: DOT</b>	Yes, it is quite common and to be expected, especially on larger projects when the scope of the work also increases.	No, we have no reason for contractor to estimate quantities for traffic control.	The Division of Traffic does the actual takeoffs for pavement marking quantities. Most of the other items are calculated by knowing the time duration to complete the project, the size of the project and then using experience to properly develop the quantities.	
<b>Delaware: DOT</b>	Yes, normally can be accredited to bad planning.	No, or estimates are done in house by the engineers.	Construction time is estimated. Then all MOT items are calculated using	Our drum spec requires drum to withstand up to 60 mph winds, with each drum to be weighted with sand or

State	Question 5: Under your method of payment, do you see change orders modifying traffic control contract items where changes affect the original estimate by more than 10%?	Question 6: Do you allow for the contractor to estimate quantities for traffic control items? If yes, how well do you feel this is working? What are the advantages? Disadvantages?	Question 7: How do you estimate traffic control quantities/cost during project development?	Question 8: Other comments or suggestions?
		Contractors can question our intentions if there is a need during their bid preparation,	estimated contract construction time (used for detailed estimate).  Some projects are estimated using past projects of similar size and scope.	other approved devices.  Our contractors are required to fill out a daily certification form that states all traffic control devices are fully operational as checked.
<b>Georgia: DOT</b>	If other contract items that do not include traffic control exceed the quantity set up in the plans by 20% we have adjusted the Lump Sum price.	They estimate everything and are in charge and responsible for the traffic control.	We pay 25% of the Lump Sum on the first Construction Report then 25% of the % the project is complete until 100% is paid.	We are satisfied with lump sum payments. The contracting industry continues to request/pressure us to pay for item per each. We dont see the value added in doing that. As a lump sum item they are in control of the costs by determining the total number of devices to dedicate to a project.
<b>Idaho: DOT</b>	There are some large changes that occur in traffic control, but we only tract/adjust items with variation of 25%+/- as required in the CFRs.	Not normally done, currently releasing a trial project with a contractor hired Traffic Control Manager, which may be somewhat similar to this, but original quantities still bid as presented in proposal.	Based on a proposed traffic plan, cost history, and experience of the designer.	Although we require approval of TCPs and CPM scheduling, am not sure we do a great job of verifying the effect the two have on each other, and that when changes are approved that additional traffic cost are always considered.
<b>Indiana: FHWA</b>	TCPs are usually detailed enough that there are not significant revisions. The contractor is allowed to submit a revised maintenance of traffic plan, but the revised plan must show some benefit to the State at no increase in cost.	Yes, but only for lump sum items such as barrels and cones, for which there are standards for spacing and layout. Otherwise, the TCP had detailed quantities.	From the detailed TCP which is developed in the project development process.	States Specifications are located at: <a href="http://www.state.in.us/dot/TS/standards/book">www.state.in.us/dot/TS/standards/book</a> The Traffic Control for Construction and Maintenance Operations is in Section 801.
<b>Iowa: DOT</b>	No	Yes, our lump sum bidding structure requires the contractor to estimate quantities during their bid preparation.	Historical data from previous similar projects.	Copy of Traffic Control Specifications are attached. Would like a copy of findings.  Receive repeated requests from contracting associations to pay for individual traffic control devices, but we have resisted because we feel it is too difficult to determine a reasonable quantity to bid.

<b>State</b>	<b>Question 5: Under your method of payment, do you see change orders modifying traffic control contract items where changes affect the original estimate by more than 10%?</b>	<b>Question 6: Do you allow for the contractor to estimate quantities for traffic control items? If yes, how well do you feel this is working? What are the advantages? Disadvantages?</b>	<b>Question 7: How do you estimate traffic control quantities/cost during project development?</b>	<b>Question 8: Other comments or suggestions?</b>
<b>Kansas: DOT</b>	Yes. We see a number that overrun by 10% or more and then we see a similar number that underrun by a similar amount, When looking at the big picture, it seems to balance out. Many times when we see significant increase in quantities it is due to a change in phasing that was approved by the field offices, It may shorten the time of construction or lessen the risk to the traveling public, but require additional traffic control. KDOT will pay for the traffic control if it is seen as benefiting the traveling public.	Only after the award of the contract and the contractor is proposing a change to the project, such as phasing or sequencing, We will request an estimate of the traffic control quantities so we can have as much information as possible when the decision is made.	We estimate on contract maintenance projects, overlays, as a certain dollar amount per kilometer. On more complicated projects we will use some percentage such as 5 or 6% depending on the location. There may be projects in the metro Kansas City area where we may estimate a little higher.	
<b>Kentucky: FHWA</b>	Change Orders are rarely seen unless an item has been omitted. Overruns are handled without a change order.	No. The State must estimate quantity before the project is bid.	Estimate is based on the TCP scheme, which may reference several standard drawings. If the contractor proposes another scheme, it must be approved and any changes in traffic control quantities must be considered at that time. Sometimes things are missed; then usually the state pays the overruns.	The key to any item being realistically bid is to have a good design, with accurate quantities.
<b>Louisiana: DOT</b>	No. Pay by lump sum regardless of additional signs and barricades,	Yes. We detail standard signs required, then, the contractor estimates the additional signs required. Works well. The advantage is it makes contractor responsible for the number and type of traffic controls.  Disadvantage is the contractor bidding unknown quantity on the plans, therefore, we may be paying higher costs. Also, struggle for the Project Engineer to get the contractor to install additional signs and barricades.	Look at costs of recent, similar type projects.	Not many complaints from contractor or Department personnel.
<b>Maine: DOT</b>	Not Yet.	Only for lump sum. This works okay for the majority of contractors.  Advantages are a more proficient contractor could do the job with less quantities.	History x length by project scope.	

State	Question 5: Under your method of payment, do you see change orders modifying traffic control contract items where changes affect the original estimate by more than 10%?	Question 6: Do you allow for the contractor to estimate quantities for traffic control items? If yes, how well do you feel this is working? What are the advantages? Disadvantages?	Question 7: How do you estimate traffic control quantities/cost during project development?	Question 8: Other comments or suggestions?
		Disadvantage is pumping up the bid price.		
<b>Maryland: DOT</b>	Most contracts are lump sum and are not changed.	NO!	Based on previous, similar projects.	N/A
<b>Massachusetts : DOT</b>          <b>FHWA</b>	Occasionally          Hardly ever. Bids almost always reflect reasonable prices.	The contractor will estimate the quantities for traffic control devices only for extra work orders.          No	By developing a suggested method of construction, estimating the time to complete each construction stage, and estimating the proper traffic control devices needed for each stage of construction in accordance with the MUTCD.          By historical data.	We would be interested in receiving the results and conclusions of this survey.
<b>Mississippi: DOT</b>          <b>FHMA</b>	No.          Unlikely to affect the OVERALL PROJECT COST by 10% or more. It is not uncommon to have individual items vary by 10% or more. Temporary striping and barricades are two types of items that seen to go over plan quantities a good bit.	No.          No, except in one instance that involved a value engineering situation.	Each traffic control device is shown on the TCP sheets of the contract plans. Quantities are totaled from the details showing the devices.          Based upon the details of the TCP. Cost associated with Lump sum Maintenance of Traffic Item based upon magnitude and complexity of the project.	Often items used in standard set-ups such as lane closures are not measured for individual payment (covered under L.S. Maintenance of Traffic Item). This has caused some problems when significant overruns (or underruns) in direct construction items resulted in seriously increased or decreased durations of the traffic control set-ups. Revisions to some lump sum Maintenance of Traffic Items have been necessary, and that action is always difficult.
<b>Nebraska: DOT</b>	Rarely.          Only if they qualify according to the specs (Para. 2 of Subsection 104.02).	No	Historical data and feedback from the field.	

<b>State</b>	<b>Question 5: Under your method of payment, do you see change-orders modifying traffic control contract items where changes affect the original estimate by more than 10%?</b>	<b>Question 6: Do you allow for the contractor to estimate quantities for traffic control items? If yes, how well do you feel this is working? What are the advantages? Disadvantages?</b>	<b>Question 7: How do you estimate traffic control quantities/cost during project development?</b>	<b>Question 8: Other comments or suggestions?</b>
<b>New Hampshire: DOT</b>	No more than any other item.	Yes, through value engineering, but not very often as our contracts are usually pretty inclusive,	As in any items of this type, we estimate costs based on a history of similar work, usually is cost/mile,	
<b>New Mexico: DOT</b>	Contractors quite often suggest changes to the States TCPs to suit their particular operations (construction phasing). Since these changes are carefully scrutinized, costs seldom overrun as much as 10%.	Since lump sum bidding has been only on simplified projects with pretty standardized traffic control and is done in a competitive atmosphere, there hasn't been too much of a problem. The contractor does estimate his own quantities for bidding purposes. There may be a tendency for the contractor to underbid traffic control. Since his TCP must be approved there are bound to be some disagreements between the contractor and the State over what is needed to satisfy the minimum requirements for traffic control. The only advantage is the time saved by the State in design and the hassles over changing the plans after going to construction.	Estimates are based on average unit bid prices.	None.
<b>Ohio: FHWA</b>	Yes, ODOT allows for value engineering of all aspects of projects including MOT plans.	No, lump sum used primarily.	Historical data and by length/contract time.	Visit ODOTs website at <a href="http://www.state.oh.us">www.state.oh.us</a>
<b>Oklahoma: DOT</b>	Only when the scope of work has been changed on a lump sum project.	No. The contractor estimates the lump sum projects. ODOT estimates the sign day projects.	By comparison to the need through a TCP and our historical database.	Whatever system is used it should discourage slow progress of the work. You might set up a lump sum arrangement for the number of days allotted to the project with a proviso that if the weather is unusually severe there will be no consideration for more compensation until after 60 days of unusually severe weather.
<b>Oregon: DOT</b>	Not that often. The main items that see change orders increasing the amount by more than 10% are flagging, temporary striping, and pavement markers. The most common of these is flagging, which is due	On ODOT projects we provide estimated quantities for traffic control devices in the special provisions or bid schedule sheets, Our specifications provide the contractor an opportunity to submit changes to the TCPs	Our Roadway and Traffic Control designers work closely together to develop the staging plan for a project. Based upon the requirements of the MUTCD, our specifications and standard drawings,	ODOTs specifications and special provisions can be viewed at <a href="http://www.odot.state.or.us/techserv/roadwav/soecs/home.htm">www.odot.state.or.us/techserv/roadwav/soecs/home.htm</a> Traffic control is found in Sections 00220 and 00225. Our

State	Question 5: Under your method of payment, do you see change orders modifying traffic control contract items where changes affect the original estimate by more than 10%	Question 6: Do you allow for the contractor to estimate quantities for traffic control items? If yes, how well do you feel this is working? What are the advantages? Disadvantages?	Question 7: How do you estimate traffic control quantities/cost during project development?	Question 8: Other comments or suggestions?
	to completion time extensions on projects. The Traffic Control Designer estimates the amount of flagging hours needed on a project based upon a preliminary project schedule developed by our Cost Estimating unit. Due to weather or other unforeseen circumstances project completion deadlines get extended causing the flagging amount to increase,	and this does occur quite frequently. One advantage would be since the contractor will probably submit their own TCP they might as well provide the estimated quantities. A disadvantage is traffic control seems to be an area where the contractor tries to do the least amount as possible. So the contractors quantities would probably be underestimated.	engineering judgment and the staging plans the Traffic Control designer develops the plans, specifications and quantities. The TCPs, specifications and quantities are reviewed by other engineering units and the affected construction office for adequacy several times before the final package is ready to go out to bid.	Cost Engineering Estimating unit has a web page that has average bid item prices and construction cost trends. It can be found at <a href="http://www.odot.state.or.us/techserv/o0roasrv/costestm/COSTEST.HTM">www.odot.state.or.us/techserv/o0roasrv/costestm/COSTEST.HTM</a>
<b>Pennsylvania: DOT</b>	No. PennDOT standard (general) provisions require a change in item quantity in excess of 25% before an adjusted unit price is considered. In the majority of such cases the Department is able to reach an agreement with the contractor to stay with the bid price.	No.	Through primarily the traffic control unit in each PennDOT District.	PennDOT website: <a href="http://www.dot.state.pa.us">www.dot.state.pa.us</a>
<b>FHWA</b>	<p>PennDOT specifications allow for price adjustments when there is a material change in scope or when an item of work is increased or decreased by 25%. (This applies to all contract items, there is no major item definition.)</p> <p>If the contract time is extended there maybe a proportional adjustment in the lump sum traffic control,</p>	Plans include tabulations of quantities for informational purposes only. There is an effort underway to simplify plans and perhaps have the contractor be more responsible for preparing plans. (No agreement on this yet.) If PennDOT did not prepare the tabs, I expect that all of the contractors would have to do so and the APC (contractors association) would probably not appreciate the extra work and risk. Several design build projects will require the contractor to prepare TCPs this summer.	From detailed phasing plans.	Good Luck!
<b>Rhode Island: DOT</b>	The goal is to hold change orders to under 10%. This is not always successful, but it is an improvement over past practices.	We are currently experimenting with this method for our Statewide Pavement Marking Contracts. We are unable to provide an evaluation at this time.	During the design process the project manager reviews the plans with the Construction Section for construction sequencing. On particularly complex projects, input may be solicited from the major contractors regarding the anticipated method of construction. The TCPs and quantities are developed based on this input. The Department's engineers estimate program maintains a database of average weighted prices bid for standard pay items in developing project estimates. The prices may be revised during the project review process.	It is an ongoing process, as problems are identified changes to procedures are proposed.



