SECTION 4
PAY QUANTITIES

PAY QUANTITIES

Contract items not documented for payment on a mix bitumen report, haul sheet, concrete paving report or piling/test piling report are recorded on SFN 10004 Pay Quantity Report. The pay quantity report information will be added to CARS using the Pay Quantity portion on the Maintenance side of the Main Menu. The Pay Quantity Report comes in booklet form with duplicate copies for each report. The original copy is submitted to the project engineer and becomes part of the project records. The duplicate copy is retained by the inspector.

Only one bid item per funding source should be documented on the pay quantity report. For example, the project you are working on has two subprojects and quantities for Traffic Control Signs are shown in each subproject. The contractor places the construction signing resulting in quantities for traffic control signs in each subproject. This would be documented on two pay quantity reports, one for each subproject. The date shown on the pay quantity report should be used when entering the report into CARS so the report dates and the dates displayed in the Quantity Book match.

The pay quantity reports should be separated and filed in spec and code order. The reports will be filed in date order within the spec/code section. When a project has more than one subproject, keep separate files for each subproject. The detail sheets from the progressive estimates can be used as a guide for subproject divisions and the spec and code order of the contract pay items. Filing the pay reports in this manner makes it much easier to verify quantities for final preparation and checking.

Documentation of certain pay quantities requires obtaining the contractor's signature on the pay quantity reports. They are:

1. Flagging
2. Pilot Car
3. Water
4. Excavation quantities documented by field measurements such as subcuts
5. Rock excavation not measured by cross sections
6. Items measured in place such as foundation fill or select backfill, if using measurements greater than plan dimensions
7. Any material paid for by load count

If the measurements and computations are being kept in a field book with only the summary of quantities documented on the pay quantity report, the contractor should review and sign the field book. For water and material paid by load count, the contractor should also review and sign the inspector's measurements and computation for the hauling unit capacity.

The purpose of obtaining the signature is to give the contractor an opportunity to review the measurements and signify agreement with the pay quantity documented.
Standard methods of documentation of pay quantities should be used. At a minimum, document the location and quantity of each pay item recorded on the pay quantity report. Any additional information documented for the pay quantities will only be beneficial. When quantities are measured in the field, make sure the measurements are shown clearly and show all calculations for the quantities submitted for payment. The following list details methods of measurement and documentation for general categories of pay items.

Contract Bond

Contract bond will be paid based on the receipted invoice submitted by the contractor along with a letter requesting payment. If the premium paid by the contractor is less than the original lump sum bid price, only the percentage represented by the invoice amount will be paid on intermediate and semi-final estimates. For example:

The invoice amount submitted by the contractor is $4,500.00
The original bid amount is $5000.00
Pay for 0.90 LS

The remainder of the original lump sum bid price remains unpaid until the final estimate. If the invoice amount submitted by the contractor is equal to or more than the original lump sum bid price, only the bid price will be paid.

Mobilization
Mobilization will be paid on the percentage of the original contract earned. The dollar amount paid will be the percentage of the mobilization bid price or the percentage of the original contract amount, whichever is less. These payments are made according to the following chart.

Amount Earned of the	Pay the lesser of:	
Total Contract	Mobilization Bid Amount	Total Contract Amount
5%	25%	2 ½%
10%	50%	5%
50%	100%	7 ½%
75%	100%	10%

Aggregates
Aggregates are generally paid by the ton. Weigh tickets are made and are summarized on CARS generated haul sheets or those produced by the contractor's scale. Small tonnages may be recorded on a pay quantity report and the tickets must be attached to the report. Aggregates are sometimes measured by the square yard or cubic yard and will be measured in place. All field measurements must be recorded on the pay report or kept in a field book. All calculations for the quantities must be shown.

Asphalt for Prime, Tack or Seal Coat
A field book will be kept to document distributor shots. Shot records are used to determine application rates and can be used as an estimated quantity. Quantities will be based on manifest quantities. Final quantities are based on the gallons delivered minus any quantities used for other purposes such as waste or private use. The total quantity from manifests should be equal to or greater than the total quantity in the shot record. On some projects like those in an urban setting, quantities will be determined by shot record only as the contractor's equipment is serving multiple projects. A manifest for the asphalt material applied to the project must still be collected for testing purposes.

Asphalt for Bituminous Mixes
Asphalt used in hot bituminous mixes is paid for by the ton. Daily estimated amounts are calculated on the Mix Bitumen Report which is also used to determine the percentage of asphalt in the mix. Quantities are based on the manifest tons. Final quantities are based on the tons delivered minus any quantities used for other purposes such as waste or private use. Sometimes hot mix is supplied from a commercial plant that is serving many other customers. In this case, the quantity determined from the mix bitumen report will be used. Manifests covering the material used on the project must still be collected for testing purposes.

Reinforcing Steel
A record of all reinforcement bars placed in a structure is kept and signed by the inspector present at the time of placement. These records are generally kept in a field book listing the number, size and length of each type of bar installed and separated by portion of the structure. The quantities are summarized on a pay quantity report as portions of the structure are completed for entry in the quantity book.

Subgrade Preparation
Subgrade preparation will be measured by the number of miles or square yards prepared and accepted. Document field measurements and calculations on the pay quantity report.

Water
Water will be measured and paid by the 'M' gallon. The 'M' gallons of the hauling units will be calculated and must not exceed the licensed legal load for the hauling unit. Quantities are determined by a count of the loads hauled and placed multiplied by the 'M' gallon capacity of the water hauling unit. The contractor will sign each days load counts along with the 'M' gallon calculations for each hauling unit.

