

*CHAPTER 12D - QUANTITIES

12D-1 MEASUREMENT

General measurement guidelines are defined in Subsection 00190.10. These include the guidelines for measuring Work or Materials on the unit basis, length basis, area basis, weight basis, volume basis, time basis and lump sum basis. Specific measurement requirements may be contained in the individual “Measurement” Subsection of the Standard Specifications or Special Provisions.

Check Contract Change Orders (CCOs), Addenda, Special Provisions, Project-specific drawings, Standard Drawings, and Standard Specifications to assure that the correct measurement is used for each item.

Guidelines for measurement are:

(a) Area, Linear, and Volume

These measurements should normally be supplemented with a field sketch. Each document must be validated to show that the Work was performed. A validation statement, such as “measured”, “re-measured”, “installed”, or “constructed”, validates the source document in addition to a signature and date.

(b) Vehicle Measure

Document each haul vehicle volume with measurements of the hauling portion to support “water level” capacity. Be sure to use the proper mathematical procedure to calculate the volume. If there is doubt, the prismoidal formula works for all cases.

When each load is delivered, verify that the load quantity equals the calculated “water level” quantity. If it is less than the “water level” quantity, deduct the quantity less than “water level”. If a load is over the “water level” quantity, make no adjustment for the extra Material. Clearly document this on the [Material Delivery and Yield Check Sheet, form 734-2792](#) [See Section 12D-1(n)(4)(b)].

If the same number of loader buckets of a Material will be loaded into each haul vehicle, determine the average load volume instead of determining the measured capacity of each haul vehicle. Load the same number of full buckets, not leveled, onto a minimum of two (2) haul vehicles. Level, measure, and calculate the volume of each load. The average of the two (2) loads is the pay volume for all loads delivered and accepted.

* All Marked Text Updated January 2017

Refer to the discussion of Weigh Memos and Scale Diary in Section 12D-1(n) for quantity requirements related to loads of material.

Remember that the PM is responsible for measuring and determining quantity for all Pay Items. The Contractor is not allowed to document or establish pay quantities.

(c) Weight/Volume Measurement Method Change

If the PM wishes to change the measurement from weight (Ton) to volume (cubic yards) or wishes to change any of the requirements of Subsection 00190.20, the PM must execute a CCO. The CCO shall include a credit to the Agency for the Contractor's cost savings related to not providing and operating the scales required by 00190.20.

Determine conversion factors prior to performing the work. Include conversion factor data for each Pay Item as part of the CCO, consisting of

- For each type of Material, load a minimum of two (2) haul vehicles that can be readily measured.
- Determine the net weight (also gross and tare weights when appropriate) and the volume for each load.
- The average of the loads will establish the conversion factor.

(d) Weighing

See the discussion on Weigh Memos and Scale Diary in Section 12D-1(n).

(e) Lump Sum

At the pre-construction conference, the Contractor should submit a breakdown or schedule for lump sum payments. If the Contractor does not provide the breakdown, the PM should complete one and share it with the Contractor. See Section 12D-2 (c) - Example #1, for a good example of a completed lump sum breakdown.

The PM must review the breakdown and make adjustments, if necessary, after discussion with the Contractor. Each progress payment for the lump sum item must relate to, and be substantiated by, the lump sum breakdown. Also refer to 00195.50.

(f) Each

These items must be identified by station or location. Items that are installed in groups, such as plants and shrubs, are exceptions that may be listed in groups at general locations.

(g) Temporary Striping, Temporary Tape , Temporary Pavement Bars and Bar Removal

The bid prices for these items only apply to the bid quantity. Payment for quantities beyond the bid quantity will be made as specified under Subsection 00225.93. Address this prior to the quantity of Work performed reaches the bid quantity.

To continue paying at the bid price beyond the bid quantity, the PM must analyze the cost of the Work and justify that the bid price is no more than the cost to perform the Work. If the bid price is no more than the cost to perform the Work, the PM must include a cost analysis with the item documentation and include it with the Project documentation.

If the bid price is more than the cost to perform the Work, the PM must either negotiate a new price to be paid under a CCO or order the Work to be performed on an Order for Extra Work to Be Performed on Force Account Basis. When negotiating a CCO for this, remember that the value paid for the Work cannot exceed that calculated on a Force Account basis, as stated in Subsection 00195.20(b).

(h) Flagger and Pilot Car Hours

Refer to the appropriate portions of Section 00225. Record these hours each day on a [Flagger and Pilot Car Receipt, form 734-3955](#), or a similar format, that includes all required information including the location of the flagging station.

Standard Specification 00225.31 requires all flaggers to have completed an approved work zone traffic control flagging course within the past three years and have in their possession a current, official state Flagger Certification from Oregon, Washington, Idaho, or Montana.

To document payment to the Contractor, the PM will need form 734-3955 and a copy of the Flagger Certification on file for each flagger that performs work on the Project. Inspectors will randomly check Flagger Certification numbers and note this on the Flagger and Pilot Car Receipt and/or [General Daily Progress Report form 734-3474](#). (Recommend keeping all flagging documentation together for auditing purposes).

The Contractor's representative must also sign to show agreement.

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		FLAGGER AND PILOT CAR RECEIPT	
PROJECT MANAGER (SECTION) <i>Phase 1G OR18: NEWBERG-DUNDEE</i>		CONTRACT NO. <i>14868</i>	
CONTRACTOR OR SUBCONTRACTOR NAME <i>ADVANCED FLAGGING</i>		DATE OF WORK <i>7-28-16</i>	
ITEM NO. / FLAGGING <i>24</i>	ITEM NO. / PILOT CAR	SHIFT <i>NIGHT</i>	
FLAGGING			
START TIME	END TIME	WORK LOCATION	HOURS
<i>7PM</i>	<i>2AM</i>	<i>IP 3+00</i>	<i>7</i>
<i>7PM</i>	<i>2AM</i>	<i>HSC 52+00</i>	<i>7</i>
<i>7PM</i>	<i>5AM</i>	<i>HSC 53+00</i>	<i>10</i>
<i>7PM</i>	<i>5AM</i>	<i>SB 16+00</i>	<i>10</i>
<i>7PM</i>	<i>5AM</i>	<i>SB 19+00</i>	<i>10</i>
			<i>44 hrs TOTAL</i>
PILOT CAR			
START TIME	END TIME	WORK LOCATION	HOURS
CONTRACTOR REPRESENTATIVE (SIGN) 			
INSPECTOR (SIGN) <i>Craig Shelton</i>		CERT. NO. <i>43585</i>	
734-3955 (4/13)		SIC 203250	
PROJECT MANAGER			

This form is only available in hard-copy and is a three-part form; one copy is given to the Contractor each day Flagging or Pilot Car Work is performed, the second copy is the pay document for this Work, and the third copy is retained by the Inspector.

