DOCUMENTATION WORKBOOK

SPECIFIC TASK TRAINING PROGRAM

Conducted by the

ILLINOIS CENTER FOR TRANSPORTATION (ICT)
AND
IDOT BUREAU OF CONSTRUCTION

FY 2018
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MAXIMUM PAYMENT for TONS EXAMPLE

Agg Base Cse TY B

Plan Quantity = 7783 Tons

Revised Plan Quantity = 7850 Tons

7850 x 1.08 = 8478 Tons

Contractor delivered 8496.0 Tons

What is the final payment?
HMA Yield Checks

Binder Course

\[
\text{YIELD} = \frac{\text{DELIVERED}}{\text{THEORETICAL}} \times 100 = \% \\
\]

For HMA Binder, verify unit weight via District Materials Office, Plans or Special Provisions.
HMA BC Theoretical Tons
Daily Yield Check

$\frac{(12 \text{ ft}) \times (7,860 \text{ ft}) \times (1 \text{sy/9sf}) \times (112 \text{ lbs/sy in}) \times (1.5 \text{ in})}{2,000 \text{ lbs/ton}} = 880.3 \text{ tons}$

$Yield = \frac{\text{Delivered}}{\text{Theoretical}} \times 100 = \frac{897.9}{880.3} = 102.0\%$
Thickness Determination Problem

How many depth checks are required for PCC sidewalk that measures 1000 ft in length by 4 ft wide?
Traffic Control Surveillance Problem

The contractor was required to perform traffic control surveillance from Tuesday afternoon until Thursday morning. The contractor worked from 7:00 a.m. to 4:30 p.m. each workday. The contractor performed the inspections and completed the BC 2240’s as required. What will the total pay be for these days of Surveillance based on the Standard Specifications?
The contractor has excavated for a proposed footing as shown below:

Determine the correct volume of Structure Excavation that will be used as final payment to the contractor at this location.
Trench Backfill Diagram
(looking down from above)

Storm sewer is paid to the inside wall of the structure

Payment for T.B.F. ends 3” from the outside wall of the structure

S.S. length ≠ T.B.F. length

Workbook Page 7
Trench Backfill Example

(for pipe running parallel to the centerline of the road)

Given:
- 42” Circular Concrete Pipe
- Average Depth from subgrade to invert of the pipe = 6.8’
- Trench Length = 75’ from outside face of manhole to outside face of manhole
- Contractor’s Excavated Trench Width = 7’ 4”
- Centerline of Pipe Run is 5’ behind the back of curb

Determine:
- Allowable Pay Quantity for Trench Backfill
Trench Backfill Solution

1. Need to determine if any part of allowable trench width falls within 2 ft of the back of curb.
   Centerline of pipe is given as 5 ft or 60 in from the back of curb.
   \[60" - 43.5" = 16.5"\] which is the dimension from the inside of the trench to the back of the curb.

   Since \[16.5" < 24"\], must use trench backfill.

2. Determine allowable pay length:
   Length given is 75 ft. from outside face of manhole to outside face of manhole.

   According to Article 602.12, 6” greater than the diameter of the structure will be backfilled and incidental to the installation of the structure.

   Therefore 3” on each manhole location is incidental backfill, and allowable pay length is \[75' - 3" - 3" = 74.5'\]
Trench Backfill Solution (cont.)

3. Check excavated width against allowable trench width.

Allowable trench width →
Since D = 6.8’ ( >5.0 ft.),
Width = 18” + Wall + ID + Wall + 18”
Width = 18” + 4.5” + 42” + 4.5” + 18” = 87”

Excavated width = 7’ 4” = 88”
Since excavated width > allowable trench width, we can use backfill tables.

D = 6.8’ and ID of pipe = 42”

4. From table, cu. yd./lin ft. x Allowable Pay Length = Trench Backfill
Volume 1.093 x 74.5’ = 81.4 cu yds.
Trench Backfill Problem
(For pipe running perpendicular to the centerline of the road)

Given:
• 24” Circular Concrete Pipe
• Average Depth from subgrade to invert = 3.8’
• Contractor’s Excavated Trench Width = 50”

Determine: Show your calculation on the IDR on Workbook Page 13
• Allowable Pay Length for the Trench Backfill
• Maximum allowable trench width
• Allowable Pay Quantity for Trench Backfill
Complete the IDR provided on Workbook Page 13