Excavation and Borrow
Excavation and borrow quantities may be recorded as estimated amounts until actual computations are made. Excavation and borrow quantities are determined by cross sections. Common excavation areas include topsoil. The topsoil quantity must be subtracted from the common excavation quantity and paid separately. The field notes will be plotted, buggied and computed or may be determined using a computer earthwork program. Hand plotted cross sections and earthwork computations should be checked in depth at the District level and submitted to Construction Services for checking prior to submission of the final. Earthwork computations computed using a program similar to RoadRunner will be submitted along with the field notes to be spot checked. Earthwork computations calculated using Geopak do not have to be submitted for checking prior to submitting final records.

Roadway Obliteration
Locations and field measured quantities for obliteration will be recorded on the pay quantity report. Show any calculations for the quantities.

Loose Rock Riprap
Riprap quantities are generally paid by the cubic yard and are determined by load counts or are measured in place. For load counts, determine the cubic yard capacity of the hauling unit. The cubic yard capacity of the truck should not exceed the licensed legal load. Document the calculations on a pay quantity report or in the inspector's diary. If the calculations are shown on the inspector's diary, note the location of the calculation on the pay quantity reports. The contractor must sign the report showing the load calculations. Record the load counts on a pay quantity report or in a field book. The contractor should also sign each day's load counts. If the riprap is paid by the cubic yard in place, measure the length and width of the area. Take random depth checks along the placement area to determine an average depth. Show all measurements and calculations for the pay quantity.

Seeding and Sodding
Seeding and sodding will be paid by actual field measurements of the placement areas. Show all measurements and calculations for the pay quantity.

Pipe
Payment of pipe will be the actual field measurements of pipe placed. Pay quantity reports should also include information such as heat numbers or inspection stamps.

Non-Structural Concrete
Concrete construction will generally be paid for by the linear foot or square yard. These items will be field measured and drawings will be shown on the pay quantity report or in a field book. Computations must

be shown for all quantities. Concrete paving quantities may also be determined by using the Concrete Paving Report.

Structural Concrete
All concrete pours will be recorded. The total yards used in each portion of the structure will be recorded in the inspector's diary or a separate field book. Tickets will be produced at the concrete plant and will be kept in the project records. The pay quantity for each portion of the structure will be 'plan quantity' unless it is determined that the plans are in error or a change in design has been made.

Miscellaneous Items
Items should be documented showing the location and amount being paid. If an additional quantity of an item was added and was not shown on the plans, it should also be noted on the pay quantity report. Lump sum quantities will be paid as a percentage of the work complete and the pay quantity report should include documentation supporting the amount of the lump sum work completed.

Always check any calculations on pay quantity reports before entering the quantities into CARS.

Enter Pay Quantities in CARS
To enter pay quantities into CARS:

1. Click on the Pay Quantity link on the main menu. The Pay Quantity selection page is displayed. Pay quantities are listed in ascending order by spec and code including change order items.
2. Click on the Add link by the pay quantity to be entered. The Pay Quantity Maintenance page for that item is displayed.
3. Enter the information for the pay quantity
    a. Enter the date from the pay quantity report or from whatever source document is being used.
    b. Use the drop down box to enter the type of source document for the pay quantity
    c. If the quantity being entered is from a change order, use the Change Order drop down to pick the change order information.
    d. The Contractor Approved radio buttons can be used for items such as water or flagging hours that require the contractor's signature.
    e. The Remarks text box is used to enter any comments about the pay item.
    f. Under locations, enter the quantity for the item documented and its location. Four quantity and location text boxes are provided but more can be added by pressing the Add Quantity Row button.
4. Click the Save button. If additional days will be entered for the item, click on the Save and Add New Button. This will save the information entered and bring up a blank page.

If you have entered multiple locations in the text boxes provided, only the first entry will be displayed in the quantity book. If you want the individual locations to be displayed in the quantity book, enter information in the first quantity and location text boxes and click on the Save and Add New button.

A quantity entry can be edited until it is paid on the progressive estimate or as long as the release flag is an R or an E. To edit a pay quantity:

1. Click on the Maint link by the pay item to be edited.
2. Pick the date of the entry to be edited. All date entries made for the items are listed in descending order with the most recent entry at the top of the list.
3. The pay quantity to be edited is displayed. Edit the information by changing the data in the text boxes, adding an entry by clicking on the Add More Rows button, or by deleting one of the quantity/locations rows by clicking in the Delete check box.
4. Click on the Save button to save the corrected entry.

The entire entry can be deleted by clicking on the delete button at the bottom of the page. A box will pop up that asks if you really want to delete the item. If so, click OK. The item will be deleted and you will return to the Pay Quantity Record Selection page for that item.

Only entries made through the Pay Quantity items will be displayed on the Record selection page. If the pay quantity was generated by a haul sheet, mix bitumen report, concrete paving report or piling/test piling report, it will be displayed in the maintenance for those reports. The quantity book should be used to see all quantities entered for a pay item.

PILING/TEST PILING

Piling reports are used to record pile driving data, calculate bearing values and document pay lengths for both test pile and foundation piling. Section 622 of the Standard Specifications contains complete information for the inspection of piling and test piling.

Before piling or test piling information is entered in CARS, you will enter the bridge number and station for each structure on the project. Next, you will enter the hammer information for each driving unit used on the project. This information is obtained from the manufacturer's specification sheet submitted by the contractor.