The bid prices for these items only apply to the bid quantity. Payment for quantities beyond the bid quantity will be made as specified in 00225.97 and 00225.99. Address this prior to the quantity of Work performed reaches the bid quantity.

To continue paying at the bid price beyond the bid quantity, the PM must analyze the cost of the Work and justify that the bid price is no more than the cost to perform the Work. If the bid price is no more than the cost to perform the Work, the PM must include a cost analysis with the item documentation and include it with the Project documentation.

If the bid price is more than the cost to perform the Work, the PM must either negotiate a new price to be paid under a CCO or order the Work to be performed on an Order for Extra Work to Be Performed on Force Account Basis. When negotiating a CCO for this, remember that the value paid for the Work cannot exceed that calculated on a force account basis, as stated in Section 00195.20(b).

(i) Temporary Sign Quantities

Temporary signs will be measured on the area basis when the signs are delivered to the project. The quantities will be limited to those in the approved Traffic Control Plan (TCP) including speed zone signage. (See Subsection 00225.81) The cost of installing the signs is included in the Temporary Protection & Direction of Traffic Pay Item.

In summary, ODOT will pay at least for the total quantity of signs shown on the approved TCP, at the bid price, whether or not all of the signs are actually installed.

(j) Earthwork

If the Digital Terrain Model (DTM) is not used to calculate earthwork quantities, field measurements generally consist of field cross sections notes that show both the original ground and the as constructed ground cross section for each section staked. The PM must assure that the survey methods, formulas, and methods of calculation are all appropriate and correctly done. The PM should perform a validation to assure that the quantities are correct and complete.

If DTM or other electronic methods are used, compare the quantity to the Bid quantity and resolve significant differences. The PM will evaluate the grade and provide acceptance or rejection before the end of the first business day following receipt of the grade verification point (GVP) data from the Contractor or as otherwise agreed to accommodate construction staging. The PM will evaluate the grade using any industry-

standard technique or the method described in this section. Also, perform a validation of the quantity, which may include the following:

- Review the grade verification report to confirm that the frequency of grade verification points meets the minimum requirements contained in Chapter 8 of the Construction Surveying Manual for Contractors and that there are no large voids in the coverage of the GVPs.
- Review the grade verification report to verify that the constructed grade is within the specified tolerances. At least 95% of the grade verification points should fall within the specified construction tolerance. All of the points should fall within two times the specified tolerance. For GVPs outside of the specified tolerances:
 - Consider size and type of material used for constructing the grade
 - Rock slope excavations and stone embankments require discretion from the PM to determine grade acceptability. The PM may disregard failing rock slope GVPs and accept the rock slopes using other industry standard practices
 - Evaluate single GVPs that exceed two times the specified tolerances
 - Evaluate groups of GVPs that indicate an area may be out of tolerance
 - Require corrective work in areas that the PM determines are not acceptable
- Provide written verification to the Contractor in the form of an email, a note on the grade verification report, or other method indicating that the PM or designee has reviewed the GVPs and taken appropriate action.

In addition to validating the grade verification reports provided by the contractor, the PM must perform independent grade verification. Project Managers can perform grade verification by periodically collecting independent “quality assurance” GVPs to verify the constructed grade. QA GVPs should be collected according to Section 8.2 of the Construction Surveying Manual for Contractors or other approved methods. Other approved methods may include using survey-grade GPS, or level loops. If discrepancies are encountered, further investigation may be required using total stations or other high precision methods.

The intent of the QA GVPs is to verify approximately 5-10% of the constructed grade.

Include the written verification and the QA GVP data in the quantity documentation for the applicable Pay Items.

Contact the Contract Administration Unit, or Geometronics for additional information or guidance.

(k) Watering

When watering is included as a Pay Item in the Contract, the Agency must:

- Pay for watering that is done as directed or ordered, and
- Not pay for watering that is done for the Contractor's convenience or that is performed and paid under other Pay Items.

Assure that the volume of each haul vehicle is properly determined, unless measurement will be by an approved meter. This can be done either by truck weight or volume measurement. The vehicle measurement must be included with the source document for watering to validate the quantities being paid.

The source document for watering work is a [Sprinkling Tally Sheet, form 734-3427](#) or a similar record that includes similar information. If the Contractor enters the information on the source document, assure that:

- Payment is only made for watering done as directed or ordered.
- Payment is not made for watering done for the Contractor's convenience or for Work paid under another Pay Item.

The Inspector performs the required validation (as noted above) to ensure the pay volumes on the record are appropriate.

The bid price for this work only applies up to 125% of the bid quantity. Payment for quantities beyond that quantity will be made as specified under Section 00340.91. Address this prior to the quantity of Work performed reaches the bid quantity.

To continue paying at the bid price beyond 125% of the bid quantity, the PM must analyze the cost of the Work and justify that the bid price is no more than the cost to perform the Work. If the bid price is no more than the cost to perform the Work, the PM must include a cost analysis with the item documentation and include it with the Project documentation.

If the bid price is more than the cost to perform the Work, the PM must either negotiate a new price to be paid under a CCO or order the Work to be performed on an Order for Extra Work to Be Performed on Force Account Basis. When negotiating a CCO for this, remember that the value paid for the Work cannot exceed that calculated on a Force Account basis, as stated in Subsection 00195.20(b).

(l) Piling

The source document for piling work is a [Pile Record Book, form 734-3485](#), or a similar format that includes all needed information. Refer to the Contract to determine the information that must be recorded by the Inspector for each pile installed on the Project.

(m) Asphalt Cement in Asphalt Concrete Mixture

When asphalt cement is paid separately from the asphalt concrete mixture, the PM must calculate the quantity of asphalt cement to be paid. Use one of the following methods to determine the pay quantity for the asphalt cement in the mixture:

1. Asphalt Inventory (Inventory) Method

Refer to the [ODOT Manual of Field Test Procedures](#) for instructions on this method.

Use the Asphalt Inventory Method to compare the asphalt cement quantity determined by tank sticking with the quantity supported by delivery invoices. This method is generally used when all plant production is dedicated to the Project, or a supplier has set aside a storage tank to be used exclusively for the Project. There can be numerous problems with this method when using commercial plants that furnish asphalt cement mixture to both ODOT and other Projects.

Record tank measurement and delivery invoice quantities on the [Daily Asphalt Cement Report, form 734-2043](#) (*see example*). Weigh and deduct all asphalt cement used for tack or other uses. Also deduct the weight of the asphalt cement in rejected mixture, waste, or Material not incorporated into the Project.