State	Question 5: Under your method of payment, do you see change orders modifying traffic control contract items where changes affect the original estimate by more than 10%	Question 6: Do you allow for the contractor to estimate quantities for traffic control items? If yes, how well do you feel this is working? What are the advantages? Disadvantages?	Question 7: How do you estimate traffic control quantities/cost during project development?	Question 8: Other comments or suggestions?
FH WA	It takes an 125% increase in quantities to trigger a change order.	No	Quantities are developed from the projects TCP.	N/A
<b>Tennessee: DOT</b>	Not normally. This may happen occasionally should an error be made in the estimate or should any traffic control items be omitted from the bid items. Also, if the Contractor proposes a different plan of operation that is beneficial to the project, the original estimated quantities of traffic control devices might be increased where the revised number of traffic control devices might be increased where the revised number of traffic control devices is not a controlling factor in the revised TCP.	No.	Traffic control quantities are estimated by the Designer using training and experience, plus the Departments Standard Roadway Drawings for Traffic Control Appurtenances. The cost of most of the traffic control items is generally estimated based on previous bid data, although the quantities of traffic control devices and anticipated duration of the project may be factors in developing the estimated price.	
<b>Texas: DOT</b>	Typically, we do not have change orders that change the traffic control quantities.	We do allow the contractor to estimate the traffic control quantities, since the contractor is responsible for plan takeoffs. We have devised standard traffic control sheets to estimate his quantities on most projects. On larger projects, we provide detailed phase construction plan sheets, but the contractor is still responsible for estimating the quantities above what is shown on these sheets. The contractor is also responsible for providing any additional traffic control devices, as the TxDOT inspector deems necessary. If the inspector deems that the contractor is not maintaining the traffic control devices as necessary, that months payment can be withheld. An advantage from the TxDOT perspective is that the inspector does not have to keep up with the quantity of each traffic control device on a project. A disadvantage from the Contractors perspective is that he may have to do more work than was anticipated when he bid the project.	We do not estimate the traffic control quantities. We estimate the total cost of the traffic control by the size of the project, the duration of the traffic control and the traffic volume for the roadway under construction.	We believe a per item payment for traffic control would be nice, however we do not have the manpower to keep track of the number of items involved in a traffic control setup.

<b>State</b>	<b>Question 5: Under your method of payment, do you see change orders modifying traffic control contract items where changes affect the original estimate by more than 10%?</b>	Question 6: Do you allow for the contractor to estimate quantities for traffic control items? If yes, how well do you feel this is working? What are the advantages? Disadvantages?	Question 7: How do you estimate traffic control quantities/cost during project development?	Question 8: Other comments or suggestions?
<b>Utah FHWA</b>	No, contractor must bid up front and is responsible for needed changes in cost.	Yes. Over and under estimating is the responsibility of the contractor.	N/A	N/A
<b>Vermont: DOT  FHWA</b>	No  At times, if there is-a special need for something, a change order is developed, Usually the change involves the addition of a non-standard warning sign for some special occurrence. Those are negotiated as per square meter of sign.	No  Our standard plans give the requirements for establishment of work zones. It is up to the contractor to do his own estimate of what will be needed beyond that. An estimate for the items bid by hour, meter, etc. is provided by the designer in the plans. Of course, if the standard traffic control plans do not adequately address the project traffic control needs, a project specific traffic control plan is developed. Lump sum and hourly, etc. estimates are then developed from that specific plan.	Using bid histories.  The lump sum item of traffic control is estimated at 10% of the total project costs for other items. Flaggers are estimated at 1 hr for each 30CM of excavation, 23 CM of subbase, and 11 metric tons of pavement. Uniformed officers are generally estimated the same, but the construction engineer is asked for an estimate at the final plan stage. Water and calcium are estimated at 1660 CM per km of two lane roadway and 2.8 metric tons per km of two lane roadway respectively. All per unit items are based on plan layouts.	Please call with questions or comments.  The general feeling is this state that is measuring each device (cone, barrel, sign, etc.) as a separate pay quantity puts too much of a burden on the project resident engineer as to counting, documenting, etc. There have been few problems to date with the system that is in use here. The contractors are usually cooperative in providing the standard items in a contract, even if they overrun from what was conceived. With our willingness to enter into a change order for those special items no matter is irresolvable.  We also have an agreement with the state police to enforce speed limits in the work zone. Those costs are eligible for federal-aid reimbursement.  With the exception of one geographic area in the state, traffic is considered to be light,
<b>Virginia: DOT</b>	Yes, if we feel the change is a changed condition.  No, if only if the quantities are either over or under running.	No, we provide the estimated quantities.	Determine the quantities from an engineering analysis based on the project design and phasing. The cost is estimated based on historical prices & a cost-based analysis; i.e. equipment, time.	
<b>Washington: DOT/FHWA joint survey</b>	Not many.	No	A traffic control strategy is applied to each project and appropriate TCPs are developed to carry out the strategy on the job. Estimates are driven by the strategy/plan requirements, number of work zones and working days.	

<b>Washington DC:</b>	No, we vary quantities a lot more than that and	Projects are usually not that long so like any bid	Most designs are done by consultants with no	For small items, (jerseys, barrels, cones,
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<b>State</b>	<b>Question 5: Under your method of payment, do you see change orders modifying traffic control contract items where changes affect the original estimate by more than 10%?</b>	<b>Question 6: Do you allow for the contractor to estimate quantities for traffic control items? If yes, how well do you feel this is working? What are the advantages? Disadvantages?</b>	<b>Question 7: How do you estimate traffic control quantities/cost during project development?</b>	<b>Question 8: Other comments or suggestions?</b>
<b>FHVA</b>	never renegotiate cost.	items, DPW inspectors keep track of quantity. The contractor keeps his own quantities and they eventually reach an agreement on how many were used.	standard procedure advocated by the DPW. Guess they use the worst case (most involved phase) and estimate quantities from that setup, although they do tend to underestimate quantities.	etc.) we include replacement (for any reason including traffic, vandalism) in cost. For major cost items (such as arrow boards, VMS, etc.) we pay by change order for damage by traffic.
<b>West Virginia: DOT</b>	There are projects where change orders exceed the original estimate by more than 10%. This usually occurs on projects where the project construction time has been extended.	No	A specific TCP is developed for each project. These plans normally use standard TCPs with established units for each plan. These are developed in the design phase and reviewed prior to construction.	
<b>Wisconsin: DOT</b>	On some contracts, especially larger staged projects.	No	Design engineer/technician estimates the number of devices expected to be used (based on the traffic control plan) and multiplies by the number of days the devices are expected to be in use for the project.	Some contractors have asked for changes to the traffic control bidding process, including a request to consider paying a bid price for each device, rather than each device per day. With the daily payment system, some contractors believe their set-up costs (for initial devices and devices added during the project) are not adequately compensated at the appropriate times.
<b>Wyoming: DOT</b>	We do not have too many change orders that involve traffic control items. Main reason is that a quantity can be overran without a change order when the item is not a major item, which is 5% of the total original contract amount and 10% of the quantity. Traffic control is not usually a major item,	Our lump sum projects are usually done on projects where it is fairly clear what will be required. These projects have worked well. This also requires the traffic control subcontractor to discuss the operation with the prime ahead of time, instead of just bidding a cost per unit. Disadvantage is if the bid was not anticipated correctly due to Contractor's efficiency being off, damaged devices or for more moves there is no way to recoup these costs. Tends to put all the risk on the Contractor, but by TCD units puts all the risk on the State.	Our field crews calculate quantities based on how they see the project being built and our traffic design group checks or verifies the number(s). Our traffic design on some projects calculate the quantities instead of the field.	

Appendix B 

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**Bidding Techniques and Average Traffic Control Costs  
of Other States** 

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## **Traffic Control Survey Results** **2001**

The Montana Department of Transportation would like some information on traffic control.

1. What traffic control bidding techniques do you use on projects? How have these techniques worked for you?
2. What scenarios cause traffic control increases or overruns in your state?
3. Has your state taken any measures to control/reduce traffic control costs and improve traffic control estimating? If so, what measures? Also, please discuss the adoption and administration processes for implementing new traffic control procedures.

Please respond to me directly at the e-mail listed below. Also, please let me know if you would like the results of this survey.

Thank you in advance for your time and efforts; it is greatly appreciated.

### **South Dakota**

1. The traffic control is included in the list of project bid items. Our spec. book requires the prime contractor to adhere to the Federal MUTCD. Inadequate traffic control is dealt with similar to any other out of spec. bid item. I would support more \$\$\$ penalty to out of spec use of traffic control devices.
2. Prime contractors changing the project sequencing at the last minute after the traffic control subcontractor has submitted a bid based on the plan sequence. This should be a problem between the prime contractor and the subcontractor. Sometimes, DOT pays because of inexperience on the part of staff.
3. I believe that traffic control for major projects is very well planned and thought out. We receive very few substantiated complaints from contractors with respect to our traffic control in project plans. The contractors would like the State to pay per each for reflectorized drums and cones. We do not because we don't have staff to count these devices on a daily or weekly basis.

### **Tennessee**

1. Tennessee bids various traffic control items identified for the project needs based on a traffic control plan developed by our Design Division. This plan is an option for the contractor, but he is allowed to develop his own plan based on his plan of operation. There generally is a lump sum payment for Traffic Control which includes flaggers, traffic cones, and removal of conflicting and incorrect markings. Other items are paid per each, square foot, linear foot, etc. for drums, warning lights, arrow boards, delineators; sign panels, channelization; barrier wall, barricades, pavement marking, etc.

This has worked satisfactorily, generally, by having flexibility for payment of items needed as conditions change. A problem could be developed if the plan of operation of the contractor attempts to increase quantities with one phase instead of using the items in sequence. Example, we only pay for a traffic barrel once as long as it is not removed from the project; therefore, contractors try to get as many barrels as allowed up front.

2. Proposing to set up individual work sites throughout the project limits at the same time instead of using a leap frog sequencing causes increased quantities. You can anticipate some proposals based on the quantities bid and the prices quoted by the contractor. Generally traffic control is not a major cost factor and can be justified when you debate safety and time reductions in work completion, if it happens.

3. Presently, a traffic control plan is developed for quantities and a potential plan of operation. Safe work zones is an issue but TDOT is still allowing the contractor to submit his traffic control plan alternative. For continuous improvement in traffic control, we have several committees working on specific objectives such as improved signage, speed limits, night construction, and advanced warning. We also have an annual Joint Process Review in conjunction with FHWA that reviews sample projects around the state for daytime and nighttime impact with respect to traffic control. They provide a report with observations and recommendations for improvements. TDOT's representatives are field supervisors, design, construction, maintenance, and traffic.

Results of your survey may provide some information or trends that could be of great use in Tennessee, please forward a copy when appropriate.

## **Utah**

1. What traffic control bidding techniques do you use on projects? How have these techniques worked for you? UDOT has recently implemented "lump sum" traffic control bidding requirements. We are currently working through some of the resulting issues but are confident that the lump sum approach will be very beneficial to the Department.

2. What scenarios cause traffic control increases or overruns in your state?

Before the implementation of lump sum traffic control, the contractor had little or no concern as to the efficiency of his operations in regards to traffic control and associated resources. The lump sum approach has resolved that issue.

3. Has your state taken any measures to control/reduce traffic control costs and improve traffic control estimating? If so, what measures? Also, please discuss the adoption and administration processes for implementing new traffic control procedures.

We are in the process of reevaluating the efforts and responsibilities of UDOT staff in the area of traffic control. With the lump sum delivery system, the contractor is responsible for the traffic control plan. However, our designers and construction crews must have input in, and oversight of, the contractors effort. The Department is also assuming the responsibility of identifying any possible project specific special requirements beyond those required by the MUTCD, esp. VMS, barrier, etc. This will help the contractors efforts in preparing fair and accurate bids and associated traffic control plans.

## **Michigan**

Answers to your questions:

1) We include all the traffic control bidding as part of our construction projects, where the control will be used. We take bids on each item (drums, barricades, signs, etc.) of traffic control. Look at our web side under: <http://www.mdot.state.mi.us/desssp/> toward the bottom of the page go to: 2003 INTERIM STANDARD SPECIFICATIONS FOR CONSTRUCTION

Then go to Section 812, which is our traffic control section. Go to 812.04 and it shows our pay items.