- Today's Date, Contract #96345
- United Construction (Prime)
- Weather is clear, 67 degrees
- Pay item number for Trench Backfill is 20800150
- Location Station 100+00
- Show calculation on the IDR since it is your primary source of documentation
# Inspector's Daily Report

**Date** ____________________________

**Contractor or Sub.** ____________________________

**Weather** ____________________________

**Initial(s)** ____________________________

**Inspected by:** ____________________________
**Date** ____________________________

**Measured by:** ____________________________
**Date** ____________________________

**Calculated by:** ____________________________
**Date** ____________________________

**Checked by:** ____________________________
**Date** ____________________________

**District** ____________________________
**Contract No.** ____________________________
**Job No.** ____________________________
**Project** ____________________________

<table>
<thead>
<tr>
<th>Item Code #</th>
<th>Fund Code (Opt.)</th>
<th>Item</th>
<th>Location</th>
<th>Quantity and Units</th>
<th>Evidence of Material Inspection (Optional)</th>
<th>Posted in Q Book</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

This is:  
- [ ] an estimated progress measurement (item no.: ____________________________)
- [ ] a final field measurement (item no.: ____________________________)

**Remarks:** (e.g., instruction to Contractor, special problems, sketches with dimensions for final measurements, computations, number of persons working, hours worked) Use reverse side, if needed.
Surface Variation Problem

You are working on a 2 lane milling and bituminous resurfacing project that is 15,000 feet long. The contractor’s bid price is $87.00 per ton for the surface mix. As per plan, the contractor mills 1.5 inch of existing surface and then places a 1.5 inch lift of binder and a 1.5 inch lift of surface. Upon the completion of the work you recorded in both lanes a total of 17 surface variations. How much money will be deducted from the contract for the surface variations?
Traffic Control Price Adjustment Problem 1
Art.701.20

Your contractor was performing contract work under Traffic Control Standard 701411. The awarded contract value of this work was $214,305.00. The final value of the completed work under this standard is $248,593.00. The unit price for this pay item is $27,500.00. What is the adjusted unit price for Traffic Control Standard 701411?

Also, what is the pay item number for the additional adjustment?
Traffic Control Price Adjustment Problem 2

Your contractor was performing contract work under Traffic Control Standard 701411. The awarded contract value of this work was $214,305.00. The final value of the completed work under this standard is $180,017.00. The unit price for this pay item is $27,500.00. What is the unit price adjustment for Traffic Control Standard 701411?

Answer located in the Workbook.
Electrical Signal Cable Problem

Given the following information, what is the pay length for the electrical signal cable?
# Prime/Tack Coat Example Problem

## Bill of Lading Information

<table>
<thead>
<tr>
<th>Description</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gross Weight</td>
<td>79,550 lbs</td>
</tr>
<tr>
<td>Tare Weight</td>
<td>24,240 lbs</td>
</tr>
<tr>
<td>Net Weight</td>
<td>55,310 lbs</td>
</tr>
<tr>
<td>Residue</td>
<td>60.0 %</td>
</tr>
<tr>
<td>Wt. of Emulsion</td>
<td>35,200 lbs</td>
</tr>
<tr>
<td>Wt. of Added Water</td>
<td>15,080 lbs</td>
</tr>
</tbody>
</table>

## Jobsite Information

<table>
<thead>
<tr>
<th>Description</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Initial Distributor Weight</td>
<td>33,473 lbs</td>
</tr>
<tr>
<td>Final Distributor Weight</td>
<td>15,020 lbs</td>
</tr>
<tr>
<td>Length of Paving</td>
<td>12,713 ft</td>
</tr>
<tr>
<td>Width of Paving</td>
<td>12 ft</td>
</tr>
<tr>
<td>Required Application Rate</td>
<td>0.05 lbs/sq ft</td>
</tr>
</tbody>
</table>

## Given the data above, determine the following:

<table>
<thead>
<tr>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Residual Asphalt Applied</td>
</tr>
<tr>
<td>Actual Residual Asphalt Application Rate</td>
</tr>
<tr>
<td>Theoretical Residual Asphalt</td>
</tr>
<tr>
<td>Max Pay Residual Asphalt</td>
</tr>
<tr>
<td>Pay Quantity</td>
</tr>
</tbody>
</table>
Pavement Patching Problem

You are the inspector on a section of two-lane road in Madison County. The contractor is performing pavement patching operations today and the pay items used for the patching are as follows:

44200108 Pavement Patching, Type II, 10"
44200112 Pavement Patching, Type III, 10"

Yesterday you laid out 3 patches in the northbound lane. The patch at Station 1246+52 is 12’ wide by 8.0’ long. The patch at Station 1247+23 is 12.0’ wide by 9.0’ long. The patch at Station 1247+79 is 12’ wide by 11.0’ long.