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DAILY ASPHALT CEMENT REPORT										
PROJECT NAME (SECTION) US20 PME: UPRR - Eddyville (Phase 4)							CONTRACT NUMBER 14890			
CONTRACTOR Knife River					PROJECT MANAGER Steve Schultz					
SUPPLIER Knife River					PLANT LOCATION Corvallis		PLANT TYPE Drum		DATE 9/22/2016	
PREVIOUS ENDING TANK STICK LINE 8 FROM PREVIOUS REPORT					1	187.83		ASPHALT TARGET % FROM JOB MIX FORMULA C		
DELIVERIES BEFORE BEGINNING TANK STICK					Tn MIX THIS DATE X C = ASPHALT CEMENT INCORPORATED					
INVOICE NO.	Tn	INVOICE NO.	Tn	INVOICE NO.	Tn	0.0000 10				
TOTAL DELIVERIES					2	0.00		BATCH TICKET NO.		
DEDUCTIONS BEFORE BEGINNING INVENTORY EXPLAIN BELOW OR ON ATTACHMENT					3	0.00				
BEGINNING INVENTORY 1 + 2 - 3 (ANY MAJOR DIFFERENCES WITH LINE 5 MUST BE RESOLVED)					4	187.83		ASPHALT CEMENT INCORPORATED 11		
BEGINNING TANK STICK					ASPHALT CEMENT SUMMARY					
TANK NO.	TEMP (F)	TK STK INCH AIR	VOLUME IN TANK (Gal)	X	TEMP. CORR. FACTOR	X	SPECIFIC GRAVITY /239.9-Tn	BID ITEM NO.		
1	335.0	63.0	8727		0.9073		1.0330	1320		
2	315.0	34.0	24090		0.9138		1.0272	ASPHALT CEMENT IN MIX		
3	315.0	60.0	15002		0.9138		1.0409	PREVIOUS REPORT LINE 14 12 2103.97		
BEGINNING TANK STICK TOTAL					5	187.83		THIS REPORT LINE 9, 10, OR 11 13 32.66		
DELIVERIES AFTER BEGINNING INVENTORY					ASPHALT MIXTURE SUMMARY					
INVOICE NO.	Tn	INVOICE NO.	Tn	INVOICE NO.	Tn	CLASS 1/2" Lvl 3 Dense HMAC BID ITEM NO. 1300				
V262166	32.22					PREVIOUS REPORT LINE 17 15 49425.92				
V262172	30.53					MATERIAL RECEIPT TOTAL FOR THIS DATE 16 832.37				
V262206	32.20					ASPHALT MIXTURE TO DATE 15+16 17 50258.29				
TOTAL DELIVERIES					6	94.95		BID ITEM NO.		
DEDUCTIONS AFTER BEGINNING INVENTORY (TACK, WASTE, REJECT, SOLD TO OTHERS ETC.) EXPLAIN BELOW OR ON ATTACHMENT					7	38.72		CLASS HMAC		
ENDING TANK STICK					PREVIOUS REPORT LINE 20 18 0.00					
TANK NO.	TEMP (F)	TK STK INCH AIR	VOLUME IN TANK (Gal)	X	TEMP. CORR. FACTOR	X	SPECIFIC GRAVITY /239.9-Tn	MATERIAL RECEIPT TOTAL FOR THIS DATE 19 0.00		
1	335	63.0	8727		0.9073		1.0330	ASPHALT MIXTURE TO DATE 18+19 20		
2	315	34.0	24090		0.9138		1.0272			
3	315	41.0	20947		0.9138		1.0409	REMARKS:		
ENDING TANK STICK TOTAL					8	211.40		S&S - Startup and Shutdown, CF - Coldfeed		
ASPHALT CEMENT LINES 4 + 6 - 7 - 8					9	32.66				
Line 3: Forcing Line 4 to equal Line 5.					HMAC Waste:					
Line 4:					A 30.00 Tn S&S waste (2401,0.5(b&S2))					
Line 7: Waste Deduction Calculation:					B 18.00 Tn HMA wasted @ Plant (2401, Line b)					
f	987.20 Tn Total Mix not Accepted (2401, Line f)				C 0.00 Tn HMA rejected @ Jobsite (2401, Line d)					
h	0.19 Avg % Mix Moisture (2401, Line h)				non-S&S Aggregate Waste:					
TD	985.33 Tn Total Dry Mix not Accepted f/(1+(h/100))				D 0.00 Tn CF Rock waste over scale (2401, Line S1)					
z	3.93 % Pb by Tank (2401, Line z)				E 0.00 Tn Rock waste thru drum (2401, Line S2)					
7	38.72 Tn Waste AC for Line 7 (TD)(z)/100				F 0.0 % Rock lost in exhaust system (2401, Line S2)					
Comments:										
TECHNICIAN (PLEASE PRINT) AND CARD NUMBER Josh Morgan, #49910					COMPANY NAME Knife River		SIGNATURE <i>JM</i>		DATE 9.23.16	

ODOT Form 2043
MSB 5/15/05

Storage tanks should be level and free of buildups in order to obtain accurate measurements. Check the tank manufacturer's volume conversion charts for accuracy. One method to do that is to compare the invoice quantity to the quantity determined from tank stickings taken before and after delivery.

Check weigh the delivery vehicles occasionally by weighing the delivery vehicle before and after delivery and comparing the delivered quantity to the invoice. Resolve any differences greater than allowed by 00190.10(d) (2). Also refer to the discussion of Check Weighing in Section 12D-1 (n-2).

2. Testing Method

Use this method when the inventory method is inappropriate because asphalt mixture is also supplied to others or the mixture contains recycled asphalt pavement (RAP). The following test method is specified for this purpose:

Asphalt Content by Ignition Method (Calibration according to ODOT TM 323 and test according to AASHTO T 308 Method A or Method B with a 60 minute burn time). Refer to the Manual of Field Test Procedures for the actual test procedure.

Enter the asphalt content test result percentages into the Statistical Testing Input Data sheet in the “Statspec” program. The program uses the asphalt and moisture content means that appear on the bottom of the Price Adjustment Computation sheet to calculate the asphalt cement pay quantity. [Refer [Chapter 12C – Quality Price Adjustments](#)]

3. Small Quantity Method

When small quantities of mixture are accepted without testing, calculate the quantity of asphalt cement in the mixture by using asphalt cement percentages from one of the following:

- Job Mix Formula
- Batch Weights
- Average as determined from the asphalt inventory or Statspec

Calculate and document quantities on the [Daily Asphalt Cement Report, form 734-2043](#), under “Small Quantity”. Refer to the [ODOT Manual of Field Test Procedures](#) for instructions on this calculation.