We have been using this process for many years and have been happy with it. We pay for only what we use. The one draw back, is the designer has to predetermine how many units of each devise will be required, rather than let the supplier/contractor figure it out.

2) When something is overlooked or unforeseen when the design is put together. Many times when we are performing work at night, we will half the spacing of plastic drums, which may cause an increase. Also,

sometimes, not often, the contractor decides to Stage the project differently than we envisioned. Our estimate of traffic control devices is based on our plan and the Contractor may change it, with our permission. The item that we have the most problem is, Truck-Mounted Attenuators (TMA). We use these a lot on bridge painting jobs in urban areas. When putting the estimate together, we do not know the schedule of the contractor. We may assume he will work on 2 bridges at a time, when he is working on 4. Doubles the quantity of TMA's.

3) We have told out designers to take care when doing the estimates, we have project level, region and Central office reviewing the plans (though project level would be the only one checking quantities). We have been trying to come up with a way to bid the TMA's in a different manner, in order to eliminate the overruns. Two thoughts have come up. .one. .don't pay for them. .require them but have the contractor put the cost as part of other pay items. The other is making TMA's a Lump Sum pay item...where the Contractor brings out as many as he needs and receive one price for all. We have not implemented any changes yet. For minor changes to traffic control procedures, we write a Special Provision, gain approval from 2 central office reviewers and place it in a contract. For major items, we take it to our Traffic Recommendations Committee (made up of Region/Central office folks) , which investigates the issues and come up with possible solutions (changes). Then the issue/solution goes before the Engineering Operation Committee, EOC (made up of the Department's Chief Engineer, Chief Operating Officer, FHWA rep., and other top management). They are the final decision point. If the issue raised is anticipated to be controversial with the Contracting Industry, we will present it to 2 large Industry Associations before, sometimes after, it goes to EOC. They will have an opportunity to express their concerns.

There is another way that policy may change,,someone knowledgeable of the subject writes a draft Instructional Memorandum. It is review by the Engineer of Construction, Engineer of Construction of Technology, our 7 Region Engineers (or their designate) , the Chief Engineer and the Chief Operations Officer.

## **New Hampshire**

The Montana Department of Transportation would like some information on traffic control.

1. What traffic control bidding techniques do you use on projects? How have these techniques worked for you?

Our traffic control item includes the work to install temporary traffic control devices as well as the construction signs and warning devices themselves. A design estimate is derived from the anticipated signs and devices and bid price history from similar projects. This is bid as a unit item and paid for at the contract lump sum price. Items that are not included in this item include portable changeable message signs, uniformed officers, and temporary pavement markings. These are all paid for at contract bid price per hour or lf. We pay the material costs of calcium chloride for dust control but labor to place it is subsidiary to the traffic control item.

2. What scenarios cause traffic control increases or overruns in your state?

A change in the contract such as the addition of work will sometimes justify a cost increase for traffic control. The additional work would have to have a significant impact on the amount of traffic control that the contractor should have anticipated when bidding the project.

3. Has your state taken any measures to control/reduce traffic control costs and improve traffic control estimating? If so, what measures? Also, please discuss the adoption and administration processes for implementing new traffic control procedures.

## **Texas**

1. What traffic control bidding techniques do you use on projects? How have these techniques worked for you? We pay for TCP by the month. Some specialty items are bid separately such as temporary concrete median barrier, changeable message signs and temporary crash cushions.

2. What scenarios cause traffic control increases or overruns in your state? Added quantities for those items bid separately and added duration of the contract when time is increased on the contract for work added or delays outside the contractors control. Otherwise, the number of months for TCP is set by the estimate. If the contractor goes beyond the months set up, they get no further payment.

3. Has your state taken any measures to control/reduce traffic control costs and improve traffic control estimating? If so, what measures? Also, please discuss the adoption and administration processes for implementing new traffic control procedures. We try to standardize the types of devices contractors can use on the project. That standardized list is generic enough to allow for competition. Every TCP is reviewed in the design stage in the district and in the division in Austin. We maintain stand TCP sheets that districts use. We provide for details in the plans that help the contractors reduce their price, take the risk out.

## **Washington**

1. WSDOT generally uses individual bid items to capture all of the traffic control related costs. We have used some lump sum traffic control items for basic projects with some success. We are just starting to use A+B bidding and have one design build project underway. The jury is still out on these latest scenarios and we are continuing to look for ways to limit traffic control cost and encourage contractor efficiency.

2. Any scenario that is "open ended" such as

- \* Too many working days

- \* No restrictions on the number of lane closures

- \* Bid items that are totally controlled by the contractors work operations, efficient or not

- \* Too much dependence on flaggers and inefficient use of traffic control labor to install and remove traffic control

3. As I mentioned above, we are just starting to explore some new scenarios and probably haven't reached too many conclusions at this point. We are becoming more aware of the scope and nature of the problem and do intend to update spec's and procedures to become more efficient. We are also concerned that if we implement too many lump sum items/contracts, the quality and level of attention to traffic control may decline if the contractor feels that there will be no further compensation, even though more work may be needed.

## **Alaska**

Question 1: What haven't we tried? We have use contingent sum, lump sum, and unit prices. We have allowed the contractor to develop the traffic control plan and we have imposed the traffic control plan on the contractor. We've even tried to make traffic control subsidiary to all other items. None of these techniques work well. Contractors have found a way to take advantage of all of the methods tried to date.

Question 2: Unit prices combined with the contractor developing the traffic control plan causes the greatest overruns followed by contingent sum with the contractor in control of the traffic control plan. Most of our contractors subcontract out the traffic control. Consequently, the subs take full advantage of any loopholes they find. They will put every device in their inventory on the road to the point of becoming dangerous. They will even leave traffic control up even though no work is going on. In some cases, we have resorted to issuing directives to remove devices within two hours or we'll remove them and bill the contractor.

Question 3: The most successful implementation has been lump sum. Because the contractors subcontract traffic control we typically get realistic costs. However, whenever we have a change in the project, the contractor tries to extract additional payment for traffic control. Every change increases traffic control



costs. The greatest downside to lump sum has been that contractors try to minimize their costs at the expense of the traffic control.

### **Wisconsin**

1. Traffic control bidding techniques: Most traffic control devices are bid and paid per day of use for each device. On a small number of projects where the traffic control is very straightforward, lump sum may be used for all of the traffic control.

Even on projects with bid items for each device, the lump sum item is also used to cover work not included in the t.c. device items, or we use a Traffic Control Surveillance & Maintenance item. The Surveillance & Maintenance item requires the contractor to provide a Traffic Control Specialist to do the daily inspection and maintenance and submit reports to the project engineer. It is used on complex projects with large numbers of devices spread over long distances, and is paid by the day.

These techniques have worked reasonably well for us. With daily pay items for each device, the paid quantities can be adjusted if more or fewer devices are needed, or if the devices are in place for a longer or shorter time period than expected. Contract change orders are rarely needed for these changes.

At the suggestion of contractors, we are considering paying for larger, more expensive devices such as Portable Changeable Message Signs by each device furnished, plus a daily item for operation of the device. Contractors say this would more accurately reflect how their costs are incurred for these large devices.

2. Scenarios causing traffic control increases: Construction project takes longer than expected, or traffic control staging is revised in the field in a way that requires more devices -- typically not an unusual problem on most projects.

3. Measures to control costs & improve estimating: Have developed more standard traffic control drawings to promote more consistency in device use, placement and quantities. We also are developing more written guidance for preparing traffic control plans to ensure the plans accurately and appropriately represent the traffic control that will be needed in the field. Before administering new traffic control procedures, they are discussed with traffic control contractors, department work zone traffic control team or other appropriate staff.

### **Illinois**

1. What traffic control bidding techniques do you use on projects?

Illinois uses several approaches to traffic control in contracts.

The most common method of paying for the various applications is by Lump Sum, and in some instances by Each. The various IDOT standards are set up for urban and rural situations. There are also pay items for expressways in Chicago and other items we specify as Traffic Control Complete or Special when our applicable standards do not fit the work. We also use Pilot cars in some situations and have a pay item that is used to monitor the traffic control outside of working hours to insure the work area where open holes or larger than three inch drop-offs are protected. It is called Traffic Control Surveillance and is paid for by the calendar day. It requires the contractor to drive through the work zone at specified hour increments and fix any problems and provide a report the following day. We have specified some "Real Time" systems that use a website, cameras and detectors to alert the Engineers on site so message boards can be changed to reflect current situations where a backup may be occurring and offer motorists an alternative route. We also use a movable barrier technique where the number of lanes in each direction can be changed to reflect rush hours. In some instances, we limit the work to avoid rush hours by working on the lanes with less traffic or require night work during rush hour.

2. How have these techniques worked for you?

These techniques work very well. Our standards cover most situations and we have the flexibility to specify other techniques when our standards do not fit a unique situation. The real time system has helped avoid delays and night work reduces backups on heavily traveled expressways. The movable barrier gives flexibility in providing more lanes for the morning phase of rush hour and then changing the number of lanes in the afternoon phase of rush hour.

3. What scenarios cause traffic control increases or overruns in your state?

We have a Special Provision that allows an extra payment for traffic controls for pavement patching when the quantity of patching increases by a certain percentage.

We have a Public Convenience Specification that increases Traffic Control costs by requiring the contractor to keep lane closures to a minimum on some interstate paving projects. This Specification requires the contractor to move the beginning tapers a mile at a time when the asphalt has cooled to the point where traffic can drive on it and keeping barrels only one half mile in front of the paving operation. This requires a full-time crew to do this where in the past a contractor was allowed a five-mile closure. 4. Has your state taken any measures to control/reduce traffic control costs and improve traffic control estimating?

Yes

If so, what measures?

With work on Interstates and Expressways we require expediting of work to decrease the time the Traffic Control devices are required. This is sometimes offset by higher prices of the actual work that requires the contractor to work longer hours.

5. Please discuss the adoption and administration process for implementing new traffic control procedures.

New traffic control procedures begin typically in the Bureau of Operations, but also in the bureau of Design and Environment. Revisions are brought about by new materials or equipment, comments from industry or IDOT personnel, or our own field observations. Proposed revisions or new procedures are reviewed by Operations and Design. Often times new products are used on a trial basis in the field to observe their performance. Information from other states and national publications also go into the decision making process. Revisions or new procedures are then incorporated into Standard Drawings or Specifications

## **Hawaii**

1. What traffic control bidding techniques do you use on projects? How have these techniques worked for you? Generally, traffic control is not paid for separately but is incidental to other contract items. We do include a force account item in the contract to pay for additional police officers and traffic control devices. Therefore, if the State requires traffic control in addition to what's shown in the plans, it is paid for on a force account basis. If a project requires extensive traffic controls, detours, construction phasing, etc. then a separate item for traffic control paid for on a lump sum basis is provided in the contract. These methods have worked pretty well for us. It gives the contractor and state engineers flexibility during construction.

2. What scenarios cause traffic control increases or overruns in your state? Whenever the designer overlooks or does not take into account the impacts to traffic the plans may need to be revised during construction. Also, the designer may rely on standard traffic control plans but the complexity of the construction may require more project specific plans.

3. Has your state taken any measures to control/reduce traffic control costs and improve traffic control estimating? If so, what measures? Also, please discuss the adoption and administration processes for implementing new traffic control procedures. It hasn't been a problem; most projects are within budget for

## 2. How have these techniques worked for you?

traffic control. Traffic control and impacts to traffic are considered early on during the project scope development phase.

### **Iowa**

The Iowa DOT uses a combination of bidding practices in our traffic control plans. We use a lump sum bid item to pay for most work zone signing, channelizing devices, and all items that do not have a separate bid item.

Some items are paid for separately. Pavement markings are divided into several items:

- Painted markings placed, per station
- Painted markings removed, per station
- Removable tape, per station
- Raised pavement markers, each
- Temporary delineators, each

We have fixed prices for flaggers and pilot cars both paid per day. Temporary signals are bid per setup with a common controller. Temporary floodlights are bid each installed. Portable Concrete Barrier is bid per ft installed.

On large complex projects we pay the contractor per day to monitor the traffic control 24 hours per day and restore missing or damaged devices and report incidents to law enforcement and DOT maintenance forces.

We have separate bid items for road closure barricades, which consist of a ROAD CLOSED sign mounted on a type III barricade and an orange plastic safety fence placed across the roadway.

We encourage our project engineers to work with the contractor to develop a price list for devices covered by the lump sum bid item to protect the contractor and the department if there is a substantial change to the project. Not all the engineers do this on every project, nor is it part of a formal policy of the department, just common sense.