The following is a list of some common terminology used in piling/test piling documentation and calculation:

Rated Energy — This is the manufacturer's rated energy in foot/lbs. Some reductions may apply and are listed in the Standard Specifications.

Weight of Striking Parts — This refers to the ram weight in pounds. This weight is used in the bearing calculations.

Rated Stroke — This is the manufacturer's rated stroke of the hammer in feet.

Rated Speed — This is the manufacturer's rated speed in blows per minute.

Average Observed Speed — The observed speed in blows per minute from the inspector's documentation

Type of Cap/Cushion — Refers to the type of material used for these parts of the hammer

Cap Weight — The weight of the cap in pounds from the hammer manufacturer's specifications. This weight is used in the bearing calculations.

Anvil Weight — The weight of the anvil in pounds from the manufacturer's specifications. This weight is used in the bearing calculations.

Adapter Weight — The weight of the adapter in pounds from the manufacturer's specifications. This weight is used in the bearing calculations.

Hammer Stroke — This is the stroke in feet from the field documentation or the manufacturer's rating.

Blows per Minute — Refers to the observed blows per minute recorded in the field documentation by the inspector

Energy — This is the observed energy from field documentation and is recorded in foot/pounds.

Number of Blows — The number of blows counted as final penetration is being taken for bearing.

Inches Penetration — Full penetration of the pile during the final check. Recorded to the nearest hundredth of an inch.

The ‘M’ value in the pile formula is the combined weight of the pile, the driving head and the hammer anvil.

Information for design load, plan length of test pile and pile type is found in the project plans. The weight per foot of steel piling is found in the size designation for the piling. For example, the bid item Steel Piling HP 14 x 73 indicates that the piling weighs 73 pounds per linear foot. The weight of the piling is also used in the bearing calculations.

Test Piling

A Test Pile Log is completed for each test pile driven for the structure. The plans will show the test pile number, location and minimum required bearing. Information needed to compute the bearing for the test pile is recorded in a field book by the inspector.

Bearing values are computed according to the applicable formula found in the Standard Specifications. ‘Obs. Stoke’ applies to single acting hammers and ‘Feet of Drop’ applies to gravity type hammers. The value for “M” in the piling formula is the combined weight of the pile, driving head and hammer anvil (lbs.) and represents the total weight of the ‘driven’ parts.

When computing the average penetration, before obtaining 50% of the design load, it is not necessary to count the total number of blows between each 5 feet of penetration, but rather count the number of blows required to penetrate the last foot of penetration.

When 50% of the design load is obtained, bearing must be computed for every foot of penetration even if the bearing drops below 50% of the design load. This is the distance below the bottom of the footing where 50% of the design load is first obtained and bearing readings begin. This distance is used to compute bearing for each foot for the test pile report. Use special attention to insure the accuracy of this entry.

The inspector records the following information in the field documentation for test piling:

1. The substructure unit and number i.e. pier or abutment number
2. Piling number
3. Date, start and stop time
4. The reading starting point
5. The number of piling and cutoff, if any, for each pile length
6. Penetration data including stroke, energy, blows, penetration in inches and the pile length number for that reading

Data recorded in the field inspector’s log for test piling is entered into CARS. The bearing calculations are made and the test piling pay quantity is sent to the quantity book. Only the plan length for test piling as entered on the Test Piling Maintenance page will be sent to the quantity book. Any test piling driven in excess of the plan length will be paid at the contract unit prices for piling. Document the excess quantity on a pay item report and enter it in the Pay Quantity portion of CARS.

Piling

A log of pile driving is completed for all abutment and pier piling. The project plans show details of piling locations, numbers for each substructure unit, pile type and design loads.

The inspector records the following information for each piling driven:

1. The substructure unit and piling number
2. Hammer stroke
3. Blows per minute
4. Energy in foot/lbs

5. Number of blows
6. Each pile length installed and any footage cut off of the pile length
7. Final Add On. When piling has been driven to the required penetration and bearing, there may not be sufficient length of piling to extend into the footing. A length of piling is welded on and shown as the final add on quantity. This length of piling is part of the pay length but is not used in the bearing calculations.

The data recorded in the inspector's field book will be entered in the Piling Maintenance section of CARS. The average penetration and bearing will be calculated. The pay length of piling driven will also be calculated and sent to the quantity book.

Before entering any piling or test piling data, you will need to enter the structure and hammer data. From the Main Menu, click on the Piling/Test Piling link. A list of the types or piling and test piling for the project will be displayed. Below the list are buttons for Structure and Hammer.

Enter Structure Information in CARS
To enter structure information:

1. Click on the Structure button. The Structure Maintenance page is displayed.
2. Make sure the correct subproject is shown at the top of the page and click on the Add button. Enter the bridge number and station in the text boxes provided. If there is more than one structure, click on the Add button. Click on the Save button. This information will appear in the Structure drop down list in the Piling and Test Piling pages.
3. To delete a structure in the list, click the check box in the Delete column by the structure information to be deleted and click on the Save button. The information is deleted and will no longer appear in the structure drop down list in the Piling and Test Piling pages.

Make sure the correct subproject is shown when entering the structure information.

Enter Hammer Information in CARS
To enter hammer information:

1. Click on the Hammer button
2. Click on the Add button. The Hammer Maintenance page is displayed.
3. Enter information for the cap, cushion and hammer type using the choices provided in the drop down boxes.
4. Enter the remaining hammer information in the text boxes shown and click on the Save button. This information will appear in the Hammer drop down list in the Piling and Test Piling pages.