It is very important to note that, no matter which method is used to determine the asphalt cement quantities, the quantities must be calculated daily during production and paid for on the progress estimate for that month. Some Contracts contain an asphalt escalation/de-escalation Specification (Subsection 00195.10) which requires the Agency to make an adjustment in payment when the price of asphalt fluctuates significantly. [Refer to [Chapter 12E – Adjustments to Lump Sum and Other Items, Section 12E-2](#)]

If you have questions about measurement of any item, contact your Region Assurance Specialist (RAS) or the Contract Administration Unit (CAU).

(n) Weigh Memos and Scale Diary

Also refer to above discussion on Vehicle Measure.

When the Contractor provides and uses scales for measuring pay quantities, the scales must meet the requirements of Subsection 00190.20.

Subsection 00190.20(d) requires that scales be inspected and tested at various times, by the Department of Agriculture or other appropriate regulatory agency. The PM may request additional inspections if there is any reason to believe that the scales may not be functioning properly. This work determines the weight for pay purposes.

1. Scale Diary

For all Projects that have Material paid on the weight basis, the PM must prepare a scale diary and submit it with the Project quantity documentation.

Record the following information in or attached to the scale diary:

- Appropriate dates and signatures of persons making entries.
- For both Project and check weighing scales, include scale location and owner, manufacturer, serial number, type of scale, and maximum capacity.
- Scale inspection reports furnished by the Department of Agriculture or a scale service company. See Subsection 00190.20(d) for frequency of inspection.
- Results of inspections directed by the PM.
- Corrective measures taken when an inspection or check weight indicates that the scale is not operating within tolerances.
- Dates, hours at the scale, and names of Agency-provided weighers and weigh witnesses.
- Dates and times that the Agency, the Contractor, or others were notified of problems that could cause inaccurate weights and action taken.
- Tare weights of haul vehicles and time that the weights were obtained. This information is not needed in the diary if tares are obtained for every load. The tare weight information is recorded on the [Tare Sheet, form 734-2394](#), or alternate form approved by the PM.
- Check weighing required by Subsection 00190.20(f), including a comparison with the appropriate weigh memo.
- Check weighing of bulk Materials shipped to the Project, such as asphalt cement, lime, or Portland cement.

2. Check Weighing

Perform check weighing as required, and at the frequency specified, in Subsection 00190.20(f). Record the results of the check weighing and the comparison in the scale diary, as indicated in the example below:

CHECK WEIGHING EXAMPLE

	<u>Project or Contractor Scale</u>	<u>Check Scale</u>
Gross Weight:	39.69 Tons	39.74 Tons
	$\frac{(39.69) - (39.74)}{39.69} \times 100 = 0.1 \text{ percent difference}$	

If observation, the check weighing, or other concern indicates that the scales are not operating within the tolerances specified in Subsection 00190.20(f), the PM must:

- Immediately order the scale operation to be corrected, and
- Determine which weigh memos were impacted by the incorrect scale operation and resolve that information.

3. Weigh Memos

The weigh technician will issue a Weigh Memo for each load of Material shipped or delivered to the Project. The weigher may use an [ODOT Weigh Memo - Material Receipt, form 734-3082](#), (Weigh Memo) or may use the Contractor or Supplier-provided format used as a Weigh Memo. The weigh memo furnished must include the information referenced in 00190.20(f)(3).

		TARE SHEET			
PROJECT NAME (SECTION) OR21: Monfanti Valley Road to Sycamore			CONTRACT NO. C14685		
MATERIAL 3/4"-0 Aggregate Base			SOURCE 22-042-2		
PREPARED BY James Adams O'Reilly			DATE 9/1/2016		
PLANT Minto Creek Quarry, Plant 1.					
		Morning Tare		Afternoon Tare	
Truck #	Driver's Name	Lightweight	Time	Lightweight	Time
402a	Sven Bjorn	24620	7:05AM	24580	1:12PM
350	Rasheed Jamel	22860	7:34AM	22740	1:43PM
555TR	Malakai McMurphy	23460	7:42AM	23380	1:53PM
44	Walter Whitaker	24560	7:49AM	24500	2:01PM

4. Receipt of Material on the Project

Each load of Material delivered to the Project Site must be documented and verified by the Agency's Materials Receiver (*not Contractor personnel*).

The PM shall document two independent reviews of the daily material totals that reconcile, regardless of which collection method chosen:

(a) Collecting Weigh Memos from Haul Vehicles

On small projects, or projects with few, intermittent loads of Materials being delivered, the field conditions may be safe enough to allow the Agency's Materials Receiver to collect the Weigh Memos directly from the haul vehicles. In these instances, the Materials Receiver will:

1. Collect the Weigh Memo directly from the haul vehicles as the Materials are delivered to the Project Site. Record the following information on each Weigh Memo:
 - Location of delivered Material (station, mile point, etc.).
 - Haul truck information (truck number), if not already noted on Weigh Memo.
 - Time Material was delivered.
 - Signature and date of Materials Receiver.
 - Perform yield calculations at least once per day when more than 10 trucks of HMAC are placed. See next section (b) for more information.
 - If the load of Materials or any portion of the load of Materials is rejected at the Project Site, write "REJECTED" on the Weigh Memo.

2. At the end of the shift, the Materials Receiver will gather all Tare Sheets for the Materials placed that date from the weigh scales and will then perform the final pay quantity calculation by running two (2) adding machine tapes or approved computer-generated source documents totaling up all Weigh Memos.
 - If the total on the second quantity summation matches the total on the first summation, the person performing the calculation will sign and date one of the adding machine tapes or approved computer-generated source documents. Include both the Project and Pay Item identification on the submittal as well.
 - If the total on the second quantity summation **does not** match the total on the first, an additional summation must be run. There must

be two (2) totals that match before the final pay quantities can be verified.

3. The Weigh Memos and signed and dated quantity tabulations are bound together and submitted for checking by a second person before payment is made for the Materials.

(b) Weigh Memos NOT Collected From Haul Vehicles

If the PM determines that field conditions are not safe enough for the Weigh Memos to be collected directly from the haul vehicles, the Materials Receiver will:

1. Record the required information for each load of Material delivered on the [Material Delivery and Yield Check Sheet, form 734-2792](#).
 - If any Material is rejected on the Project Site, write “REJECTED” and an estimated quantity in the remarks section on form 734-2792.
2. The Materials Receiver will perform theoretical yield calculations at least once per day when more than 10 trucks of HMAC are placed and record the required information on the [Material Delivery and Yield Check Sheet, form 734-2792](#).
 - The actual tonnage placed should be within 10% of the calculated yield. If it is not, verify the measurements and recalculate the yield.
 - After verifying the measurable values for the yield calculations, if the calculated yield and actual yield difference cannot be resolved, an explanation is needed in the remarks area of the form.
 - If there are another 10 loads of HMAC being placed, perform another yield calculation to verify the results are within the 10% tolerance.
 - If the results are still out of tolerance, check with the density technician to verify if there are problems with the MAMD.
3. The Materials Receiver will periodically (daily, or several times per day) gather the Weigh Memos from the weigh scale and compare the information on the Weigh Memos to the information recorded on the Material Delivery and Yield Check Sheet. Any discrepancies in the information should be discussed with the Contractor’s representative and resolved immediately.
4. At the end of the shift, the Materials Receiver will gather all the Weigh Memos and associated Tare Sheets for the Materials placed that date from the weigh scales.