We have a good working relationship with most of the traffic control subcontractors that get the bid through the prime contractor. The Iowa DOT and the majority of the subcontractors are members of the national and Iowa Chapter of ATSSA Through the DOT Specification Committee we have at least annual meetings with the traffic control subs to discuss specification issues.

### **Maryland**

My question to you is: How do you define 'traffic control'?

Is it for maintenance of traffic during construction or positive guidance to motorists in general (signing, pavement markings, traffic barrier, etc.)? This will give me a better idea of the information you're after.

I have a list of the questions you sent to Ms. Barbara Adkins.

We are always looking for ways to improve our traffic control items and reduce cost. We have tried some new products that have worked well.

### **Oregon**

Thank you, Sue, for your inquiry regarding Oregon's Traffic Control practices and policies. As the supervisor for the Traffic Control Plans Unit within ODOT, I will try to address your questions as completely as possible. Please feel free to contact me for further comment or discussion.

From your email of October 18, you asked the following:

**1) What traffic control bidding techniques do you use on projects? How have these techniques worked for you?**

Our construction contracts are bid on all aspects of the project as a whole. We do not bid separately on the Traffic Control portion of a contract. However, we do calculate estimated quantities for the Traffic Control Devices (TCD) needed for each project and that sum is rolled into the total project cost estimate.

The Traffic Control cost estimate is comprised of lump sum items, individual bid items and anticipated items. I am including a list of typical bid items, items included in the TP&DT lump sum cost and anticipated items. Please see the included Excel spreadsheet for these items.

Each Traffic Control cost estimate includes a dollar amount for Temporary Direction & Direction of Traffic (TP&DT). That amount can be calculated or approximated as a percentage of the total construction budget. The calculated TP&DT amount is comprised of a number of items frequently used on the project (see the enclosed spreadsheet for TP&DT items).

For the most part, we find our cost estimates reasonable, yet not overly conservative. Characteristically, the more complex the project, the more involved our cost estimates become. In assembling our Traffic Control Plans (TCP) and estimates, we carefully look for any methods or options available to cut TCP costs, yet maintain the integrity and safety factor for the traveling public and the contractor.

**2) What scenarios cause traffic control increases or overruns in your state?**

**Increases in TCP costs can originate from many sources. A leading culprit is an oversight during the development of the project — last minute right of way issues, undiscovered environmental constraints, constructibility issues, etc.**

As a recent example, a bridge replacement project originally contained a temporary one-lane, two-way bridge with a temporary traffic signal regulating traffic flow while the new bridge was constructed, in kind. Right of way and environmental constraints made the temporary structure impossible and forced a change in the construction staging. Instead, the structure was rebuilt, half at a time. Temporary concrete barrier was placed along the exposed cut line and 24-hour flagging used to control traffic. The loss of the ability to use a temporary bridge also meant the loss of the temporary signal due to sight distance deficiencies. The 24-hour flagging added significant cost to the project and delayed the project completion date.

Other examples might include Contract Change Orders (CCO) requested by the Project Manager to add TCD to the work site or make changes to the staging of the work. Adding a single Truck-Mounted Attenuator (TMA) can add \$8000 to \$16000 to the project. If a Project Manager or Contractor changes the staging such that a 300 m run of temporary plastic drums protecting the edge of pavement becomes a run of temporary concrete barrier, the cost may jump by \$18,000.

Hopefully, through the Project Delivery process, my designers and I can catch the majority of these oversights or anticipate the need for these extra items.

**3) Has your state taken any measures to control/reduce traffic control costs and improve traffic control estimating? If so, what measures? Also, please discuss the adoption and administration processes for implementing new traffic control procedures.**

The Traffic Control Plans Unit relies heavily on automated information and tools in producing our Traffic Control Plans, Specifications and cost estimates. In an effort to maintain consistency from one set of contract documents to the next, we have strict drafting standards for the plan sheets and specification templates, or “boilerplates,” for our Special Provisions. Average unit bid item costs for TCD, flagging hours, etc., come to us from our Cost Estimating Unit. To further improve consistency and efficiency, we utilize a Peer Review program with the TCP Unit. Designers will frequently ask fellow designers to review their plans, specs and estimates for completeness and accuracy. The combination of these strategies has helped the Traffic Control Plans Unit, and ODOT, to continually improve upon the quality and accuracy of the contract documents.

Depending on the complexity of the new procedure, and who and what it affects, most new procedures are developed and approved within the TCP Unit. If the TCP Unit sees the need to change a

Standard Drawing or a Traffic Control Specification, the process is quite simple. If there is a major change to the Standard Specifications that would require legal advice from the Attorney General, the process is much more complicated and time-consuming. Changes to the process we use in developing plans and estimates is much the same way. If the change only affects our internal development process, the Team will meet, discuss the change and approve or disapprove. If the process change would affect other Units or the process as a whole, more players are invited for input.

From a technical standpoint, changes to specific Traffic Control design processes, first and foremost, must meet the minimum requirements of the MUTCD. Changes we make that meet or exceed the policies dictated by the MUTCD are at our discretion. The process for those changes would include a Team discussion, followed by input gathered from any or all of the following ODOT disciplines -- the Specification Unit, Traffic Management Branch, Project Managers and Industry Members (Contractors, Vendors, AGC members, etc.). On occasion and like yourself, we may turn to other State DOTs for advice or input on new Traffic Control procedures or technologies.

## Average Annual Traffic Control Costs

### **Montana**

The Montana Department of Transportation would like another bit of information with regards to traffic control. We would like to know the average annual percent of total contract dollars spent on traffic control for the last three years. MDT's averages are 1999=7.3%, 2000=5.3%, and 2001 (To date)=5.6%.

### **New Hampshire**

Some of our traffic control items are separate pay items, and some are subsidiary to other items in the contract, so we can't really give a valid percentage.

### **Iowa**

1998 = 3.3%  
1999 = 3.5%  
2000 = 2.7%

### **Kentucky**

Traffic control totals		awarded totals	%
1999	\$11,595,520	\$689,496,561	1.68
2000	\$11,760,013	\$735,725,434	1.59
2001	\$10,108,266	\$613,225,231	1.64

(To date as of October 2001)

### **New Jersey**

NJ has spent 7% each year for 1999, 2000, and 2001.

### **Mississippi**

Mississippi averages 3.9% of contract cost spent on traffic control for new construction (grade, drain, base and pave) and on rehabilitation projects 5.0% is spent on traffic control.

### **California**

The traffic control item (bids) compared to award amount approx. in calendar year: 1999 3.1% (52/1676)

i.e., 52 million out of 1,676 million, 2000 2.8% (70/2498) and 2001 to August 3.5% (35/985).

### **Vermont**

FY99 5.57%  
FY00 4.77%  
FY01 4.35%

### **Indiana**

In Indiana the traffic control costs for a project has averaged 15% of the construction costs for the last 3 years.

## Utah

1996 = 3.5%  
1997 = 3.6%  
1998 = 4.4%  
1999 = 4.9%

I need to track down 2000 data.

## Iowa

The Iowa DOT traffic control costs have been:

1998 = 3.3%  
1999 = 3.5%  
2000 = 2.7%

## Kentucky

Our 'Maintenance and Control Traffic' bid item is just exactly that: only the costs to the contractor to maintain what is required of the highway contract. KyTC pays separately for all other items that may be required and itemized on each contract. These items may be flashing arrows, temporary pavement markings, extra traffic signing, barricades, police enforcement, etc. However, some maintenance and rural-aid road projects generally may include some or all of these items as incidental to another item just to keep the projects simple. But I believe that, generally, all of these separate items would not appreciably change the percent of work compared to the total awarded amounts of money per year:

	Traffic control totals	awarded totals	%
1999	\$11,595,520	\$689,496,561	1.68
2000	\$11,760,013	\$735,725,434	1.59
2001	\$10,108,266	\$613,225,231	1.64

(To date as of October 2001)

## Hawaii

HDOT does not have info on cost readily available. It would take excessive time and effort to go through each project cost estimate to determine cost

Appendix C \_\_\_\_\_

**MDT Field Comments on Lump Sum and Competitive  
Bidding**

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**Traffic Control Competitive and Lump Sum Bidding**

**EPM Comments**

**11-27-01**

**Competitive Bidding**

**Competitive Bid Item # 618010000**

Quantity	Unit Price	Date	Designation	
150,000.00	\$0.700	9/27/01	North Main St-Helena	Kevin Christensen
150,000.00	\$0.700	9/27/01	Lyndale Overpass-Helena	Kevin Christensen
350,000.00	\$0.790	6/28/01	Sula-N & S	Tom Benedik
40,000.00	\$0.850	2/22/01	Three Forks-West	Terry Held
100,000.00	\$0.010	1/25/01	Superior-Tarkio	Dan Ham
70,000.00	\$0.010	1/25/01	Clinton-East	Dan Ham
170,000.00	\$0.720	12/6/00	Coalwood-South	Bob Swanson

**Competitive Bid Item # 618030005**

220,000.00	\$1.00	7/26/01	Silver Star-N & S	John Starceovich
150,000.00	\$0.85		Pleasant Valley	Jim Roberts

The Special Provision for TC competitive bidding:

1. **TRAFFIC CONTROL - DEVICES**

The Traffic Control - Devices item will be bid competitively on this contract.

In the event that the actual quantities required for Traffic Control - Devices exceeds the plan quantity on the project, the price paid per unit for all quantities over the plan quantity will be the lesser of the unit price bid or \$0.80. A change order will be written if the actual quantities exceed the planned quantity.

**Dan Ham**

*Your project used the traffic control competitive bidding technique. Please explain how this traffic control bidding technique worked on your project, the positives and negatives.*

This bidding technique worked ok on my project. The contractor bid \$0.01/unit on devices and \$10.00/hour on flagging, but we never had a problem getting flaggers or getting them to put out devices.

*Was it hard or a fight to get all the devices installed that you wanted?*

No

*Did the contractor try to install more devices than you thought was necessary?*

No

*Did this help or hurt the traveling public's safety?*

The contractor installed what was required for the traveling public's safety.

*Was this easier or harder for your inspectors to keep track of and document? Why?*

I felt at \$0.01/unit it was hardly worth keeping track of units for devices, and it required just as much time. More time consuming, than a lump sum item.

*Do you feel this technique made the contractor try to be more efficient with his operations?*

Yes

*Other comments?*

I feel that the traffic control contractor you get has a lot to do with how well things go. Also some jobs are more conducive to the competitive bidding technique than others.

**Bob Swanson**

No problem getting the devices we wanted and at times there were more than necessary like several detours close together for grading and pipe installations with speed limits up and down so had them install one continuous speed limit throughout the area which also eliminated the breakdown series. I remember coming to a resume speed and you could read a reduced speed ahead from the same spot. I told the contractor there were several signs I wouldn't pay for and there was no argument.

Most projects I have been on there has been a signing sub-contractor and his quote to the prime is going to be the same whether it is competitive bidding or not, the contracts that call for a set bid of \$1.00 per unit puts from \$25,000 to \$30,000 in the primes pocket for every 100,000 units.

I don't think the price made any difference or had any effect on documentation or the traveling publics safety but I can see potential problems where they bid a penny and hide another 70 cents in mobilization.

As far as the contractor being more efficient with his operation I would say no because a sub-contractor had the traffic control, it could be different if the prime done his own.

Here are some bids from the 2 projects I have;

Coalwood South -	Sub-contract \$0.70	Prime bid \$0.72 (competitive bid)
Olive N & S	<b>-Sub-contract \$0.74</b>	Prime bid \$1.00 (not competitive)

**Dean Harris**

Your project used the lump sum traffic control bidding technique. Please explain how you felt this traffic control bidding technique worked on your project, the positives and negatives.

*Was it hard or a fight to get all the devices installed that you wanted?*

No more than usual

*Did the contractor try to install more devices than you thought was necessary?*

No- but why would they?

*Did this help or hurt the traveling publics safety?*

Neither- I still have to check on what's in place.

*Was this easier or harder for your inspectors to get track of and document? Why?*

Easier- no daily notes for the contractor to sign.

*Do you feel this technique made the contractor try to be more efficient with his operations?*

Not necessarily but that could vary with contractors

*Other comments?*

I have a question about how other Engineering Project Managers paid for traffic control, keep daily notes, use rate schedule and a dollar amount to get monthly percentage; and either run out early or make up the difference on the last estimate or to break the project into months and pay that percent of the total lump sum on each monthly estimate?

**Kevin Christensen 11-29-01**

Your project used the traffic control competitive bidding technique. Please explain how this traffic control bidding technique worked on your project, the positives and negatives.

*Was it hard or a fight to get all the devices installed that you wanted?*

No

*Did the contractor try to install more devices then you thought was necessary?*

No. I have generally had very good luck with the traffic control subcontractor. We always look at traffic control with the traveling public in mind.

*Did this help or hurt the traveling public's safety?*

*Was this easier or harder for your inspectors to keep track of and document? Why?*

It is time consuming to keep track of traffic control at times. I try to put one man in charge and instruct him to stay on top of it daily.

