1. Payment by Plan

What is it?

Payment by plan quantities is an alternative payment provision where contractor's reimbursement is based on measurement of quantities derived from plans and schedule instead of field measurements *(1)*.

Why use it?

According to the Construction and Materials Manual of the Wisconsin Department of Transportation *(2)* a payment by plan quantity provision can have the following benefits:

* Reduces the time needed for taking measurements on the field,
* Eliminates the need of resolving minor quantity variations, and
* Provides for quicker payment to the contractor.

What does it do?

The purpose of payment by plan provisions is to streamline contract administration by eliminating field measuring and time spent resolving small quantity variations *(1)*. Under this provision the contract specifies the list of items that will be paid according to planned quantities. These items are usually items that can be estimated accurately, are not expect to vary significantly from the specifications, and can be easily measured after payment *(1)*.

How to use it?

The first step when using payment by plan provisions is to select the items that will be reimbursed to the contractor according to this provision. This provision works best on items that *(3)*:

* Can be estimated accurately
* Are not expected to vary beyond specification thresholds during construction
* Are measured linearly or by area
* Can be easily measured once built

The next step is to determine the payment exceptions used for these items. Under normal conditions the STA would reimburse the contractor for the items periodically according to the scheduled quantities; however, in some cases changes to the project design or miscalculations can result in different quantities than those on the plans and specifications when the contract was signed. In order to avoid paying short or in excess the contract must include criteria that will allow for readjustments. According to the WisDOT Construction Materials Manual, a STA can use two types of exceptions:

* Adjustments for Contract Revisions - This occurs when changes to contract occur that can increase/reduce the quantities, or eliminate a specific item. If an increase occurs the contract should specify how the addition will be reimbursed. Options can be whether it will be measured or if it will be paid as a planned quantity as well. In case a decrease occurs the contract should specify whether the payment provision for the item will change to a measured one, or the quantity will be adjusted and paid by planned quantities. Finally, if the item is eliminated, the contract should specify what type of reimbursement the contractor will receive if he/she has already made an expenditure to procure or build the item.
* Adjustment for Quantity Variations - Here, the STA should set up threshold limits for when the engineer or contractor identify items with a variation in quantity from what was planned and what was built. When the variations are larger than the threshold the contract should specify whether the item can be adjusted by measuring, and whether the entire quantity will be adjusted or only the portion where the variation occurred.

When to use it?

Pay by plan quantities should be used on items that can be estimated accurately, are not expected to vary beyond specification thresholds during construction, are measured linearly or by area, and can be easily measured once built *(2)*. Common items are concrete, excavation, backfill, structural and reinforcing steel, pipe culverts and storm sewers, and guardrails *(1)*. Other less used items are asphalt, retaining walls, fencing, timber structures, sound barriers, traffic management and signals, demolition, and manhole and inlet covers *(1)*.

Limitations?

One of the main risks of payment by plan quantities is that the planned quantities are sensible to human mistake, which ultimately can lead to conflict with the contractor.

Who uses it?

This provision is used by the following state departments of transportation: Colorado, Florida, Indiana, Iowa, Michigan, Minnesota, North Carolina, Pennsylvania, Texas, and Wisconsin *(1)*.

Examples

Example 1) Washington Department of Transportation

 The Washington Department of Transportation uses Payment by Plan Quantity provisions on every project that involves bridge substructure or retaining walls. Currently, this provision is being used at the Bridge replacement project over Rock Creek on SR-6. This project will replace two concrete bridges built on 1924 with two wider structures that accommodate 12-foot lanes and 6-foot shoulders. As of February 2014, the project was on design phase and construction was scheduled to be complete by Fall 2015 *(4)*.

The following is the general payment by plan quantity contractual provisions used by the Washington Department of Transportation *(5)*. This specifications are used on retaining walls, and bridge substructure items for steel reinforcing bars, epoxy-coated steel reinforcing bars, and concrete, expect shafts and seals.

The quantity of the following items to be paid for on this project shall be the quantity shown in the Proposal, unless changes are made in accordance with Section 1-04.4 which affect this quantity. The quantity shown in the Proposal will be adjusted by the amount of the change and will be paid for as specified in Section 1-04.4.

\*\*\* $$1$$ \*\*\*

The quantities in the Proposal are listed only for the convenience of the Contractor in determining the volume of work involved and are not guaranteed to be accurate. The prospective bidders shall verify these quantities before submitting a bid. No adjustments other than for approved changes will be made in the quantity even though the actual quantities required may deviate from those listed.

The unit contract price for these items shall be full pay to construct and complete this portion of the work.

Example 2) Maine Department of Transportation

The Maine Department of Transportation has the following payment by plan quantities provisions:

SECTION 108 – PAYMENT

108.1 Measurement of Quantities for Payment

108.1.1. Use of Plan Quantities Payment for all items labeled in the Bid Documents as “Plan Quantity” will be based upon the estimated quantity. The Contractor shall accept such payment as full and complete compensation for that item without physical measurement. Upon mutual written Agreement by the Department and the Contractor, the estimated quantity of any item of Work may be used as the final quantity for that item without physical measurement.

References

1. Scott, Sidney and Kathryn Mitchell. *Alternative Payment and Progress Reporting Methods: Task #2*. Trauner Consulting Services, Inc. FHWA Construction Management Expert Technical Group, Federal Highway Administration, Washington, DC, 2007.
2. Wisconsin Department of Transportation (WisDOT).*Construction and Materials Manual*, June 2013. <http://roadwaystandards.dot.wi.gov/standards/cmm/>cm-02-32.pdf [Accessed: September 21, 2013].
3. Wisconsin Department of Transportation (WisDOT). *Pay Plan Quantity*. Madison, WI, September 2004.
4. Washington Department of Transportation (WSDOT). SR-6 Rock Creek Bridge – East Bridge Replacement. <http://www.wsdot.wa.gov/projects/sr6/rockcreekbridgeeast/> [Accessed: March 3, 2014].
5. Washington Department of Transportation. General Special Provisions. <http://www.wsdot.wa.gov/publications/fulltext/projectdev/gspspdf/egsp1.pdf>. [Accessed: Feb. 28, 2014].