5. Using the information recorded on the Weigh Memos, the Materials Receiver will record the quantities for each corresponding load of Materials on the Material Delivery and Yield Check Sheet, calculate the total Materials placed that date, and sign and date the form.
6. The Materials Receiver will perform the final pay quantity calculation by running an adding machine tape or approved computer-generated source document totaling up all Weigh Memos.
 - If the total on the quantity summation matches the total on the Material Delivery and Yield Check Sheet, the person performing the calculation will sign and date the adding machine tape or approved computer-generated source document.
 - If the total on the quantity summation **does not** match the total on form 734-2792, a second summation must be run. There must be two (2) totals that match before the final pay quantities can be verified.

The Material Delivery and Yield Check Sheet, signed and dated quantity tabulations, and all Weigh Memos are bound together and submitted for checking by a second person before payment is made for the Materials.

SAFETY: If the Materials Receiver must work in the construction area, s/he will be exposed to vehicle traffic and construction operations. If the PM determines that field conditions **are not** safe enough for the Materials Receiver to be on-site to verify Materials delivery, the PM should contact the CAU or the Contract Administration Engineer (CAE) for guidance on alternative methods for Materials verification.

If the PM determines that field conditions are safe enough for the Materials Receiver to be on-site to verify Materials delivery, follow these safety tips:

- **Never** walk behind any Equipment or haul vehicles.
- **Always** be aware of Equipment, haul vehicles, or traffic. At all possible times face Equipment, haul vehicles, and traffic. Walk in front of haul vehicles or Equipment where the driver or operator can see you and make eye contact. Maintain eye contact until you are in a safe area.
- **Always use common sense.**

12D-2 **QUANTITY DOCUMENTATION**

The written evidence to support progress payments, and eventually final payment, consists of “source documents” with appropriate signed and dated calculation sheets showing the quantities of Work completed or accepted. For progress payments on lump sum items, a signed and dated source document must verify the amount of Work completed and correspond to an appropriate lump sum breakdown, or schedule, approved by the Project Manager (PM) and generally submitted by the Contractor.

(a) Source Documents

Source documents must be prepared in a clear manner such that a person who has never been on the Project and knows nothing about the Work should be able to follow on paper what is being paid for and why.

“Source documents” are the field notes, calculations, receipts, invoices, and reports used to determine project pay quantities. Acceptable source documents generally do not exceed a single pay period and shall include the following:

1. **Project Identification** - There must be sufficient identification on each document to clearly identify on which Project the Work was done. If the document is large enough, both the Project name and Contract number should appear on each document, including those documents prepared by the Contractor, Supplier, or manufacturer.
2. **Pay Item Identification** - Project Pay Item number(s) and, if appropriate, the item name. The source document must also indicate the proper Participation Indicator (sub-job) to which the Work is to be charged if more than one Participation Indicator could be used for that Pay Item.
3. **Validation** - Verifying statement that the item was actually installed, performed, re-measured, furnished, completed, received, or accepted.
4. **Specific Location of Installation** - Project station(s) and, when appropriate to clarify or explain measurements, a sketch of the installation to show measurements or as-constructed details. Include additional information, such as Bridge number or stream, intersection, street, or road names (if applicable).
5. **Date(s)** - Date(s) the source document was prepared, validated, checked, and, (when appropriate) the date(s) of the Work.
6. **Signatures** - Signatures for each person that prepared, validated, and checked the document. If the checker finds an error in the original information, the checker should have the original preparer review and confirm the correction. A signature is a person’s name written the way that they normally write it. Initials

are not acceptable unless the person's signature also appears on or is attached to the document. Source documents shall show the signature of the person making the entries and the names of other members of the crew involved in obtaining the information on the note. Payments should not be posted until the document has been checked by a second person.

Prepare the source document at the time and place of delivery, performance, installation, or measurement of the Pay Item. Line out, rather than erase, incorrect entries on a source document. Validate alteration of data by date and signature. If one person makes all of the changes and the affected documents are bound, a single validation statement is sufficient.

The source document does not necessarily need to be on letter size paper or on pre-printed forms, but it must include all required information.

If it is necessary to copy or combine source documents, identify the original documents as "ORIGINAL" and the copied documents as "COPY". Cross-reference each set to the other, and submit both sets of documents with the Project records. Also, submit the originals, when copies are required for documents that are illegible, that need clarification, or when notes are inserted. A scrap of paper with a note on it is not necessarily a source document.

(b) Computer-Generated Source Documents

In order to allow the use of computers by field personnel, the following guidelines also apply to computer-generated source documents:

- A signature tied to each person's initials must appear on the document. On documents with single or multiple installations, the dates may be computer-generated. For multiple installations, initials are not required, but an original handwritten signature and date is required for each document. Electronic or digital signatures are not acceptable, since they are not yet legally valid.
- A source document for a unit price Pay Item normally covers one pay period.
- Calculation methods and input must be checked.
- Formula(s) for calculations must be included and shown on the final quantity source document.
- Summary sheets do not replace final quantity source documents.

c) Record Keeping

Record keeping is extremely important for payment purposes. Accurate records are required to assure proper progress and final payments. The PM must assure that the procedures include the following activities:

- Review Plan quantities to verify their accuracy.
- Establish quantity documentation methods for progress and final payments.
- Organize a user-friendly system for records.
- Use proper validation of source documents.
- Use accurate, easy to follow measurement and calculation methods.
- Assure that each pay quantity is properly charged to the right Participation Indicator (sub-job).
- Have a second person check all formulas and calculations.
- Prepare a summary sheet of pay quantities.
- Assemble documents for final records submittal.

It is important to remember that Section 00190.00 of the Contract specifically states that the Engineer will measure or determine all pay quantities unless otherwise specified. The PM is responsible for measurement and quantity determinations for all Pay Items.