Enter Test Piling Information in CARS
For test piling:

1. Click on the Add link by the test piling spec and code.
2. Pick the structure location from the choices in the drop down box.
3. Enter the pier or abutment number, the pile number, date and start and stop time in the text boxes.
4. Pick the hammer being used from the choices in the drop down box.
5. Enter the pile weight, design load, plan length and the start point reading in the text boxes. A text box is also provided for remarks if there would be any special comments to make.
6. Enter the Pile Length information and Penetration Data. To add additional rows, type the number of readings in the text box and click on the Add Penetration Row button.
7. When all the test pile information has been entered, click on the Save button or the Save and Run Report button.

Enter Piling Information in CARS
For piling reports:

1. Click on the Add link by the piling spec and code.
2. Pick the structure location from the choices in the drop down box.
3. Enter the pier or abutment number, the pile number and date in the text boxes.
4. Pick the hammer being used from the choices in the drop down box.
5. Enter the piling weight, required penetration and required bearing.
6. Enter the pile length added after bearing was reached, if any.
7. Enter the hammer stroke, blows/minute, energy, number of blows and penetration in inches.
8. Enter the pile lengths driven and any cutoff footage. If more than four length and cutoff entries are needed, click on the Add Pile Row button.
9. Click on either the Save or Save and Add New button if there are more piling to enter for that part of the structure.

Clicking on the Save and Add New button will bring up the same information as the first piling entered except that the piling number and pile lengths text boxes will be blank. When the information for all piling for that report is entered, click on either the Save or Save and Run Report button. The Piling Record Selection Page will display each piling separately but will produce the report based on the date driven and the pier/abutment number. For example, if you have driven piles 1, 2 and 3 for abutment #1 and pile 1 for pier #2 on the same day, separate reports will be made for abutment #1 and pier #2.

After the report has been saved, the data can be edited or deleted as long as the quantity has not been paid on an estimate.

1. Click on the Mtce link by the test piling or piling spec and code.
2. Click on the bridge number by the date of test piling or piling report to edit.
3. Enter corrected information in any of the text boxes.
4. An entire row of penetration data can be deleted by clicking in the check box in the delete column for that row. In the piling report, only the last row of pile length can be deleted at one time.
5. The entire test piling or piling report can be deleted by clicking on the Delete button on the Test Piling or Piling Maintenance page.

Payment for test piling and piling is usually made at the contract unit prices for lengths of piling installed. Sometimes, adjustments to the payments for piling are made for circumstances such as underruns/overruns or piling splices. Refer to Section 622.06 Basis of Payment of the Standard Specifications for details of these types of payments.

Copies of the piling and test piling reports will be printed with one copy for the contractor and the second copy forwarded to the Bridge Division. On the back of the copy sent to the Bridge Division, make a drawing of the substructure unit and number. Show the pile locations in the substructure and indicate those driven for that report. Also indicate where ‘North’ is in relation to the substructure location.

MIX BITUMEN REPORTS

The mix bitumen report is used to calculate the estimated pay quantity of oil for a day's hot bituminous paving and to establish the percentage of oil in the mix.

When paving begins, some bituminous material may already be stored in the tanks supplying oil to the hot mix plant. This quantity is measured and recorded for the first mix bitumen report on a project. On subsequent days of paving, the bitumen in storage at the beginning of the day's paving is usually the quantity recorded as left in storage from the previous day. Sometimes, there is a break in paving from a particular plant to work on other projects. In these cases, the oil tanks supplying the hot mix plant will have to be re-measured. When the hot mix is being supplied from a commercial operation, it may be necessary to measure the tanks at the beginning of each day of paving. Commercial operations supply mix to many customers so the oil tank quantities are measured for those hours when mix is supplied to your project.

Any oil delivered by transport and used in the day's paving is also recorded on the mix bitumen report. The manifests for each load of oil delivered are collected and become a part of the project records.

The oil tanks are measured again at the end of a day's paving to record and calculate the quantity of oil left in storage.

The bitumen in storage at the beginning and end of each report are calculated by correcting the volume for temperature, multiplying by the specific gravity and dividing by 2,000 to obtain the quantity in tons. The bitumen delivered is recorded in pounds and converted to tons. The amount of bitumen used for a day's paving is calculated by adding the bitumen in storage and bitumen delivered then subtracting the bitumen left in storage. If any bitumen was used for purposes other than paving such as tack or fog coat, the gallons used are converted to tons and are also subtracted. The result is then divided by the total tons produced from the plant for the day's paving to obtain the percent of oil in the mix. The oil quantity for mix produced but not used on the project (waste, private use, etc.) is multiplied by the oil percentage and those tons are subtracted from the quantity of bitumen for all mix produced. This result is the estimated pay quantity for the bitumen used on the project.

When this information is entered in the Mix Bitumen portion of CARS and saved, it will send the estimated pay quantity to the quantity book.

When paving is complete on the project, you will make an oil summary to check the quantity. An oil summary lists all bitumen delivered to the project from the manifests. Add the quantity for oil in storage at the beginning of the project. Oil quantities from non-project mix (waste, private use, etc.) along with any material left in storage when paving is complete is subtracted. The result of these computations is the total oil quantity for the project.