*Do you feel this technique made the contractor try to be more efficient with his operations?*

Yes.

*Other comment?*

I have not yet worked on a project with lump sum traffic control.

**Lump Sum**

Your project used the lump sum traffic control bidding technique. Please explain how you felt this traffic control bidding technique worked on your project, the positives and negatives.

Was it hard or a fight to get all the devices installed that you wanted?

Did the contractor try to install more devices then you thought was necessary?

Did this help or hurt the traveling publics safety?

Was this easier or harder for your inspectors to get track of and document? Why?

Do you feel this technique made the contractor try to be more efficient with his operations?

Other comments?

These comments will help us determine if we should keep using this traffic control bidding technique.

Thanks, Paul.

**Lump Sum Item # 61802000**

Quantity	Unit Price	Let Date	Designation
0.260	\$127,491.800	01/25/01	MILLIGAN CANYON-Dean Harris
0.390	\$127,491.800	01/25/01	BOULDER HILL-Dean Harris
0.350	\$6,250.000	02/22/01	1997 GREAT FALLS - ELEC-Randy Aafedt

0.650	\$6,250.000	02/22/01	1996- D3 - SIGNALS-Randy Aafedt
1.000	\$117500000	12/06/00	GERALDINE - S.E.-Harold Woodhouse
1.000	\$180,000.000	11/09/00	BIG HORN INTER E & W-David Sloe
0.990	\$ 126,000.000	11/09/00	MIDVALE CK - E GLACIER-Mark Beckdedahl
1.000	\$8,000.000	01/25/01	MADISON RIVER -58 KM S ENNI-Bill Brazil
1.000	\$10000000	08/17/00	INDIAN CREEK BRIDGE-Bill Brazill
1.000	\$25,000.000	05/25/00	Belt Cr 1.5km Se Neihart-Harold Woodhouse
1.000	\$2,675 .000	02/24/00	2000-D3-DUR PAVE MARKING-Mike Klette
0.620	\$1 00,000.000	12/03/98	KOOTENAI RIVER - LIBBY-Gary Kalberg
1.000	\$ 153,800.000	09/24/98	KOOTENAI R- 3.7km NW TROY-Gary Kalberg
1.000	\$ 186.700	05/24/01	2001-DS-DURABLE PAVE MARK-Ron Tiltzey
1.000	\$ 125,000.000	06/28/01	SOUTH FRONTAGE ROAD REL-Tom Shupak
1.000	\$36,500.000	05/24/01	YELLOWSTONE-CARTERS BR-Dan Gravage
1.000	\$5,000.000	06/28/0 1	PIPE-S OF CLYDE PARK-Tom McCormick
1.000	\$1 00.000	05/24/01	D1 -NON-INTER GUARDRAIL-Dan Ham
1.000	\$1 00.000	05/24/01	D2 NON-INTER GUARDRAIL-John Starcevich
1.000	\$2,400.000	05/24/01	2001 -D3-DURABLE PAVE MARK-Mike Klette
1.000	\$5,040.000	04/26/01	BITTERROOT R-WOODSI DE-Tami Hembree
1.000	\$45,000.000	04/26/0 1	BRIDGE DECK-COLUMBIA FALLS-Gary Kalberg
1.000	\$ 1,500.000	04/26/01	SWEETGRASS REST AREA-Mark Beckdedahl
1.000	\$20,000.000	04/26/01	D1 -BRIDGE DECK SEAL-Sheila Sullivan

### **Dan Ham**

*Your project used the lump sum traffic control bidding technique. Please explain how you felt this traffic control bidding technique worked on your project, the positives and negatives.*

I feel the lump sum technique on this particular project did not work very well. The contractor bid only a \$100.00 total. He was very reluctant to put devices out and did not seem to know what was required or cared.

*Was it hard or a fight to get all the devices installed that you wanted?*

Yes

*Did the contractor try to install more devices than you thought was necessary?*

No

*Did this help or hurt the traveling publics safety?*

This hurt the traveling publics safety.

*Was this easier or harder for your inspectors to get track of and document? Why?*

It was easier to keep track of because it was lump sum. Every day was battle getting the correct devices out.

*Do you feel this technique made the contractor try to be more efficient with his operations?*

No

*Other comments?*

Some projects would work well for lump sum traffic control. But as many locations as there were, this was not one of them. Also the contractor had a lot to do with this not working well.

### **John Starcevich**

I had, as you know, the D2- Non Interstate Guardrail project, which had the traffic control bid as lump sum. I requested a traffic control plan prior to any work, just like we are supposed to do. They sent one in and I revised it and sent it back. The revised plan is what we used. I felt that lump sum work quite well. The

Contractor bid \$100.00 for the entire project, which had 5 different locations. I did not require perm's because of the amount of time spent at each location. I feel that if we approve their plan, lump sum could work.

### **Tom McCormick**

Our project involved installing a new pipe in an approach and then paving the approach. Most all of the work was done along the roadway and out of traffic. They did flag 1-way traffic for a couple of days when paving the approach and putting in some guardrail. This small type of job where the traffic control is pretty cut and dried is probably the best type to have lump sum traffic control.

1. We did not have any problems getting the devices installed. They submitted a standard traffic setup for their plan, and put it up every day before any work started.
2. No extra devices were placed. It was a standard set-up daily.
3. Public safety was probably the same as usual. The signing was the same as usual. It was just paid by lump sum instead of units.
4. It was somewhat easier to document because we did not have to fill out traffic control cards and get them signed daily, but I had our people keep a record of the devices in place anyway. I found this to be necessary many years ago. We had the 1-penny price for units so we did not bother keeping records of the devices in place. Then there was a wreck on the project, and we did not have adequate records to keep the attorneys from beating us up.
5. It did not really have any effect on the operations of this project.

### **Mike Kiette**

Lump sum traffic control used for the 2000 & 200 1-D3-Durable Pavement Marking projects that were assigned to me worked well with these type of projects.

With these types of projects, not many signs are needed so it wasn't a problem for the contractor to put out the signs we requested plus the paint trucks had arrow boards. Also, both contractor's involved with these projects had enough cones available to keep the traveling public of the freshly painted stripes.

If there is sufficient traffic control in place, inspectors can concentrate on their inspecting duties rather than keeping track of traffic control devices. I feel that with these type of projects, lump sum traffic control works best. As far as this technique making the contractor more efficient will always depend on the type of project and what contractor will be doing the traffic control.

It is my opinion that on larger projects, the contractor would be more efficient with installing the signs we request when there are bid items set up rather than lump sum.

### **Terry Held**

We didn't have any problems getting the necessary signs put in place. We had to reject the use of one crossover for a truck turn-around but we did not pay for the devices that had been put up.

Because we closed the Three Forks Exit No. 278 EB, additional signing was necessary to direct the motorists. Also wide load detours were necessary, requiring additional signs.

I believe the units of devices on this project were planned assuming all work in either the EB or WB lanes would be done with no traffic. However, the special provisions allowed for some work under traffic such as crack and seat, milling, paving, seal and cover, etc. We also eliminated a couple of crossovers to shorten our two-way traffic sections.

In my opinion, the competitive bidding process in conjunction with the traffic control special provision is the only reasonable option. There are just too many variables that can change the day-to-day operations on a project. Our traffic control inspectors oversee what devices are used or not used and therefore we control their operation.

One area I believe needs to be looked into is the use of these 3” poles being used to mount signs. Their size nearly always requires a double post mount, which of course, we are paying extra for. We should require a minimum 4” post or 4x4. If the 4” post is used, a preventative block must be installed on the base to prevent turning

**Harold Woodhouse**

Your project used the lump sum traffic control bidding technique. Please explain how you felt this traffic control bidding technique worked on your project, the positives and negatives.

*Was it hard or a fight to get all the devices installed that you wanted?*

Geraldine - No problem that I remember

Belt Creek - Yes, the contractor did not want to supply flaggers when needed. They said that’s not how they bid it. Also, they did not want to maintain the Traffic Control maybe as well on these remote type of projects. This would have been the case either way though.

*Did the contractor try to install more devices then you thought was necessary?*

No on both projects

*Did this help or hurt the traveling publics safety?*

Contractor did not put out extra TC.

*Was this easier or harder for your inspectors to get track of and document? Why?*

Not much difference in making sure that the minimum TC was installed.

Inspectors don’t care what TC the contractor is using as long as it is at least the minimum. The inspectors think that if the Traffic Control is LUMP SUM they don’t have to pay as much attention to it. They don’t document the Traffic Control as well.

*Do you feel this technique made the contractor try to be more efficient with his operations?*

Belt Creek - No — The contractor did not do a very good job of coordinating with their traffic control people. They stick to their own agenda and make the TC people adjust to what they are doing. Geraldine — Somewhat, the contractor’s operations were fairly efficient but hard to tell if it had anything to do with Traffic Control.

*Other comments?*

When Misc. Work is encountered and Traffic Control is required, the Traffic Control contractor will refuse to supply Traffic Control under LUMP SUM Traffic Control because they feel that it cannot be covered/anticipated in their bid. They feel it is extra work. This needs to be clarified.

Overall, I like the Lump Sum option although some of the kinks need to be worked out.

**Bill Brazill**

The Madison River 58 km S of Ennis

The answer to all your questions is NO, but bear in mind it worked very well due to the fact we closed the road to all traffic and detoured traffic on another route. I am not sure how lump sum would work on a normal construction project.

**Gary Kalberg**

*Your project used the lump sum traffic control bidding technique. Please explain how you felt this traffic control bidding technique worked on your project the positives and negatives.*

I felt that this worked really smooth. Utilizing lump sum T.C. forced the contractor to continue the project work aggressively all the way through to the completion. My projects were both static Bridge Construction Projects. Sign maintenance is always a problem with either type of bidding because there isn't enough steady work to keep a dedicated construction sign worker busy.

*Was it hard or a fight to get all the devices installed that you wanted?*

Not at all, the contractor can't go to work until all the T.C. needed was set up, and though we passed their T.C. Plan back and forth a couple of times, by carefully wording my final acceptance to allow for more signs as needed once we were totally set up, we had no problems. We paid for additional signing throughout the winter when we needed to slow the traffic down beyond the ordinary construction 35 MPH. This was covered by change order.

*Did the contractor try to install more devices then you thought was necessary?*

No.

*Did this help or hurt the traveling publics safety?*

Neither, if the Prime felt additional signing or I was needed, we got it.

*Was this easier or harder for your inspectors to get track of and document? Why?*

Way easier. Lump Sum notes are easier to track than T.C. Notes.

*Do you feel this technique made the contractor try to be more efficient with his operations?*

Yes, I do. The contractor's don't like bidding Lump Sum because they don't really plan the project using CPM Scheduling and get involved directing the work of their sub-contractors. They are getting better at this as we go on.

*Other comments?*

A + B bidding should be tried more. Forcing the contractor to bid his working days will make his operations more efficient and give us a much more manageable construction season. This might even force some of the contractors to really read the bid documents.

*These comments will help us determine if we should keep using this traffic control bidding technique.* I think lump sum T.C. is the best way to go on static type projects or on projects where we can put the traffic into two other lanes while the work goes on in the remainder of the PTW. I've seen many cases that once the traffic was channeled into two lanes on the 4-lane highway, it appeared no work was going on. Lump Sum T.C. and A + B bidding would both add to the contractors incentive to get the projects done as soon as possible. This will assist the MDT with our public image.

**Appendix D**

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**Contractor's Comments on Lump Sum and  
Competitive Bidding**

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# **United Rentals™**

## *Highway Technologies, Inc.*

**The Right Equipment.**

*Right Now!*

November 5, 2001

Mr. Paul Thompson  
Gilman Construction  
3105 Kossuth  
Butte, MT 59701

RE: Lump Sum Traffic Control

**Dear Paul:**

The purpose of this letter is to express our concern regarding the MDT's trend towards lump sum traffic control on State Highway Projects and the impact it will have on companies providing traffic control services on these projects.

Up until the early 1980's, traffic control was paid for on a lump sum basis. Because of this, it was the prime contractors motivation to perform traffic control for the least amount of money possible. The way you do traffic control for the least amount of money is to utilize employees working in other capacities on the project to set up and tear down the traffic control. Once the traffic control is set up, these employees would go back to their other duties, such as being a rock foreman, tack truck driver, string line laborer, etc... Traffic control was a low priority and the quality would always suffer.

In an attempt to put more emphasis on good traffic control, the State of Montana set up traffic control as a pay item and paid the contractor to provide quality traffic control. The result of this was that subcontractors specializing in traffic control began to evolve. Because traffic control was a unit bid item and the contractor wasn't motivated to cut costs on traffic safety, it made sense to the prime contractors to turn traffic safety over to these specialty subcontractors. Traffic safety services were then being provided by trained employees whose only duty on the project was providing good traffic control. The attention being paid to traffic safety dramatically increased. This resulted in a much higher quality of traffic control and therefore projects with much safer environments for both the traveling public and employees working on these projects.