Contractors and Subcontractors are not allowed to document or establish pay quantities. The PM may use some information that is developed by the Contractor or Subcontractor to determine pay quantities, but must perform some sort of validation of the Contractor or Subcontractor's information. For example:

- Although the Contractor is allowed to complete a [Sprinkling Tally Sheet, form 734-3427](#) or a similar format, the Inspector must validate the quantity used [See Section 12D-1(k)].
- Section 12D-1(n) below on Weigh Memos and Scale Diary addresses Materials weighed on Contractor-provided scales.
- If the PM uses information prepared by the Contractor's surveyor to calculate pay quantities, the PM must perform a validation of the surveyor's information [See Section 12D-1(j)].

Each Pay Item must have documentation to support each monthly payment. It is reasonable to expect a reviewer in May to request documentation for a payment made the previous month or many months before. Do not make any payment without the proper quantity calculations and required quality documents.

Organize the documentation for easy review. Submit in pads as discussed in [Chapter 37 - Submittal of Final Project Documentation](#).

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For reference, following are some examples of Source Documents (“paynotes”) prepared using the [ODOT Installation Sheet, form 734-2605](#) and the [ADA Ramp Inspection Form, 734-5020](#):

EXAMPLE 1: Source Document (“paynote”) and Lump Sum (LS) Schedule of Values or Lump Sum (“breakdown”). This breakdown is used to establish the monthly progress payments for the lump sum Pay Items. If this information is not provided by the Contractor, the PM should establish the values (see 00195.50) prior to any lump sum payments being made.

Oregon Department of Transportation		INSTALLATION SHEET	
PROJECT: <u>US101: Pistol River Br. Repair</u>			
CONTRACT: <u>C14499</u>	EA: <u>CON03352</u>	ITEM NUMBER: <u>230</u>	
EM DESCRIPTION: <u>Bridge Removal Work</u>	GROUP NO.: <u>11</u>		
METHOD OF QUALITY ASSURANCE			
SUPPORTING DATA			
T - TEST CERTS <input type="checkbox"/>	Q - COMPLIANCE CERTS <input type="checkbox"/>	L - ODOT LAB. REPORT # _____	
O - CMO <input type="checkbox"/>	E - EQUIP. LIST & DWG. <input type="checkbox"/>	BG - BLUE AND GREEN SHEETS <input type="checkbox"/>	
F - FIR # _____	SQ - SMALL QUANTITY <input type="checkbox"/>	QPL Approved <input type="checkbox"/> Qualified <input type="checkbox"/>	
NO QUALITY DOCUMENTATION REQUIRED <input checked="" type="checkbox"/> QUALITY DOCUMENTS SUBMITTED W/PAYNOTE <input type="checkbox"/>			
QUANTITY DATA			
PREVIOUS QUANTITY: <u>85.0%</u>	UNIT: <u>LS</u>	RE-MEASURE <input type="checkbox"/>	
INSTALLED THIS NOTE: <u>10.0%</u>	UNIT: <u>LS</u>	MEASURED IN PLACE METHOD <input checked="" type="checkbox"/>	
TOTAL TO DATE: <u>95.0%</u>	UNIT: <u>LS</u>	PARTIAL PAYMENT <input type="checkbox"/>	
		BID ITEM COMPLETE <input type="checkbox"/>	
		INSTALLATION COMPLETE <input type="checkbox"/>	
AS PER PLAN: YES <input checked="" type="checkbox"/> NO <input type="checkbox"/> IF NO WHY? _____		UPDATED AS CONSTRUCTED PLANS <input type="checkbox"/> N/A <input type="checkbox"/>	
LOC. / STA.: <u>Pistol River Bridge #08719</u>		CL <input type="checkbox"/>	Rt. <input type="checkbox"/> Lt. <input type="checkbox"/>
PLAN SHEET # _____	NOTE # _____	NOT ON PLANS <input type="checkbox"/>	
SKETCH / CALCULATIONS / REMARKS:		INSTALLATION DATE: <u>1/2/13 - 1/4/13</u>	
<p><u>Location</u></p> <p align="center"><u>Sta 540+70 LT to 546+40 LT 1/2/13 - 1/4/13</u></p> <p align="center"><u>5 deck drains and drain pipe on east side removed = 10.0%</u></p> <p align="center"><u>(Note: Per LS breakdown of "Removing existing drain pipe east" - 10.0%)</u></p>			 NORTH ARROW
<div style="border: 1px solid black; padding: 5px;"> <ul style="list-style-type: none"> • 230 Bridge removal work <ul style="list-style-type: none"> ○ Remove existing bridge rail east – 37.5% ○ Remove existing bridge rail west – 37.5% ○ Remove existing drain pipe east – 10% ○ Remove existing drain pipe west – 10% ○ Removal work for bent 2 and 3 beam repair – 5% </div>			
INSPECTOR SIGNATURE: 	DATE: <u>1-31-13</u>	SEE BACK <input type="checkbox"/>	
FOR OFFICE USE ONLY			
CHECKED BY: <u>Peggy Nelson</u>	QUANTITY CHECKED <input checked="" type="checkbox"/>	QUALITY CHECKED <input checked="" type="checkbox"/> <u>Schunk</u>	DATE: <u>2-4-13</u>
QUANTITY THIS NOTE: <u>10%</u>	UNIT: <u>LS</u>	ESTIMATE # <u>3</u>	NOTE # <u>3</u>

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EXAMPLE 2: Source Document (“paynote”) for a completed lump sum bid item. This payment is made using the lump sum breakdown schedule required by the Contract (00280.90).

