

**Forest Service Handbook
National Headquarters - Washington Office
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**Forest Service Handbook 7709.57 – Road Construction Handbook
Chapter 5 - Measurement and Payment**

Amendment: 7709.57-1992-1

Effective date: September 4, 1992

Duration: This amendment is effective until superseded or removed.

Superseded Directive: Entire Handbook issued September 1986; Title Page; 0--1 thru 7.3

Approved by: F. Dale Robertson, Chief

Date approved:

Responsible Staff:

Explanation of changes: Following is an explanation of the changes throughout the directive by section.

This amendment is a reissuance of FSH 7709.57 to conform the format and structure of the Handbook to the requirements of electronic directive issuance.

This amendment makes no substantive changes to the text. The only changes made are those necessary to meet new format requirements or to correct spelling, punctuation, or unit names.

This Handbook is now available electronically in the National Information Center in the same format as the paper copy. Henceforth, amendments to this Handbook will be issued to Forest Service units electronically on a document basis.

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5.1 - Methods of Measurement

1. To establish an estimate of the contractor's progress for payment purposes, first determine the quantities completed. The Contract Schedule of Items shows the methods of measurement and the basis of payment.

2. FSH 7709.56 discusses the preparation of contracts and lists five measurement methods:

- a. Designed quantities (DQ).
- b. Lump-sum quantities (LSQ).
- c. Actual quantities (AQ).
- d. Vehicle quantities (VQ).
- e. Staked quantities (SQ).

3. The DQ and LSQ methods do not require measurement of the item of work for final payments; however, some measurement or estimate will be required if intermediate payments are to be made.

4. The AQ method requires in-place measurement of the acceptable, completed quantities of the items of work.

5. The VQ method measures quantities on the basis of weight or volume established in hauling vehicles.

6. The SQ method uses slope stake data to compute earth-work quantities and should be done prior to construction.

5.2 - Determination of Quantities for Payment

1. Only AQ, VQ, and SQ methods determine quantity by a measurement.

- a. When the Schedule of Items indicates the AQ method, review each item specification subsection "Method of Measurement" to determine location, method, and limits of measurement specified.
- b. When the Schedule of Items indicates the VQ method, measure and record the weight or volume of the hauling vehicles. Take visual count or use delivery slips to record quantities as they arrive at the project site. Sequentially number the material receipts to aid in recording and tracking quantities. Check spread rates to verify daily quantity summaries.

c. When the Schedule of Items indicates the SQ method, calculate stakeout data to determine quantities. Any change from the original estimate of quantities could affect balance points and haul distances. Inform the contractor of any deviations prior to construction.

2. Record field estimates for intermediate payments. For final payments, all adjustments made to the quantities during construction must be accounted for. A detailed record of these changes must be kept current throughout the work. Discuss quantities for payments with the contractor before preparing the payment estimate. The contractor may be required to measure and compute quantities on public works contracts.

3. If measured quantities exceed the variation in quantity limits stated in the contract, an adjustment in unit price may be required.

5.3 - Intermediate Payment

1. Intermediate payments for public works contracts are discussed in FSH 6309.11. FSM 2450 contains information about reporting purchaser credit. Exhibit 01 describes the accuracy for various pay items and should be used except if it disagrees with the contract.

2. Prepare the progress payment based on quantities of acceptable work accomplished. Use exhibit 02 to estimate the allowance for work completed.

3. Payment for project material delivered to the site should be considered only after receipt of the supplier's invoice or verification of quantities. Only the Contracting Officer can authorize payment of materials delivered to sites other than the project.

4. Partial payments may be retained for both timber sale and public works contracts; however, the amount of retention is calculated differently. FSM 2450; Timber Sale Contract Division B, section B/BT5.3 and C/CT5.3 discusses retention for timber sale contracts, and FSH 6309.11 prescribes the retention procedure for public works contracts.

5.3 - Exhibit 01

Accuracy for Final Payment

The following tabulation indicates the accuracy required for quantities of the various pay units used in the Schedule of Items. Use this guide to determine the decimal placement in the final payment. Carry field computations to one more decimal and then round the figure to the decimal indicated below.

Pay Unit

Linear Foot	1
Exception--Timber, Steel, and concrete Piles	0.1
Station	0.1
Mile	0.01
Square Foot	0.1
Square Yard	0.1
Each	1
Acre	0.01
Gallon	1
M-Gals.	0.1
Cubic Yard	1
Exception--Structure Excavation; Sheathing Materials; Bedding, Bed Course, and Backfill Materials; Gabions	0.1
Exception--Concrete; Masonry	01
Pound	1
Ton	0.1
Exception--Calcium Chloride; Sodium Chloride; Hydrated Lime; Bituminous Materials; Pavements; Bed Course Materials	0.01
Hour	0.1
MFBM	0.01
Station Yard	1
Cubic Yard Mile	1
Ton Mile	1

5.3 - Exhibit 02

Guide for Intermediate Payments

Use the following cumulative percentages to determine the amount completed for various pay items to supplement measurements made on the project.

<u>Item</u>	<u>Allowance</u> (cumulative percent)
Clearing, Grubbing, and Slash Disposal	
Felled and slashed	35
Bucked and piled	60
Grubbed	75
Burned, buried, scattered, or windrowed	90
Cleanup completed	100
Excavation and Embankment	
Pioneered	5
Drilled and blasted	35
Roughed-out to grade	80
Completed except slope rounding and scaling	90
Cleanup completed	100
Crushed Aggregate Base	
Crushed and delivered in stockpile	50
Place on roadway	75
Spread and compacted	95
Cleanup completed	100
Plant-Mix, Road Mix Asphalt Surfaces, and Treatments	
Base on estimate of area, volume, or weight placed	-
Concrete Structures	
Formwork and Falsework in Place	50
Reinforcing Steel in Place	65

Concrete Placed, Finished, and Cured	90
Forms Removed and Cleanup Completed	100
Steel Structures	

Timber falsework in place--estimated actual cost	-
Structural steel erected--bolted and welded	85
Field painting completed	95
Cleanup of structure site completed	100

Timber Structures

Base on estimate of percentage of each item delivered and in place	-
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NOTE: Allowances are approximate and are subject to adjustment. If there is a question of material quality, do not pay for the item in question until quality concerns are resolved.

5.5 - Final Payment

Prepare the final payment document immediately after all work has been properly completed, measured, and the final inspection report recommends acceptance. FSH 6309.11 discusses final payment for public works contracts. FSH 2409.15 provides direction for final purchaser credit for specified road construction on timber sale contracts.