Today, we are seeing the MDT making a move back to the lump sum method of payment for traffic control. Numerous projects have been bid with lump sum traffic control the past year. More lump sum jobs are being bid every month and there is talk that the MDT is considering going back to a totally lump sum payment method on all traffic control in the near future. The impact of this move on the quality of traffic control and the specialty contractors now doing most of the traffic control would be devastating. You can already look at some of the lump sum projects being bid now to see what the impact is going to be. On these projects, the prime contractors are not utilizing the specialty contractors because they can do it cheaper with their own employees working in other capacities on the project. If the MDT does move to lump sum traffic control, the specialty traffic safety contractors could cease to exist.

I don't feel that traffic safety is a good item to motivate contractors to do for the least amount of money possible. The Montana Highway market is extremely competitive and forcing the prime contractors to provide traffic safety for as little money as possible is a dangerous proposition for everyone concerned. Project and public safety should be of paramount importance and a move toward lump sum traffic control is a move sure to decrease safety.

I feel that MDT's present unit price system for payment of traffic control is a good system and should not be abandoned for a lump sum payment method. I know that the MDT is concerned about some of the overruns occurring in traffic control on various projects and the cost of these overruns. A large part of the problem with cost of these overruns comes from the fact that traffic control is presently pre-bid at \$1.00 per unit. Most of the time, the prime contractor is subcontracting the traffic control for between \$.60 and 3.85 per unit. These overruns are resulting in windfall profits to the prime contractors at great cost to the MDT. The Montana Contractors Association submitted a proposal to the MDT which would get rid of the pre-bid \$1.00 per unit and yet prevent the prime contractor from off-balancing on the item to take advantage of over-runs. Adopting this proposal would greatly reduce the cost for traffic control while maintaining unit price payment. Many projects are also being put out to bid with quantities that are obviously out of line. Additional effort by the MDT in setting the quantities for traffic control would also help.

If you have any questions or need additional information, please give me a call. I would also like to volunteer to be on the joint MCA / MDT committee to deal with this issue.

Sincerely,

United Rentals Highway Technologies, Inc.

  
Jeff Hollenback  
Branch Manager

**Omo Construction, Inc.**

P O BOX 31793 • BILLINGS, MT 59107 • 445 SUGAR AVE • BILLINGS, MT 59101  
TEL 406-256-0199 • FAX 406-256-8081

October 24, 2001

Paul Thompson  
Jim Gilman Excavation Inc.  
1488 Continental Drive  
Butte, MT 59701

RE: MCA - MDT Technical Committee  
Lump Sum Traffic Control - Devices

Hello Paul:

This letter is in response to your request for information regarding the lump sum bid item for traffic control. We have done three projects this season with the MDT that have been set up with this type of bid item. On two of the projects we lost a considerable amount of money and on the other one we barely covered our costs.

The problem with the lump sum bid item is the differences in each contractor's operation require different lump sum bids. There are also differences in an individual contractor's operation on different types of projects. There are even differences from the beginning of the contract to the end. Just the difference in the rate a milling contractor can produce their portion of their contract can mean the difference in completing the project ahead of schedule or putting the schedule off by days or weeks.

There have been incidents where we should not have had to set up any traffic control, and because the bid item was lump sum, we were required to set up traffic control and leave it in place with a support crew for three days. We have a project manager for the MDT required that us to have all this equipment and personnel available for a dirt project because he thought the contract was lump sum. Then, when he found out it was a unit bid job the equipment and personnel requirements changed to, "We do not need this set up at all. Just put up a couple of signs and that's all we will pay for." Having a project run smoothly depends on what MDT crew is in charge of the project and whom the prime contractor is. Then we can see what the requirements the MDT have for the project. In several cases the contractor is one that the MDT has worked with frequently, and the requirements are more relaxed for that contractor. If the contractor is from out-of-state then we are talking a whole new game. The fight is on!

Because of all the variables, we are now forced to give daily rates to the prime contractors for the lump sum bid item, and it is up to them to decide if and when they will need traffic control. For example, we think the contractor will need traffic control every day and we plan our crews to be there daily. The contractor, realizing that they could save a few bucks that day on traffic control, decides that they do not need anything. We

would then be stuck in a situation where we have our crews show up and sit there without being paid. How long would we be expected to keep the crews there? Our contract states that if the prime is working we need to be available for work on the project. We could see this scenario happening on an interstate reconstruct very easily, especially with a contractor that knows how to play the system very well. We will now have to make our quotes more specific in what is expected from the prime contractor including what we consider a chargeable day, the rate for a chargeable day, flagging costs per hour, pilot car costs per hour, and the minimum charges daily.

The MDT has difficulty correctly estimating the traffic control devices, flagging, and pilot car hours for projects. They really complain, with good reason, when a project overruns the quantities set up. But the contractor suffers when a project under runs the plan quantities. A lot of our bridge projects and RTF projects under run more times than not. We bid the project for the quantities set up and when they under run, we lose money. It seems there is not a happy medium in any of this. It's all or nothing. If the MDT has underestimated the quantities then the field personnel are quick to shut down the amount of devices used through the work zones. There are times when they do not even follow their own detailed drawings and specs. The Road and Bridge spec book works for them when they want it to. When the spec book isn't in their favor then they convert to "as directed by the engineer." This is a problem statewide. All it would take is for some unfortunate soul to drive through the work zone that hasn't been set up right due to their cut backs and get in a lethal accident. What then do you suppose would happen? We know from experience the prime contractor and the traffic control sub is on the hook for the lack of traffic control, and will be sitting in court three years later trying to explain to the jury why the work zone wasn't set up right.

If the MDT forces the traffic control to be lump sum then you will see the 1970's come back to play. What we mean is there will be little or no traffic control used on the projects. When required, the lane closures will be as long as possible with little or no maintenance. As you are aware, the fatality rates in work zones are increasing yearly. The accident rates are also on the rise. Do we really want to jeopardize the traveling public, our employees, and the MDT field personnel to save a few bucks? What's the cost for a life? Is the issue safety, or is it dollars and cents?

The solution? We can speculate about different scenarios or different payment options. The bottom line is the MDT needs to more correctly estimate the quantities. If the quantities were more correct, then there would be no huge overruns or under runs. They have all the historical data in the "big house" to project these quantities, why can't someone do a little research and project them more accurately. All it takes is a little time and forethought. If the quantities were more correct, then the fighting in the field would be reduced and our work zones would be safer for everyone.

We are under the impression that there is going to be a committee set up between the MDT and the MCA to discuss and find solutions to this turbulent issue. We would like to be involved in this committee. We have experience in dealing with this exact type of

situation and would be a valuable assistant to both parties. Collectively as a team we can come up with some real solutions that will benefit the industry as a whole.

We hope this information has proven to be useful. If you have any questions or require further information please contact me at the office.

Sincerely;



**Bob Rannebarger**  
**Traffic Control Coordinator**

601 GARDEN AVE  
BUTTE, MT 59701



(406) 782-1422  
(CELL) 491-8566  
(CELL) 593-2284

QUALITY TRAFFIC CONTROL SERVICES

November 6, 2001

Mr. Paul Thompson  
Gilman Construction  
Butte, MT 59701

Re: Lump Sum Traffic Control Dear Paul,

In regards to your request for written comments on how the Lump Sum Traffic Control bid item was working on MDT projects, I would submit the following.

During the past construction season, my company completed several Lump Sum Traffic Control projects. It was my experience that Lump Sum Traffic Control projects have removed the incentive for the traffic control contractors to provide a quality product to the Department of Transportation and the traveling public. Traffic Control is a labor-intensive operation, and the only alternative Lump Sum Traffic Control projects leave the traffic control contractor is to cut operating costs to the bare minimum. In most cases, this results in cutbacks in traffic control personnel and operating hours, leaving the State and the traveling public with a less than desirable product.

For example, many Lump Sum Traffic Control projects involve Two-Way Traffic. With a Lump Sum bid item on these projects, the traffic control contractor is basically forced into a maintenance role once or twice per day versus having a qualified full time traffic control employee on site at all times. Many times, a situation arises where a traffic control employee is needed, however, in most cases with Lump Sum bids, the employee is unavailable except for the few hours when the site is being maintained. It is also very difficult to find qualified employees who are willing to work only a few hours each day.

Another reason Lump Sum Traffic Control projects are very difficult to administer is the inevitable variables that arise on each project. Change orders are very common on highway projects, and most of these change orders result in added days to the project. Unless the change orders result in added dollars to the Lump Sum Traffic Control bid item, then the traffic control contractor is forced to absorb the additional costs resulting from additional work.

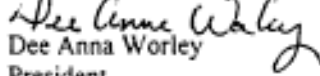
Inconsistencies between MDT Project Managers within different MDT Districts are another difficult variable that the traffic control contractor is expected to bear with Lump Sum projects. Project Managers in the Butte District may require something totally different than Project Managers in the Billings District, resulting in higher costs to the traffic control contractor. Even Project Managers within the same districts often require different traffic control setups, which can result in different costs to complete the project, as I have seen firsthand.


Several traffic control contractors have begun charging a daily rate for Lump Sum traffic control projects. By removing the risk for the traffic control contractor, however, the risk is placed entirely upon the general contractor. Once again, when time becomes a critical factor, the end product delivered to the state can suffer.

My company has also completed projects where there was a Lump Sum item as well as traffic control units. My experience with this type of bid item was utter confusion between the Project Manager and the traffic control contractor over what was to be paid for under Lump Sum and what devices qualified as units. This is not a good situation in the field for the State or the traffic control contractor.

Overall, my experience in dealing with Lump Sum Traffic Control has not been pleasant. Lump Sum bid items place an unnecessary burden on the traffic control contractor as well as the general contractor, and the end result is an undesirable product to the State. My company would definitely prefer the previous system where the traffic control contractor is paid by the Unit Price.

Sincerely,

  
Dee Anna Worley  
President

  
Keith Johnston  
Vice President

**Appendix E** \_\_\_\_\_

**Work Zone Operations Best Practices**



## Best Practices Area 6. Contracting and Bidding Procedures

### STATE-OF-THE-ART

Contracting and bidding procedures reward contractors for quality work, innovation, accelerated early completions, minimizing motorists delays, and enhancing the safety of road-users and workers. On high-risk, high-visibility, and complex projects contractors are pre-qualified on the basis of quality and past performance.

To achieve state-of-the-art contracting and bidding, transportation agencies would need to:

- Utilize time-based bidding and flexible Notice to Proceed dates on all projects which adversely affect the existing level of service.
- Incorporate the quality and timeliness of a contractor's past performance into pre-qualification procedures.
- Update and enhance existing computer software for calculating road-user costs to make it user-friendly and ensure that outputs are realistic and legally defensible.

The following "best practice" relate to work zone contracting and bidding procedures:

Subcategory	Ref. #	Contracting and Bidding Best Practices
Contracting Practices	119	Alternative Contracting Practices
	137	Frequent use of innovative contracting procedures
Contractor Qualifications	125	Contractor Rating System
	129	Pre-qualification to restrict the bidding capacity of contractors who were behind schedule on current DQT contracts or who consistently demonstrated their inability to complete DOT contracts on schedule.
Flexible timing	120	Flexible Start Times
	121	Summertime Bridge Reconstruction Program
	132	Flexible start time provisions in contract
	136	Narrow window for on-site construction
Incentives! Disincentives	122	A+B, I/D and Lane Rental in reducing contract time
	123	+B, and Incentive/Disincentive clauses
	124	Time Based Bidding (A+B, I/D, and Lane Rental)
	126	A+B with I/D for reducing contract time
	127	A+B contracts
	128	+B Bidding Clauses in North Carolina DOT contracts
	133	A+B Bidding (Time-Based Bidding)
135	Contract award of the I-5 Interstate bridge lift span repair project based on performance and cost	
Lane Rental	130	Construction lane-mile rentals
	131	Lane rental
	134	Lane Rental specification

**119. FLORIDA****BEST PRACTICE/POLICY:**

Alternative Contracting Practices

**DESCRIPTION OF THE BEST PRACTICE/POLICY:**

In 1996, the Florida Legislature authorized the Florida Department of Transportation (EDOT) to use accelerated contracting techniques on construction projects, and limits innovative contracting to \$60 million in contracts annually. Alternative contracting techniques include the following: A+B, Lane Rental, Design/Build, Warranty Clauses, No Excuse Bonus, Lump Sum, Liquidated Savings, and Incentive/Disincentive.

**REASON(S) FOR ADOPTING THE BEST PRACTICE/POLICY:**

To accelerate contract completion and to control cost overruns on construction projects.

**BIGGEST BENEFIT(S) BEING REALIZED FROM THIS BEST PRACTICE/POLICY:**

Early project completion results in reduced disruption and inconvenience to motorists and abutting businesses and homeowners.