Oregon Department of Transportation		INSTALLATION SHEET	
PROJECT: <u>Westport Ferry Landing Replacement (Clatsop Co)</u>			
CONTRACT:	<u>14741</u>	EA:	<u>CON03645</u>
		ITEM NUMBER:	<u>110</u>
DESCRIPTION:	<u>Erosion Control</u>		GROUP NO.: <u>11</u>
METHOD OF QUALITY ASSURANCE			
SUPPORTING DATA			
T - TEST CERTS <input type="checkbox"/>	Q - COMPLIANCE CERTS <input type="checkbox"/>	L - ODOT LAB. REPORT # _____	
O - CMO <input type="checkbox"/>	E - EQUIP. LIST & DWG. <input type="checkbox"/>	BG - BLUE AND GREEN SHEETS <input type="checkbox"/>	
F - FIR # _____	SQ - SMALL QUANTITY <input type="checkbox"/>	QPL Approved <input type="checkbox"/>	Qualified <input type="checkbox"/>
NO QUALITY DOCUMENTATION REQUIRED <input checked="" type="checkbox"/>		QUALITY DOCUMENTS SUBMITTED W/PAYNOTE <input type="checkbox"/>	
QUANTITY DATA			
PREVIOUS QUANTITY:	<u>75%</u>	UNIT: <u>LS</u>	RE-MEASURE <input type="checkbox"/>
INSTALLED THIS NOTE:	<u>25%</u>	UNIT: <u>LS</u>	MEASURED IN PLACE METHOD <input type="checkbox"/>
TOTAL TO DATE:	<u>100%</u>	UNIT: <u>LS</u>	PARTIAL PAYMENT <input checked="" type="checkbox"/>
			INSTALLATION COMPLETE <input checked="" type="checkbox"/>
AS PER PLAN: YES <input type="checkbox"/> NO <input type="checkbox"/> IF NO WHY? _____		UPDATED AS CONSTRUCTED PLANS <input type="checkbox"/> N/A <input checked="" type="checkbox"/>	
LOC. / STA.: _____		CL <input type="checkbox"/> RL <input type="checkbox"/> Lt. <input type="checkbox"/>	
PLAN SHEET # _____	NOTE # _____	NOT ON PLANS <input checked="" type="checkbox"/>	
SKETCH / CALCULATIONS / REMARKS:		INSTALLATION DATE: <u>8/5/2015</u>	
<p>Standard Specification Payment Schedule</p> <p>25% When ESCP is approved</p> <p>25% When 50% of Contract is complete</p> <p>25% When 75% of Contract is complete</p> <p>25% When BMPs removed</p> <p>100% Total</p> <p><u>This Note:</u> 25% BMPs removed, August 2015</p>		<div style="border: 1px solid black; width: 50px; height: 50px; margin: 0 auto;"></div> <p align="center">NORTH ARROW</p>	
		See back <input type="checkbox"/>	
 CONTRACTOR SIGNATURE	<u>8/29/15</u> DATE	<input checked="" type="checkbox"/> Bid Item Complete <input type="checkbox"/> Yes <input type="checkbox"/> No	
FOR OFFICE USE ONLY			
CHECKED BY: <u>[Signature]</u>	QUANTITY CHECKED <input checked="" type="checkbox"/>	QUALITY CHECKED <input checked="" type="checkbox"/>	DATE: <u>9-1-15</u>
QUANTITY THIS NOTE: <u>25%</u>	UNIT: <u>LS</u>	ESTIMATE # <u>9</u>	NOTE # <u>4</u>
734-2605 (3-2013)		http://www.oregon.gov/ODOT/HWY/CONSTRUCTION/HwyConstForms1.shtml	

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EXAMPLES 3 and 4:
These are Source Documents (“paynote”) illustrating different methods of calculating Materials installed.

INSTALLATION SHEET

PROJECT: 138E: Corridor Solutions
 CONTRACT: C14808 EA: CON03685 ITEM NUMBER: 700
 TM DESCRIPTION: Trench Resurfacing GROUP NO: 111

METHOD OF QUALITY ASSURANCE

SUPPORTING DATA
 T - TEST CERTS Q - COMPLIANCE CERTS L - ODOT LAB REPORT # _____
 O - CMO E - EQUIP. LIST & DWG. BG - BLUE AND GREEN SHEETS
 F - FIR # 7-700 P - PROOF CERT/LICENSE CPL Approved Qualified
 NO QUALITY DOCUMENTATION REQUIRED QUALITY DOCUMENTS SUBMITTED W/PAYNOTE

QUANTITY DATA

PREVIOUS QUANTITY: 132.9 UNIT: sqyd RE MEASURE
 INSTALLED THIS NOTE: 8.7 UNIT: sqyd MEASURED IN PLACE METHOD
 TOTAL TO DATE: 142.6 UNIT: sqyd PARTIAL PAYMENT
 INSTALLATION COMPLETE

AS PER PLAN: YES NO IF NO WHY? _____ UPDATED AS CONSTRUCTED PLANS N/A
 LOC / STA: See Below for locations SC 10+35 RL 9.4 CL RL LI
 PLAN SHEET # _____ NOTE # _____ NOT ON PLANS

SKETCH / CALCULATIONS / REMARKS: INSTALLATION DATE: Thru 6/30/2016

Temporary trench patch for open lanes for holiday restrictions.
 See FIR for additional information. See SC 10+35 RL 9.4 *9 sq. ft. per 1 sq. yd.
 SC 10+25 RL NORTH ARROW

Length = 25.0' dia plus (for pipe less than 36" width = 24" wide) = 2.0'
 = 25.0 x 3.5 = 87.5 sq. ft.
 18" + 24" = 42" / 12" per foot = 3.5' wide

Summation = 87.5 sq. ft. / 9 sq. ft. per sq. yd.
 9.7 sq. yd.

Field measured length with wheel and pocket tape SEE BACK

Patrick Gage *Patrick Gage* 44394 DATE: 7/7/2016 Bid Item Complete Yes No

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QUANTITY CHECKED QUALITY CHECKED
 CHECKED BY: *Patrick Gage* DATE: 7/12/16
 QUANTITY THIS NOTE: 9.7 UNIT: sqyd ESTIMATE # 12 NOTE # 7

78-2905 (3-2015) <http://www.oregon.gov/ODOT/TRAFFIC/CONSTRUCTION/Forms/InstallSheet.shtml>

INSTALLATION SHEET

PROJECT: 138E: Corridor Solutions
 CONTRACT: C14808 EA: CON03685 ITEM NUMBER: 380
 TM DESCRIPTION: Removal of Inlets GROUP NO: 111

METHOD OF QUALITY ASSURANCE

SUPPORTING DATA
 T - TEST CERTS Q - COMPLIANCE CERTS L - ODOT LAB REPORT # _____
 O - CMO E - EQUIP. LIST & DWG. BG - BLUE AND GREEN SHEETS
 F - FIR # _____ P - PROOF CERT/LICENSE CPL Approved Qualified
 NO QUALITY DOCUMENTATION REQUIRED QUALITY DOCUMENTS SUBMITTED W/PAYNOTE

QUANTITY DATA

PREVIOUS QUANTITY: 21.0 UNIT: Each RE MEASURE
 INSTALLED THIS NOTE: 3.0 UNIT: Each MEASURED IN PLACE METHOD
 TOTAL TO DATE: 24.0 UNIT: Each PARTIAL PAYMENT
 INSTALLATION COMPLETE

AS PER PLAN: YES NO IF NO WHY? _____ UPDATED AS CONSTRUCTED PLANS N/A
 LOC / STA: See Below CL RL LI
 PLAN SHEET # _____ NOTE # _____ NOT ON PLANS

SKETCH / CALCULATIONS / REMARKS: INSTALLATION DATE: Thru 5/19/2016

Removed inlets during Stage 5, Phase 1
 Backfill to subgrade with aggregate / install new structure / pipe per plan.
 (See Below for stationing)

Sheet / Note	Station	Quantity
5B / 10	SC 11+45 Rt.	1.0 Each <input checked="" type="checkbox"/>
7B / 9	SC 13+42 Rt.	1.0 Each <input checked="" type="checkbox"/>
7B / 10	SC 13+67 Rt.	1.0 Each <input checked="" type="checkbox"/>
Summation =		3.0 Each <input checked="" type="checkbox"/>

SEE BACK

Patrick Gage *Patrick Gage* #44394 DATE: 5/31/2016 Bid Item Complete Yes No

FOR OFFICE USE ONLY

QUANTITY CHECKED QUALITY CHECKED
 CHECKED BY: *Patrick Gage* DATE: 6/1/16
 QUANTITY THIS NOTE: 3 UNIT: EA ESTIMATE # 10 NOTE # 7

78-2905 (3-2015) <http://www.oregon.gov/ODOT/TRAFFIC/CONSTRUCTION/Forms/InstallSheet.shtml>

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EXAMPLE 5: Source Document (“paynote”) for the [ADA Ramp Inspection Form, 734-5020](#). This inspection form is intended to be the paynote for compliant ADA ramps.