Enter Mix Bitumen Information in CARS

To make a Mix Bitumen Report is CARS:

1. Make sure the Project and Subproject are correct.
2. Click on the Mix Bitumen link. The Mix Bitumen page is displayed.
3. Select the type of oil for the report by clicking on the Add link. Goes to the Mix Bitumen Maintenance page.
4. Enter the information for fields in the Mix Bitumen report:
    a. Date, begin and end time.
    b. The change order drop down box will have a default of 'None' if no change orders apply to the material hauled. If the material is affected by a change order, the change order number, date of the change order, quantity and unit price will be display in the change order drop down box. This can be left in the drop down or the 'None" option can be chosen.
    c. Enter the haul sheet or pay quantity tonnage for that day's paving.

d. Add the specific gravity from the oil manifest.
e. Enter the waste amount in gallons for any oil used for purposes other than in the hot bituminous pavement.
f. Enter any waste tonnage. This includes plant waste, road waste, private use, tons of pavement going to another project or any other pavement quantities that were not placed on the project.
g. Enter any remarks. This can include information about plant shut downs during the day or the types and tonnages of waste.
h. Enter the bitumen in storage. The beginning and ending gallons and beginning and ending temperatures for each tank are entered on one line. If you would need to enter more tanks than the four lines provide for click on the Add Storage Row button. Also, the ending storage and temperature readings from the previous day's report will automatically be filled in. If there has been a break in the paving on the project, that quantity and temperature can be changed by clicking in the text box and typing the new numbers.
i. Enter the bitumen delivered. Enter the manifest number and the net weight in pounds for each load of oil delivered. A remarks line is also provided if needed. To add more lines for loads delivered, click on the Add Delivered Row.

5. Click on the Save or the Save and Run Report button.

Data entered in the mix bitumen report can be edited or the entire report can be deleted as long as there is an 'R' or an 'E' in the release flag column. After the oil quantity has been paid on a progressive estimate, the report can only be viewed and/or printed

To edit or delete a mix bitumen report:

1. Click on the Mix Bitumen link. The page listing the types of material is displayed.
2. Click on the Maint link by the material used. The Mix Bitumen Record selection page is displayed where all reports for that item are listed in ascending date order.
3. Click on the date link for the mix bitumen report to edit or delete.
   a. To edit the report, change any incorrect data and click on the Save or the Save and Run report button.
   b. To delete the report, click on the delete button at the bottom of the page. A dialog box that confirms if the report should be deleted appears. If it should be deleted, click OK.

CONCRETE PAVING

The concrete paving report is used to record and calculate concrete design and paving information. It also calculates the square yards paved and sends it to the quantity book.

Enter Concrete Paving Information in CARS

To make a concrete paving report in CARS:

1. Click on Concrete Paving link. The page listing the types of concrete pavement on the project is displayed.
2. Select the type of pavement by clicking on the Add link. The page to enter data for the paving report is displayed.
3. Enter the mix design data, any additional square yards paved and any remarks.
4. Enter the start and end time, start and end stations and any minutes of delay.
    a. The linear distance will be computed automatically from the numbers entered in the start and end stations. Remember to enter the stations as a whole numbers without the plus, for example; 14+00 would be entered as 1400, 8+56.82 would be entered as 856.82. If there is an equation within the area paved, you will make two entries for the linear distance computations. Enter the start station for that day's paving and enter the back station for the end station. Make a second entry with the ahead station for the start stationing and then enter the end station for that day's paving.
    b. If additional paving stations are required, click on the Add Blank Station Row button.
5. Save the data by clicking on either the Save or Save and Run Report button.
    a. Clicking on the Save button, saves your data. A report can be generated later.
    b. Clicking on the Save and Run Report button, saves the data and generates the report.

The concrete paving report includes a text box where additional square yards paved can be added. This is for small areas placed without the paving machine but included in the plant quantities produced for that day's paving. These quantities are field measured and the square yards calculated. These measurements and calculations could be recorded in the remarks section if space allows. If not, record the measurements and calculations in a field book and make note of where the calculations can be found. Field measurement and calculations may also be attached to the paving report.

A copy of the paving report may be given to the contractor. A copy can also be made and filed in the project records but is not required as the report can be accessed on line at any time after it has been saved.

To view and/or print a previous concrete paving report:

1. Click on the Concrete Paving link. The page listing the types of concrete pavement on the project is displayed.
2. Click on the Maint link by the type of concrete pavement. The Concrete Paving Record selection page is displayed where all reports for that item are listed in ascending date order.
3. Click on the Report link for the concrete paving report to be viewed and/or printed. The report is generated.

Data entered in the concrete paving report can be edited or the entire paving report can be deleted as long as there is an 'R' or an 'E' in the release flag column. After the concrete quantity has been paid on a progressive estimate, the report can only be viewed and/or printed.

To edit or delete a concrete paving report:

1. Click on the Concrete Paving link. The page listing the types of concrete pavement is displayed.
2. Click on the Maint link by the type of concrete pavement. The Concrete Paving Record selection page is displayed where all reports for that item are listed in ascending date order.
3. Click on the date link for the concrete paving report to edit or delete.
    a. To edit the report, change any incorrect data and click on the Save button.
    b. To delete the report, click on the delete button at the bottom of the page. A dialog box appears to confirm if the report should be deleted. If it should be deleted, click OK.

HAUL SHEETS

Most pay items for material measured by the ton and delivered to the roadway by truck are documented on a haul ticket. These tickets are summarized daily and added to the project records on a haul sheet. A spreadsheet can be used to control the quantity of hauled material placed on a roadway. Quantities for other hauled materials that are paid by the cubic yard are measured in place or by load count.