**LOCATION AND TYPE(S) OF PROJECTS WHERE THIS PRACTICE/POLICY IS MOST APPLICABLE/EFFECTIVE:**

Alternative contracting practices are used on many different types of projects. FDOT specifically evaluates which method may be most suitable for a particular project. More than one alternative contracting technique may be used on the same project (e.g., Lane Rental/No Excuse Bonus). Incentive/Disincentive is used on all critical projects on the Turnpike.

**CONTACT(S):**

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Telephone: (850) 942-9650, ext. 3035

E-Mail: [patrick.bauer@fhwa.dot.gov](mailto:patrick.bauer@fhwa.dot.gov)

Gregg Xanders, Construction Engineer, Florida DOT

Telephone: (850) 414-5203

**120. FLORIDA**

**BEST PRACTICE/POLICY:**

Flexible Start Times

**DESCRIPTION OF BEST PRACTICE/POLICY:**

In 1987, after endorsement by the Florida Legislature, the Florida Department of Transportation (FDOT) began using flexible start times on construction projects. Normally, after award of a project, the “Notice to Proceed” is issued and the contractor is to begin work within 15 days. However, with flexible starting provisions, the contractor is allowed to extend this period of time (usually up to 100 days) to start construction.

**REASON(S) FOR ADOPTING BEST PRACTICE/POLICY:**

Flexible start times are used for two primary reasons: 1) reducing the time period the public is exposed to construction conditions, and 2) increasing the frequency of completing contracts within the authorized contract time.

**BIGGEST BENEFIT(S) BEING REALIZED FROM THIS BEST PRACTICE/POLICY:**

Flexible start time encourages competition in the bidding process and enables a contractor to have more flexibility in scheduling use of equipment and manpower. By having additional flexibility in scheduling resources, the contractor should have less scheduling problems which may cause delay to completion of a contract. Therefore, contracts using flexible start time are expected to finish on time.

**LOCATION AND TYPE(S) OF PROJECTS WHERE THIS PRACTICE/POLICY IS MOST APPLICABLE/EFFECTIVE:**

This provision is being used on State funded projects and projects not on the National Highway System. In addition, it is primarily used on smaller, less complex projects such as resurfacing contracts.

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**121. COBB COUNTY, GEORGIA**

**BEST PRACTICE/POLICY:**

Summertime Bridge Reconstruction Program

**DESCRIPTION OF THE BEST PRACTICE/POLICY:**

The Summertime Bridge Reconstruction Program is a program to let bridge replacement projects to contract with beginning construction dates coinciding with the day after the last day of the school year and completion dates coinciding with the day before the first day of the following school year.

**REASON(S) FOR ADOPTING THE BEST PRACTICE/POLICY:**

Replace deficient bridges on school bus routes while minimizing inconvenience to school children being transported over these routes.

**BIGGEST BENEFIT(S) BEING REALIZED FROM THIS BEST PRACTICE/POLICY:**

A number of bridge replacement projects can be let to contract throughout the year. Contractors then have time to schedule work to begin construction on the day after school lets out for the summer break. The construction must be complete before school begins at the end of the summer break which encourages contractors to schedule work in the most efficient manner.

**LOCATION AND TYPE(S) OF PROJECTS WHERE THIS PRACTICE/POLICY IS MOST APPLICABLE/EFFECTIVE:**

Type of work: Bridge Replacement — Urban & Rural — Low Volume

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**122. INDIANA**

**BEST PRACTICE/POLICY:**

A+B. I/D and Lane Rental in Reducing Contract Time

**DESCRIPTION OF THE BEST PRACTICE/POLICY:**

The A+B bidding is cost plus time bidding; A is the traditional bid for contract items, and the work to be done under the contract; B is time with an associated cost and is used in low-bid determination. The B is the time, which is bid of the number of days/periods required to complete the contract of identified parts of the contract phases as estimated by the bidder. The value of the day/period is established by the owner and is based on user costs. Therefore, B equals number of days/periods (estimated by Bidder) times monetary value of day/period (determined by the Agency). The low bid is determined by the sum of A+B values. All A+B contracts have an incentive/disincentive provision in them. The disincentive provisions is incorporated into the contact to discourage the contractor from overrunning the time bid for work. The incentive provision is included to reward the contractor if work is completed earlier than the time bid. The contractor has set their own destiny with his or her time bid. This becomes the completion date/time, restriction time. Indiana has used A+B bidding since 1996.

**REASON(S) FOR ADOPTING THE BEST PRACTICE/POLICY:**

The A+B bidding provides time savings which reduces travel impacts to the public due to reduced construction time.

**BIGGEST BENEFIT(S) BEING REALIZED FROM THIS BEST PRACTICE/POLICY:**

With construction time reduced, the user cost to the traveling public. Almost all A+B contracts in Indiana have finished 30 days ahead of time bid.

**LOCATION AND TYPE(S) OF PROJECTS WHERE THIS PRACTICE/POLICY IS MOST APPLICABLE/EFFECTIVE:**

All type of facility — All types of work

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**123. MICHIGAN**

**BEST PRACTICE/POLICY:**

A+B, and Incentive/Disincentive clauses

**DESCRIPTION OF THE BEST PRACTICE/POLICY:**

- **A+B bidding** — The contractor is asked to factor in his estimated time, including the cost of his work.
- **I/D** — The contractor is assigned a cost value for time, that rewards or costs him money during execution of the contract, depending on how efficient his operation is.
- **Disincentive only** — In some cases, MDOT will assign a disincentive cost to lane closures, and assess the contractor in 15-minute intervals. This type of contract provision is used to assure that certain lanes will be opened by the contractor to accommodate rush hour or weekend directional traffic patterns. On this type of clause, there is no incentive money awarded for opening a lane ahead of the rush hour; this is disincentive only.

**REASON(S) FOR ADOPTING THE BEST PRACTICE/POLICY:**

MDOT wanted to minimize the time required to complete work thereby reducing the amount of traffic inconvenience. By utilizing the A+B technique along with an I/D clause, MDOT has been able to tap contractor ingenuity as to how to get the work done in the least time possible.

**BIGGEST BENEFIT(S) BEING REALIZED FROM THIS BEST PRACTICE/POLICY:**

- **A+B bidding** — Reduced overall contract time, with resultant reduced motorist delay.
- **I/D and Disincentive only** — reduced delay during critical high-traffic periods.

**LOCATION AND TYPE(S) OF PROJECTS WHERE THIS PRACTICE/POLICY IS MOST APPLICABLE/EFFECTIVE:**

These particular techniques have been reserved for those projects in which the construction has a major impact on traffic. Generally these projects have been on their major urban freeways.

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Work Zone Best Practices Guidebook

**124. MISSISSIPPI**

**BEST PRACTICE/POLICY:**

Time Based Bidding (A+B, I/D and Lane Rental)

**DESCRIPTION OF THE BEST PRACTICE/POLICY:**

These are the typical innovative contracting practices implemented under SEP-14.

**REASON(S) FOR ADOPTING THE BEST PRACTICE/POLICY:**

MDOT has used these practices on a few projects. These practices were used in an effort to reduce the delays to the traveling public either by restricting lane usage and charging the contractor to close down a lane (lane rental) or potentially expediting a project by having the contractor bid contract time (A+B).

**BIGGEST BENEFIT(S) BEING REALIZED FROM THIS BEST PRACTICE/POLICY:**

The primary benefit is the reduction of delays to the traveling public. MDOT has seen the benefits to using some of these methods, but they are used on a limited basis.

**LOCATION AND TYPE(S) OF PROJECTS WHERE THIS PRACTICE/POLICY IS MOST APPLICABLE/EFFECTIVE:**

Typically these methods are used for projects on high-volume roadways in urban areas or on Interstate projects. These methods are used mostly for 3R or 4R type work.

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125. **MISSOURI****BEST PRACTICE/POLICY:**

Contractor Rating System

**DESCRIPTION OF THE BEST PRACTICE/POLICY:**

A Contractor Performance Rating System involving ratings in four categories of quality, prosecution and progress of work, contract compliance and safety was implemented by MoDOT January 1, 1998. The new system replaced MoDOT's Contractor Performance Report process which had been in place since June 1991. The new rating system was developed by a MoDOT Task Force including representatives from the FHWA Division and the Associated General Contractors. The system provides incentives, based on a statistical analysis of ratings, including awards to top achievers and penalties for unacceptable performance such a probation or suspension from bidding on MoDOT projects.

**REASON(S) FOR ADOPTING THE BEST PRACTICE/POLICY:**

Major problems of MoDOT's Contractor Performance Report process implemented in 1991 were identified as the evaluation criteria were too subjective; category criteria overlapped, performance measures weren't included to rate financial responsibility; documentation wasn't provided to support ratings; rewards were minimal; penalties were non-existent; and information regarding subcontractor's effect on the overall rating was difficult or impossible to determine. The Task Force mentioned above was responsible for reviewing the problems and concerns with the MoDOT Contractor Performance Report and to provide recommendations to resolve those issues. The recommended rating system addresses the problems identified.

**BIGGEST BENEFIT(S) BEING REALIZED FROM THIS BEST PRACTICE/POLICY:**

The new performance reporting system has been developed to remove subjectivity and to provide a more objective rating with supporting documentation. An anticipated benefit is an incentive to contractors to continuously improve their operations and for MoDOT to reward outstanding performance.

**LOCATION AND TYPE(S) OF PROJECTS WHERE THIS PRACTICE/POLICY IS MOST APPLICABLE/EFFECTIVE:**

This practice is applicable to all projects awarded to a contractor and administered by the Missouri Department of Transportation.

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**126. MISSOURI****BEST PRACTICE/POLICY:**

A+B with I/D for reducing contract time

**DESCRIPTION OF THE BEST PRACTICE/POLICY:**

MoDOT defines A+B with I/D clauses as Job Special Provisions designed to accelerate the completion of a particular phase of a project or for total project completion. The practice of A+B with I/D special provision includes the establishment of a road user cost per day which is multiplied by the quantity of time (no. of days) stated by the bidder and used to calculate the low bidder. MoDOT began using the A+B with I/D clauses in late 1988 and since then has utilized this practice approximately fifty times. The MoDOT's objective to reducing the time in which the traveling public is disrupted has been attained through the use of this practice and MoDOT is committed to continually striving to improve on the practice and various aspects of the practice.

**REASON(S) FOR ADOPTING THE BEST PRACTICE/POLICY:**

MoDOT's experience has shown that reduction of construction time and reduction of time the traveling public is disrupted has been attained when using the practice, specifically I/D with A+B Bidding. The Engineer's estimate of days or hours of closure time is critical in this practice to provide for comparison of the bids. Also, it has been noted by staff that the practice may add to the cost of a project, and the decision to use the I/D clause should be project specific, with consideration of road user costs and input from management.

**BIGGEST BENEFIT(S) BEING REALIZED FROM THIS BEST PRACTICE/POLICY:**

The data shows I/D clauses do achieve the goal of shortening construction time on the phase or activity selected and reduction of time that the traveling public is disrupted.

**LOCATION AND TYPE(S) OF PROJECTS WHERE THIS PRACTICE/POLICY IS MOST APPLICABLE/EFFECTIVE:**

Type of Facility: Freeways, 2-lane/2-way highway, bridge

Location: Urban or complex Rural, impact to public safety or schools

Volume/Speed: High-Volume/High-Speed, High-Volume/Low-Speed

Type of Work: Resurfacing, Reconstruction, Restoration/Rehabilitation

*\*Note: Also considered for projects with intense public interest, or when a project or phase of project is critical to scheduling of future projects or work.*

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*Work Zone Best Practices Guidebook*127. **NEW YORK****BEST PRACTICE/POLICY:**

A+B Contracts

**DESCRIPTION OF THE BEST PRACTICE POLICY:**

A+B Contracts specify a bid for the work (A) and a bid for the time that a highway facility will be occupied by the contractor (B). The State began use of this specification on selected projects in 1994.

**REASON(S) FOR ADOPTING THE BEST PRACTICE/POLICY:**

The State began using this innovative contracting method to reduce the duration of construction delays in urbanized areas.

**BIGGEST BENEFIT(S) BEING REALIZED FROM THIS BEST PRACTICE/POLICY:**

To date they have used this method on 65+ projects. These projects have saved an estimated 8,500 contract days based on the difference between the estimated contract time and the contract time bid. The State estimates that these projects have resulted in a \$100 million reduction in user delay costs.

**LOCATION AND TYPE(S) OF PROJECTS WHERE THIS PRACTICE/POLICY IS MOST APPLICABLE/EFFECTIVE:**

The A+B projects are employed on all types of projects with high volumes (urbanized freeways) and on other projects where substantial user delay (i.e., bridge replacement where difficult detours are necessary) will occur.