ADA Ramp Inspection Form Submit by E-mail

Project Name (Section) _____ Construction Year _____ Contract No. _____ Highway No. _____ MP _____ Cross Street Name _____

Calibration Date: _____

RAMP RUN 1 Pass Fail

Running Slope 1 ≤ 8.3% > 8.3%

Run 1 Length ≤ 15' > 15'

Cross Slope 1 ≤ 2.0% > 2.0%

Detectable Warning (TD, X) None

Lip Height ≤ 1/4" > 1/4"

Gutter Flow Slope

Curb Running Slope ≤ 8.3% > 8.3%

Counter Slope (+/-) ≤ 5.0% > 5.0%

Slope Differential

RAMP RUN 2 Pass Fail

Running Slope 2 ≤ 8.3% > 8.3%

Run 2 Length ≤ 15' > 15'

Cross Slope 2 ≤ 2.0% > 2.0%

RAMP RUN 3 Pass Fail

Running Slope 3 ≤ 8.3% > 8.3%

Run 3 Length ≤ 15' > 15'

Cross Slope 3 ≤ 2.0% > 2.0%

TURNING SPACE Pass Fail

Width X ≥ 4** < 4**

Length Y and or

Slope X ≤ 2.0% > 2.0%

Slope Y

MISCELLANEOUS Pass Fail

Clear Width (feet) ≥ 4' < 4'

Physical Condition (G,F,P)

ADA Design Exception (Y,N)

Design Ex. Control Number

Inspector's Signature _____ Date _____

Print name clearly _____ Certification No. _____

Company/Agency _____ Crew No. (ODOT) _____

734-5020 (11-14-2016) Reset Entire Form Keep Intersection, Reset Fields <http://www.oregon.gov/ODOT/HWY/CONSTRUCTION/Pages/TheyConstForms1.aspx>

Additionally, the PM will send a copy of the inspection form to the email listed in the inspection form instructions.

Send the Inspection forms as the ramps are accepted and paid for, rather than at the end of the project. If any ramps need to be reconstructed, send in the final inspection form after corrections have been made.

12D-3 REVIEW PROCESS FOR QUANTITY DOCUMENTATION

(a) Review by PM

The PM must review each source document as it is prepared to verify that documentation and calculation methods are proper and correct.

Steps in the review procedure for quantity documentation include:

1. Assure that required dates, signatures, Contract numbers, locations, etc. are included on each original source document. Also assure that the Work has been charged to the proper Participation Indicator (sub-job).
2. Prepare and include two (2) adding machine tapes or alternate summation method for all Weigh Memos, tickets, and Material receipts to verify that all individual quantities are included in the summation. Assure that the required date, signature, and Contract number are included on adding machine tapes, computer-generated source documents, and summaries.
3. Assure that a separate person has checked all formulas and calculations and has also signed and dated the documents.
4. When Material is paid for by volume of hauling vehicle, include measurements of the hauling vehicle and calculate the volume for each hauling vehicle. The person measuring the vehicle and calculating the volume must sign and date the document.
5. When conversion factors have been used to compute pay quantities, assure that documentation of the conversion factors is included. The person calculating the conversion must sign and date the document.
6. Verify that proper and correct formulas and procedures were used in each computer-generated source document and spreadsheet to calculate quantities. Computer calculated quantities must be documented with the original field measure notes along with input and output printouts.
7. Compare the calculated quantity of each item to the bid quantity and resolve significant differences.
8. Ask the theoretical question on each item: "Does this quantity seem appropriate for the Work that was actually done on the Project?"
9. Assure that all Work has been included in the calculated quantity and that the calculated quantity does not include inappropriate areas, volumes, or quantities. This may require some independent verification of quantities. For earthwork volumes, refer to the Measurement of Earthwork discussion in Section 12D-1(j).

10. Check all lump sum quantity adjustments and supporting documentation.

11. Verify and submit final quantities on a Quantity Ledger Report.

(b) Review by Region Assurance Specialist (RAS)

The RAS will periodically review all Project quantity documentation. The frequency of those reviews will be planned and will depend on Project size, duration, complexity, and the PM's experience in administering ODOT construction Contracts, and quarterly release of retainage.

The RAS will review and provide guidance in quantity documentation procedures used to support payments to the Contractor, including:

- Source document must be on file.
- Lump sum schedules for progress payment of lump sum items.
- Flagger and Pilot Car Receipts or similar format.
- Sprinkling Tally Sheets or similar format.
- Accurate, easy to follow measurement and calculation methods.
- Calculations and calculation methods checked by a second person.
- Proper source document validations.
- For quantities paid by weight, padded Material receipts with adding machine tapes, or acceptable alternate method, summarizing the total quantities.
- Scale Diary, including scale certification.
- Cost justification for overrun of Flagging, Traffic Control Supervisor, Pilot Cars, Temporary Removable Tape, Temporary Non-Removable Tape, Temporary Non-Reflective Tape, Temporary Striping, Temporary Pavement Bars, Bar Removal, and Watering.
- Quantity price adjustments.
- Material on Hand (MOH) payments.

At the time of the periodic Project review, the RAS will review the quantity documentation to determine whether it fulfills the Contract requirements and supports the payments that have been made to the Contractor. The RAS will report any deficiencies to the PM. The RAS will also address the noted deficiencies and their resolution at the next scheduled periodic review.

The RAS will list the following on the [Documentation Review Report, form 734-1903](#) regarding quantities:

- Agreement to resolution of calculations that are done in a manner different from that specified by the Contract, or from that normally accepted by ODOT, and

- Calculations for which the PM and RAS are unable to agree on the acceptability of the calculation or method.

For acceptance of final Project documentation, refer to [Chapter 37 - Submittal of Final Project Documentation](#).