Weighed Material

Material that is measured by the ton is generally weighed before it is placed on the project. The scale person makes out haul tickets for all material passing over the scale. Automated systems are also used where the load is weighed and a ticket is produced for that load. In either case, tickets should include the following information.

1. Project number
2. Date and time
3. Type of material
4. Truck number

The ticket may also include spread information and the running total of the material. Two copies of the tickets will be made. The original is the contractor's copy which is kept in the scale or plant.

The scale person checks that each loaded truck is not loaded in excess of its licensed legal load. The scale person will also make an inspection report with the following information:

1. Beginning and ending ticket numbers
2. Total tons hauled
3. A list of all trucks hauling each day and the empty weight and legal load for each truck
4. Time and results of scale checks
5. Ticket numbers of any voided tickets

Both copies of any void tickets are kept in the scale or plant and then turned in with the scale person's inspection report.

The duplicate copy of each ticket is given to the truck driver and collected by the checker on the roadway. This ensures that the loads weighed are being used on the project. As the tickets are collected on the roadway, the checker will initial each one and keep the tickets separated in groups by use such as mainline, shoulders, approaches, etc. The checker also writes the location of each different placement area on each group of tickets. This information will be used when making the haul sheet. Sometimes, only a partial load will be used on the project and the rest of the load will be considered waste. The checker will write the tons actually used on the ticket and initial it. At the end of the day, the checker makes an inspection report including the following information:

1. Beginning and ending ticket numbers
2. Locations material was placed and the total tons for each area
3. Any missing ticket numbers
4. Any partial or whole loads not used and considered waste

The inspection report and the tickets are turned in to the field office.

Some preparation is required before making a haul sheet. Keep the tickets separated by use as turned in by the checker. Using the scale and checker inspection reports, check that there are no tickets missing other than those listed on the inspection reports. Total each use area and compare it to the total on the checker's inspection report and make any corrections. Also check the total of all loads hauled that day and compare it to the scale and checker inspection reports. Tickets that are produced automatically have

the total for the day on the last ticket. If this total is used for comparison, any voided loads or waste tonnage must be subtracted from the total on the last ticket.

Enter Haul Sheet Information in CARS

To make a haul sheet with CARS:

1. Make sure the Project and Subproject are correct.
2. Click on the Haul Sheet link.
3. To make a new haul sheet, click on the Add link by the type of material. The Haul Sheet Maintenance page is displayed.
4. Enter the information in the fields for the haul sheet.
    a. Date
    b. The change order drop down box will have a default of 'None' if no change orders apply to the material hauled. If the material is affected by a change order, the change order number, date of the change order, quantity and unit price will be displayed in the change order drop down box. This can be left in the drop down or the 'None' option can be chosen.
    c. Enter the pit or plant information, the pit owner and the pit number. These fields can be left blank.
    d. The pit type will show as State Owned unless a different choice is made in the drop down box. The other choices in this field are Private, State Option and Commercial.
    e. If a subcontractor is hauling the material and it should be displayed on the report, pick the company name from the drop down list. 'None' will be displayed if no other choice is made in this drop down box.
    f. The remarks text box can be used to enter any additional information for the haul sheet.
5. Enter all data for use types and locations.
6. Begin entering use number, ticket, truck number and tonnage.
    a. The ticket number must be entered for the first four loads.
    b. Enter the number of loads to add after the first four and click on the Add Tickets button. The ticket number will advance in numerical order from the last ticket number entered. It also fills all the use fields with the same number as the use field in the last ticket entered.
    c. If you have a break in ticket number sequence, you can add the number of loads to automatically number to the sequence break. Enter the number starting the new sequence and add the number of tickets needed after that.
7. When all the tickets have been entered, click on the Save button. A pop up box displays the total of all the loads entered. If the total is correct, click OK. If the total is incorrect, click cancel and edit any errors. An hourglass will show by the mouse pointer but this won't keep you from making corrections. After corrections are made, click on Save again and if the total is correct, click OK.
8. Warning messages will be displayed at the top of the Haul Sheet Maintenance window for such things as missing or duplicated tickets, overrun of plan quantity, etc. You can either edit the data or click on the Ignore Warnings button. Clicking on the Ignore Warnings button will save the haul sheet and return to the Haul Sheet Record Selection page. Click on the Report link to generate and print the haul sheet.
9. If you have added too many rows for tickets, put some information in the blank fields and click on the Save button. You will be returned to the Haul Sheet screen. Click on Maint link beside the material just used. The Haul Sheet Record Selection screen is displayed. Click on the date by the haul sheet that needs editing. The Haul Sheet Maintenance page is displayed. Go to the area of the input screen where loads are entered. Edit any entries that are incorrect and save the report. A delete column is also displayed. Click in the boxes by rows to delete which puts a check in the box. Save the report and the checked rows will be deleted.
10. If all data on the haul sheet is correct, click on the Save or Save and Run Report button.

Data entered in the haul sheet can be edited or the entire haul sheet can be deleted as long as there is an 'R' or an 'E' in the release flag column. After the haul sheet quantity has been paid on a progressive estimate, the report can only be viewed and/or printed

To edit or delete a haul sheet:

1. Click on the Haul Sheet link. The page listing the types of material is displayed.
2. Click on the Maint link by the material hauled. The Haul Sheet Record selection page is displayed where all reports for that item are listed in ascending date order.
3. Click on the date link for the haul sheet report to edit or delete.
    a. To edit the report, change any incorrect data and click on the Save or the Save and Run Report button.
    b. To delete the report, click on the delete button at the bottom of the page. A dialog box that confirms if the report should be deleted pops up. If it should be deleted, click OK.