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**128. NORTH CAROLINA**

**BEST PRACTICE/POLICY:**

A+B Bidding Clauses in North Carolina DOT Contracts

**DESCRIPTION OF THE BEST PRACTICE/POLICY:**

The A+B Clause in NCDOT contracts allows contractors to set contract time. Specific criteria are applied to any project under evaluation for this technique to ensure that the benefits from reduced contract time are equal or greater to the potential increased cost. North Carolina has used this technique 20 times since 1989.

**REASON(S) FOR ADOPTING THE BEST PRACTICE/POLICY:**

This method was used to assist in accelerating contract time for critical projects. Critical projects are defined as having a high user cost during construction activities.

**BIGGEST BENEFIT(S) BEING REALIZED FROM THIS BEST PRACTICE/POLICY:**

The use of A+B bidding has thus far resulted in substantial contract time reductions on the majority of projects where it has been utilized.

**LOCATION AND TYPE(S) OF PROJECTS WHERE THIS PRACTICE/POLICY IS MOST APPLICABLE/EFFECTIVE:**

This method is typically used on high-volume urban rehabilitation projects.

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## 129. OHIO

### **BEST PRACTICE/POLICY:**

Pre-qualification to restrict the bidding capacity of contractors who were behind schedule on current DOT contracts or who consistently demonstrated their inability to complete DOT contracts on schedule.

### **DESCRIPTION OF THE BEST PRACTICE/POLICY:**

The ODOT prequalifies contractors two different ways: 1) By type of work to be accomplished in the contract, (Can the contractor build this type of bridge, etc?), and 2) the Contractor's ability to manage a certain dollar value of projects, (Can the Contractor manage 4 projects worth \$250 million?).

### **REASON(S) FOR ADOPTING THE BEST PRACTICE/POLICY:**

Contractors were being awarded projects that they could not finish because they were not professionally qualified or able to manage projects of that size. This leads to continued disruptions of traffic because a new contractor must be hired or the work is inferior and will not last as long.

### **BIGGEST BENEFIT(S) BEING REALIZED FROM THIS BEST PRACTICE/POLICY:**

When a contractor is awarded a project, there is no question as to his ability to complete the project. The responsibility issue of the contractor is eliminated. Projects are not delayed due to the inability of a contractor to complete a project.

### **LOCATION AND TYPE(S) OF PROJECTS WHERE THIS PRACTICE/POLICY IS MOST APPLICABLE/EFFECTIVE:**

All types of work — All locations

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## 130. OKLAHOMA

**BEST PRACTICE/POLICY:**

Construction Lane-mile Rentals

**REASON(S) FOR ADOPTING THE BEST PRACTICE/POLICY:**

This practice was started to reduce user delay by encouraging the contractor to work during non-peak hours and minimize the length of the work zone lane closures.

**BIGGEST BENEFIT(S) BEING REALIZED FROM THIS BEST PRACTICE/POLICY:**

This method provides a fair and equitable means to allow the construction contractors to choose their own methods of construction and coordination. Because the rentals charges are based on conservative, real numbers—changes in highway capacity, minimum wages, average gasoline prices in the area, etc.—the charges reflect the actual, measurable costs experienced by the motoring public and make the contractor aware of and responsible for the costs.

By encouraging the contractor to limit the length of the work zone lane closures, the public's respect for the work zone is increased because they will no longer see multiple miles of work zone lane closure with no construction activity.

**LOCATION AND TYPE(S) OF PROJECTS WHERE THIS PRACTICE/POLICY IS MOST APPLICABLE/EFFECTIVE:**

Currently this technique is only used on the Oklahoma Turnpikes, but can be effective on any roadway type for rehabilitation and reconstruction projects.

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131. **OKLAHOMA**

**BEST PRACTICE/POLICY:**

Lane Rental

**REASON(S) FOR ADOPTING THE BEST PRACTICE/POLICY:**

This practice was started to minimize motorist delay by encouraging the contractor to work during non-peak hours. It provides a fair and equitable means to allow the construction contractor to choose its own methods of construction. The lane rental costs for peak volume hours are relatively high (up to \$60,000 per hour per lane), are reduced for non-peak daylight hours, and are generally free for night time construction operations.

**BIGGEST BENEFIT(S) BEING REALIZED FROM THIS BEST PRACTICE/POLICY:**

Reduced motorist delay and accelerated construction times on the work requiring a lane closure. Because the rentals charges are based on conservative, real numbers— changes in highway capacity, minimum wages, average gasoline prices in the area, etc.—the charges reflect the actual, measurable costs experienced by the motoring public and make the contractor aware of and responsible for the costs. Since this practice was recently begun (spring 1998), the Oklahoma Department of Transportation has not seen the full effects of this practice yet.

One of the problems associated with bidding a project with lane rentals is that it is generally perceived to be a large risk to the smaller contractors and therefore may limit competition.

**LOCATION AND TYPE(S) OF PROJECTS WHERE THIS PRACTICE/POLICY IS MOST APPLICABLE/EFFECTIVE:**

This technique is used mainly on the high-volume/high-speed interstates and highways for rehabilitation and reconstruction projects.

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## 132. OHIO

**BEST PRACTICE/POLICY:**

Flexible start time provisions in contract: Pre-qualification to restrict the bidding capacity of contractors who were behind schedule on current DOT contracts or who consistently demonstrated their inability to complete DOT contracts on schedule.

**DESCRIPTION OF THE BEST PRACTICE/POLICY:**

The ODOT prequalifies contractors two different ways: 1) By type of work to be accomplished in the contract, (Can the contractor build this type of bridge, etc?), and 2) the Contractor's ability to manage a certain dollar value of projects, (Can the Contractor manage 4 projects worth \$250 million?).

**REASON(S) FOR ADOPTING THE BEST PRACTICE/POLICY:**

Contractors were being awarded projects that they could not finish because they were not professionally qualified or able to manage projects of that size. This leads to continued disruptions of traffic because a new contractor must be hired or the work is inferior and will not last as long.

**BIGGEST BENEFIT(S) BEING REALIZED FROM THIS BEST PRACTICE/POLICY:**

When a contractor is awarded a project, there is no question as to his ability to complete the project. The responsibility issue of the contractor is eliminated. Projects are not delayed due to the inability of a contractor to complete a project.

**LOCATION AND TYPE(S) OF PROJECTS WHERE THIS PRACTICE/POLICY IS MOST APPLICABLE/EFFECTIVE:**

All types of work — All locations

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**133. OKLAHOMA**

**BEST PRACTICE/POLICY:**

A+B Bidding (Time Based Bidding)

**REASON(S) FOR ADOPTING THE BEST PRACTICE/POLICY:**

A+B bidding was begun to encourage innovation from the construction contractors to reduce construction time, thus reducing user delays.

**BIGGEST BENEFIT(S) BEING REALIZED FROM THIS BEST PRACTICE/POLICY:**

The contract time bid is generally less than the maximum allowable contract time set by the DOT in the bid documents.

**LOCATION AND TYPE(S) OF PROJECTS WHERE THIS PRACTICE/POLICY IS MOST APPLICABLE/EFFECTIVE:**

The high-volume/high-speed interstates and highways for rehabilitation and reconstruction projects.

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134. **OREGON****BEST PRACTICE/POLICY:**

Lane Rental Specification

**DESCRIPTION OF THE BEST PRACTICE/POLICY:**

The ODOT has used an aggressive lane rental specification on several Portland area reconstruction projects beginning in 1993. Lanes are rented in 15-minute increments. Charges, based on road user costs, can be as high as \$50,000 per lane per hour or free during nighttime hours.

**REASON(S) FOR ADOPTING THE BEST PRACTICE/POLICY:**

Use of the lane rental specification was adopted to minimize lane closures and make contractor responsible for road user costs.

**BIGGEST BENEFIT(S) BEING REALIZED FROM THIS BEST PRACTICE/POLICY:**

Lane closures are minimized. (Due to high costs, there are few rentals except during free periods.)

Lane closures are determined by the contractor alone and disagreements with the ODOT construction staff are eliminated.

**LOCATION AND TYPE(S) OF PROJECTS WHERE THIS PRACTICE/POLICY IS MOST APPLICABLE/EFFECTIVE:**

Lane rental has been used only on urban freeways, but the concept is applicable to all highways, especially multi-lane facilities.

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135. **OREGON****BEST PRACTICE/POLICY:**

Contract Award of the 1-5 Interstate Bridge Lift Span Repair Project Based on Performance and Cost

**DESCRIPTION OF THE BEST PRACTICE/POLICY:**

To ensure that repairs were made by the most qualified contractor with the most attractive price proposal, the Oregon DOT decided to base the contract award upon performance and cost. This was the first time the ODOT awarded a construction contract on any basis other than the low bid for the work.

**REASON(S) FOR ADOPTING THE BEST PRACTICE/POLICY:**

Because of the specialized nature of the work, short time period for the bridge closure (21 days), and the high level of public and news media attention, it was decided that contract award should be made based on consideration of price and contractor qualifications in order to ensure that the contract would be awarded to the bidder with a both a satisfactory price proposal and the necessary expertise to perform the work. Bidders submitted both a technical and a price proposal which were scored and the highest combined score was the basis for award. Price proposals were scored according to the following criteria:

- The average of price proposals received will equal 50 points,
- Each proposal less than the average price will receive an additional 1 point for \$10,000 it is less than the average, to a maximum of 50 points,
- Each proposal above the average price will have 1 point subtracted for each \$10,000 it is greater than the average, to a maximum of 50 points, and
- The maximum score will be for one (or more) proposal(s) \$500,000, or more, below the average of all proposals, which would be 100 points. The minimum score would be for one (or more) proposal(s) \$500,000, or more, above the average of all proposals, which would be 0 points.

Technical proposals were evaluated by a panel of experts for ODOT Bridge Section, the design consultant, ODOT Program Services, and the AGC. A maximum of 100 points was the maximum score for technical proposals. Criteria considered in scoring the technical proposals included:

- Waterfront/Moveable Bridge construction experience could score up to 30 points,
- Fabrication of complex machinery experience could score up to 25 points.
- Crane maintenance, inspection, and operation could score up to 25 points, and
- Construction management team experience could score up to 20 points.

**BIGGEST BENEFIT(S) BEING REALIZED FROM THIS BEST PRACTICE/POLICY:**

The contract was awarded to the most qualified contractor who coincidentally submitted the lowest bid.

*Work Zone Best Practices Guidebook***LOCATION AND TYPE(S) OF PROJECTS WHERE THIS PRACTICE/POLICY IS MOST APPLICABLE/EFFECTIVE:**

This practice is most applicable on complex projects which require specialized equipment, materials, fabrication, or expertise. Because of state law ODOT needed to get an administrative exemption in the event award was not made to the lowest bidder. Use of the performance and cost based award concept was also approved by FHWA under SEP-14 as an alternate bidding method.

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## 136. OREGON

**BEST PRACTICE/POLICY:**

Narrow Window for On-Site Construction

**DESCRIPTION OF THE BEST PRACTICE/POLICY:**

On selected projects, ODOT specifies a restricted time frame for on-site construction within the allowable contract time. For example, on-site work on an overlay project might be limited to 30 consecutive calendar days although the contractor may have 100 calendar days to complete the entire project.

**REASON(S) FOR ADOPTING THE BEST PRACTICE/POLICY:**

This was adopted to minimize the length of time traffic is disrupted and to present a more positive image to the public.

**BIGGEST BENEFIT(S) BEING REALIZED FROM THIS BEST PRACTICE/POLICY:**

Projects are completed in a more timely manner with minimal disruption.

**LOCATION AND TYPE(S) OF PROJECTS WHERE THIS PRACTICE/POLICY IS MOST APPLICABLE/EFFECTIVE:**

This policy is most applicable to overlay projects on 2-lane rural highways, but can be applied to other work.

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**137. UTAH**

**BEST PRACTICE/POLICY:**

Frequent Use of Innovative Contracting Procedures

**DESCRIPTION OF THE BEST PRACTICE/POLICY:**

The UDOT, with FHWA approval and encouragement, has utilized several different aspects of innovative contracting procedures on highway projects. From I/D clauses to A+B contracting, and design-build projects. The UDOT has been utilizing these innovative contracting practices for several years.

**REASON(S) FOR ADOPTING THE BEST PRACTICE/POLICY:**

The main reason for adopting these practices was to minimize traffic disruptions to the traveling public. Each of these practices serves to reduce the time needed to complete a project.

**BIGGEST BENEFIT(S) BEING REALIZED FROM THIS BEST PRACTICE/POLICY:**

The biggest benefits are exactly what was intended by using these practices; reduced traffic disruptions to the traveling public, and quicker completion of projects.

**LOCATION AND TYPE(S) OF PROJECTS WHERE THIS PRACTICE/POLICY IS MOST APPLICABLE/EFFECTIVE:**

All projects.

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**Appendix B**

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**Bidding Techniques and Average Traffic Control Costs  
of Other States**

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