After the patching operations for these 3 patches are complete, you measure the patches. The in-place dimensions are as follows:

<table>
<thead>
<tr>
<th>Station</th>
<th>Width</th>
<th>Length</th>
<th>Depth</th>
</tr>
</thead>
<tbody>
<tr>
<td>1246+52</td>
<td>12.0’</td>
<td>8.0’</td>
<td>10”</td>
</tr>
<tr>
<td>1247+23</td>
<td>12.0’</td>
<td>10.0’</td>
<td>10.2”</td>
</tr>
<tr>
<td>1247+79</td>
<td>12.0’</td>
<td>11.0’</td>
<td>12”</td>
</tr>
</tbody>
</table>

You have received the required material inspection documentation.

Complete the attached field book entries and total the page for these items.
## PAVEMENT PATCHING 10

<table>
<thead>
<tr>
<th>Patch #</th>
<th>TYPE 2</th>
<th>TYPE 3</th>
<th>CALCULATIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>11</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1246+52</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1247+23</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>13</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1247+79</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Depth

- **SB LANE**
  - **A = 10"**
  - **A = 10.2"**
  - **A = 12"**

### Evidence of Mat'l Insp:
- Plant Report, Tickets & Test

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**Workbook Page 20**
HMA SC Example (as specified by Engineer)

1. Calculate new theoretical tonnage

Plan Quantity = 229 Tons
Plan Length = 1,022 FT
Plan Width = 24 FT
Plan Thickness = 1.5 inches

Measured in field
Length = 1,027.5 FT
Width = 24 FT
Thick = 1.5 inches

\[
\frac{112 \text{ lbs/sy-in} \times 1027.5 \text{ ft} \times 24 \text{ ft} \times 1.5 \text{ in}}{9 \text{ sf/sy (2000 lbs/ton)}} = 230.2 \text{ tons}
\]
HMA SC Example

2. Calculate the adjustment (Article 406.13)

\[ \text{Gmb} = 2.37 \quad \text{U} = 112 \text{lbs/sy-in} \quad \text{Constant} = 46.8 \]

\[ C = \frac{2.37 \times 46.8}{112} = 0.990 \]

Adjusted Qty: \( 0.990 \times 230.2 = 227.9 \text{ tons} \)

3. Calculate the max pay (Article 406.13)

Max Pay: \( 227.9 \times 1.03 = 234.7 \text{ tons} \)
HMA Surface Max Pay

\[ G_{mb} = 2.360 \]

Length = 10,110.0 ft

Width = 24.0 ft

Thickness = 1.5 inch

Delivered = 2310 tons

Is the contractor exceeding the maximum payment quantity?
Answer to Workbook Page 5

Tues 4:30 p.m. to Wed 7:00 a.m. = 14.5 hours

Wed 4:30 p.m. to Thurs 7:00 a.m. = 14.5 hours

14.5 hours + 14.5 hours = 29 hours

29 hours / 24 hours per day =

1.21 Calendar Days for Traffic Control Surveillance
According to Article 502.12, horizontal dimensions will not extend beyond vertical planes 2’ outside of the edges of footings. Also, if the contractor did not excavate to the 2’ limit, you cannot pay the contractor for work they did not do. Therefore, the pay dimensions are as follows:

Length = 1.0’ + 32.0’ + 2.0’ = 35.0’
Width = 2.0’ + 10.0’ + 2.0’ = 14.0’
Depth = 5.0’ (given)

Volume = (35.0 x 14.0 x 5.0) x 1/27 = 90.7 cubic yards
Trench Backfill Problem Answer – Workbook Page 11

(For pipe running perpendicular to the centerline of the road)

Allowable Pay Length = 2’ + 4’ + 2’ + 2’ + 53’ + 2’ = 65’

Maximum allowable trench width = 9” + OD + 9” = 9” + 3” + 24” + 3” + 9” = 48”

Actual trench width exceeds maximum, therefore use Trench Backfill tables.