Sometimes it is necessary to split a load between two use types. CARS doesn't allow entry of duplicate tickets or the use of a letter along with the ticket number. Enter a zero at the end of the ticket number when entering it for the second time. When all ticket information has been entered and saved, a warning will show that there are tickets missing because of the extra digit entered on the duplicated ticket. Note in the remarks that no tickets are missing but that a ticket was duplicated for a split load. Click on the Ignore Warnings button to continue the save process.

Because CARS uses a time out feature, it is recommended that you click on the Save button every so often when entering tickets for a haul sheet, especially for haul sheets with a large number of loads. Entering tickets on the Haul Sheet Maintenance page does not register as activity and the session could time out before you finish the tickets.
Any data entered and not saved prior to a time out would be lost.

Contractor Produced Haul Sheets
Some contractor's weighing operations not only weigh the load and produce a ticket but are also capable of producing a haul sheet. The contractor produced haul sheets must include the following information:

1. Date
2. Project number & type of project
3. Contractor (and subcontractor if applicable)
4. Haul sheet number
5. Type of material hauled
6. County
7. Pit location & owner
8. Haul sheet total
9. Running total for type of material

The contractor generated haul sheet must list each truck number, the net tons for each load hauled and the total tons hauled for each truck. A haul sheet will be made for each type of material. The contractor's haul sheet must include a certified statement that the haul sheet is a true and accurate quantity of material supplied to the project. The haul sheet must also provide lines for the contractor's and engineer's signatures.

Check the tickets turned in by the checker against the contractor produced haul sheet. The beginning and ending ticket numbers should correspond with the tickets turned in by the checker as should the total tons hauled. The total and running total on the contractor's haul sheet may be adjusted for voided tickets or partial loads used. The haul sheet must be signed by the contractor's representative.

To enter the contractor generated haul sheet into CARS:

1. Made sure the Project and Subproject are correct
2. Click on the Pay Quantity link.
3. The Pay Quantity Selection page is displayed. Click on the Add link by the type of material that was hauled.
4. The Pay Quantity Maintenance page is displayed
5. Enter the date. Pick Contractor's Haul Sheet from the source document drop down box. Fill in any remarks. For example, list the number and reason any tickets are void.
6. Enter quantities and their locations in the text boxes. Additional quantity and location text boxes can be added by clicking on the Add Quantity Row button.
7. When all the information has been entered for the contractor generated haul sheet, click on the Save button. If you have more haul sheets to enter, click on the Save and Add New button and a new Pay Quantity Maintenance page will be displayed.

A pay item report can be made for the contractor generated haul sheet especially if several haul sheets are being summarized but it is not necessary. The contractor generated haul sheet will be considered the source document. Copies of the contractor generated haul sheets must be retained and filed.

A copy of any CARS generated haul sheet should be given to the contractor. A copy may also be given to the subcontractor if applicable and one is requested. A copy of the CARS generated haul sheet may also be made and filed in the Haul Sheet file but is not required as the report can be accessed and viewed at any time after is has been saved. Haul sheets should be separated by type of material and filed with the most current haul sheet on top. Additional copies of a CARS generated haul sheet can be made at any time by:

1. Click on the Haul Sheet link in the Report column of the Main Menu. The Daily Report for Haul Sheets page is displayed.
2. If the project displayed in the Project ID is not the correct one, pick a different project from the Project Search Criteria by using the Assigned Project drop down box, typing the project number in the Project ID text box or typing the project control number in the PCN text box and clicking on the Search button.
3. When the project displayed in the Project ID is correct, all the haul sheet data available will be listed by subproject and then by type of material. Click on the date link by the haul sheet report to print.
4. The report will be generated and then printed.

Load Counted Material (Volume Measurement)
Volume measurement is used to determine pay quantities because of the type of material or because only a small quantity is being used. Volume measurements are typically used for items such as foundation fill, riprap and water. Volume measurement can be calculated by load counts or by in-place measurement.

Measured In Place
After the material is placed, measure the length, width and depth of the placement area. Take several depth measurements throughout the area to establish an average depth of the material. Calculate the cubic yards.

Load Counts
Determine which trucks the contractor will use to haul the material. Measure width, length and depth of the truck box and compute the cubic yards. The volume used for each truck's load should be agreed to by the contractor and should not exceed the legal load limits for the hauling unit. Record the truck number and the calculations in the inspector's diary, a load count field book or on a pay item report. This information is necessary to check the quantities when the project is finaled.

Record the number of loads each truck hauls and places on the project. Calculate the quantity by multiplying the number of loads by the cubic yard measurement for each truck. These load counts can be kept in a field book or be recorded directly on a pay item report. The contractor must sign the field book or pay quantity report for each day's load counts.

Water quantities are also determined by load counts but instead of cubic yards, water quantities are paid for by "M" gallons. Water hauling units are required to haul loads within their legal load limits so determine the legal load for each water hauling unit before it is used. Payment for individual water loads should never exceed the legal load limits or the tank capacity of the water truck.

To determine the "M" gallons measurement for a water truck, it should be weighed empty (tare weight) and with a full load of water (gross weight). Determine the net weight of the water truck by subtracting the tare weight from the gross weight. Divide the net weight of the water truck in pounds by 8.33 lbs./gal and then divide that number by 1,000 to establish the "M" gallons. Check the licensed legal load for the water truck. Divide the gross vehicle weight by 8.33 lbs/gal and then by 1,000 to determine the licensed legal load in "M" gallons. If the "M" gallons calculated from the net weight is less than the "M" gallons calculated from the GVW of the water truck, use that amount for the load count. The "M" gallons calculated from the GVW will be used if the calculations from the net weight exceed the legal load limit. Spot check the loaded water truck to ensure compliance with legal load limits.

Again, record the number of loads each water truck hauls and places on the project. Calculate the quantity by multiplying the number of loads by the "M" gallon amount for each truck. Keep the load counts in a field book or record them on a pay item report. The contractor must sign the field book or pay item report for each day's load counts.
If a field book is used to document the load counts, note this when entering these types of pay items into CARS.

STOCKPILES AND INVOICED ITEMS

Section 109.06 of the Standard Specifications allows the DOT to make payment for material produced or purchased specifically for a project when requested by the contractor. Payment is based on a receipted invoice, letter or statement furnished by the contractor that lists a breakdown of the material cost. Freight charges may also be included in the payment for stored material. An example of the contractor's breakdown of material costs is included at the end of this section.

Stockpiled or invoiced items must meet specifications for the type of material. The material must be stored on the project site or in an area approved by the project engineer. Payment will not be made for quantities greater than plan quantity. Payment must also not exceed the contract unit price for the item of work that will include the stockpiled or invoiced materials. As these materials are used in the item of work, they will be automatically subtracted from the previously made stockpile or invoiced materials payments.

Payment for stockpiled commercially produced aggregate purchased by the contractor will be based on a receipted invoice for the aggregate material. The invoice must state that the material has been paid for and must be signed or initialed by the supplier. Payment for aggregate produced by the contractor or an approved subcontractor will be based on a signed statement from the contractor with the following information:

1. Project number
2. Type of material
3. Quantity of material stockpiled
4. Location of the stockpile
5. An itemized breakdown of the contractor's production costs for the material

The statement must be filed in the project file. The aggregate must be stockpiled within the vicinity of the project in the state of North Dakota to qualify for payment. Aggregate stockpiled at a commercial source will not be eligible for payment.

Payment for material other than aggregate that is purchase by the contractor from a manufacturer or supplier will be made based on a receipted invoice only. The invoice must state that the material has been paid for and will be signed or initialed by the manufacturer or supplier. The invoice must be filed in the project file.

Payment for material other than aggregate that is manufactured or produced by the contractor can be made after the contractor has submitted a fully documented statement of production costs to the project engineer. The statement must show a breakdown of all labor, equipment and material cost incurred by the contractor in the manufacture or production of the material to be included in a contract bid item. The statement of production costs must be signed by the contractor and must be filed in the project file.

Stockpile or invoiced materials other than aggregate must also be stored on or near the project site and within the boundaries of the state of North Dakota to be considered eligible for payment with the following exceptions:

1. Materials that have been specially manufactured for a specific project and are not suitable for general use in other work can be paid for if stored in the state of North Dakota without being stored near the project. Example of specially manufactured items are:
    a. Bridge beams
    b. Prefabricated retrofit box beam guardrail
    c. Structural steel

2. Material not stored near the project must be tagged or marked with the words ‘Property of North Dakota Department of Transportation’ or ‘Property of NDDOT’ to be eligible for payment. This material will also be stored in a manner that it is easily identified from other inventories in the storage area.

Enter Stockpile/Invoiced Items in CARS
To enter stockpile or invoiced items into CARS:

1. Click on the Stockpiles link on the main menu. The Stockpile spec and code Selection page is displayed.
2. Click on the Add link for the material or items to be stockpiled. The Stockpile/Invoiced Item Maintenance page is displayed.
    a. Enter the date
    b. Click in the radio button to choose between stockpile or invoiced.
    c. If the item to be stockpiled is material added by change order, be sure the change order material is chosen in the Change Order drop down box.
    d. Enter the quantity and price.
    e. Remarks can be entered in the text box provided. These will be displayed in the quantity book.
3. Click on Save.

Deplete Stockpile/Invoiced Items in CARS
Stockpile or Invoiced items will be automatically depleted as the material is entered in the various reports such as haul sheets or in the pay quantity option.

If there is any stockpile quantity remaining when the work for the contract item is completed, it can be deleted by:

1. From the Main Menu, click on the Stockpiles link. The Stockpiles page is displayed.
2. Find the spec and code for the item to delete and click on the Maint link. The Stockpile/Invoiced Item Selection page is displayed.
3. Click on the date link for the stockpile/invoiced item. The Stockpile/Invoiced Item Maintenance page is displayed.
4. Click in the check box by Deplete Quantity.
5. Click on Save. This will deplete any remaining stockpile or invoiced quantity.

STATEMENT OF PRODUCTION COSTS

TO: North Dakota Department of Transportation
District Office
Grand Forks, ND

This is to certify that we have crushed and stockpiled, at the pit site located in the following location

NE ½ 5-158-35

3,000 tons of Class 4 for use on Project No. F-6-111((801)182 in Walsh County.

The following are our costs for producing this material:

Moving to Job Site	$ .22
Stripping	.25
Crushing	1.00
Stockpiling	.30
Supervision	.13
Total per Ton	$1.90

Signed by

Title Estimator