From Table: 0.323 cy/ft

Trench Backfill = 65’ x 0.323 = 21.0 cubic yards
Allowable Pay Length = 2' + 4' + 2' + 2' + 53' + 2' = 65'
Maximum allowable trench width = 9” + OD + 9” = 9” + 3” + 24” + 3” + 9” = 48”
Actual trench width exceeds maximum, therefore use Trench Backfill tables.
From Table: 0.323 cy/ft
Trench Backfill = 65’ x 0.323 = 21.0 cubic yards
Answer Workbook page 14

Solution: (Per Article 406.11)

1) Since the existing surface was milled, it is considered ‘reprofiled’

2) Per the chart, the cost of 2 tons of mix shall be deducted for each variation

3) Calculation:

\[
($87.00 \text{ per ton} \times 2 \text{ tons per surface variation}) \times 17 \text{ surface variations} = $2,958.00
\]
See calculation file for Original and Final contract amounts of items under 701411

Original Value: $214,305.00

Final Value: $248,593.00

Unit Price: $27,500.00

\[
X = \frac{(248,593 - 214,305)}{(214,305)} = 0.160 \text{ Increase > 0.10}
\]

Adjusted Unit Price = \(0.25P + 0.75P \left(1 + (X - 0.1)\right)\)

= \(0.25 \times 27,500 + 0.75 \times 27,500 \times (1 + (0.16 - 0.1))\)

= \(0.25 \times 27,500 + 0.75 \times 27,500 \times 1.06\)

= \$6,875.00 + \$21,862.50 = \$28,737.50

Unit price difference: \$28,737.50 - \$27,500 = \$1,237.50

Add new pay item # XXX03100 for \$1,237.50
See calculation file for Original and Final contract amounts of items under 701411

Original Value: $214,305.00
Final Value: $180,017.00
Unit Price: $27,500.00

\[
X = \frac{(180,017 - 214,305)}{214,305} = -0.160 \text{ Decrease } > 0.10
\]

Adjusted Unit Price = \(0.25P + 0.75P \left(1 + (X - 0.1)\right)\)

\[
= 0.25 (27,500) + 0.75 (27,500) (1-(0.16-0.10))
\]
\[
= 0.25 (27,500) + 0.75 (27,500) (0.94)
\]
\[
= 6,875.00 + 19,387.50 = \$26,262.50
\]

Unit price difference: $26,262.50 - $27,500 = - $1,237.50

Add new pay item # XXX03100 for - $1,237.50
Electrical Signal Cable Problem

Pay Length = 3.0' + 5.0' + 13.0' + 45.0' + 6.5' + 60.3' + 6.5' + 13.1' + 3.0' + 13.0' = 168.4'
### Electrical Signal Cable Problem

<table>
<thead>
<tr>
<th>From</th>
<th>To</th>
<th>Horizontal Measure</th>
<th>Slack Pg. 716</th>
<th>Vertical Pg. 717</th>
</tr>
</thead>
<tbody>
<tr>
<td>C-1</td>
<td>DH-1</td>
<td>5.0’</td>
<td>13.0’</td>
<td>3.0’</td>
</tr>
<tr>
<td>DH-1</td>
<td>H-1</td>
<td>45.0’</td>
<td>6.5’</td>
<td>X</td>
</tr>
<tr>
<td>H-1</td>
<td>H-2</td>
<td>60.3’</td>
<td>6.5’</td>
<td>X</td>
</tr>
<tr>
<td>H-2</td>
<td>P-1</td>
<td>13.1’</td>
<td>X</td>
<td>3.0’</td>
</tr>
<tr>
<td>P-1</td>
<td>Signal</td>
<td>X</td>
<td>X</td>
<td>13.0’</td>
</tr>
<tr>
<td></td>
<td>Sub-Total</td>
<td>123.4’</td>
<td>26.0’</td>
<td>19.0’</td>
</tr>
</tbody>
</table>

Pay Total = 123.4’ + 26.0’ + 19.0’ = **168.4’**
### Answer to Prime/Tack Coat Problem Workbook Page 18

#### Bill of Lading Information

<table>
<thead>
<tr>
<th>Description</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gross Weight</td>
<td>79,550 lbs</td>
</tr>
<tr>
<td>Tare Weight</td>
<td>24,240 lbs</td>
</tr>
<tr>
<td>Net Weight</td>
<td>55,310 lbs</td>
</tr>
<tr>
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<tr>
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<td>15,080 lbs</td>
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</table>

#### Jobsite Information

<table>
<thead>
<tr>
<th>Description</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>Initial Distributor Weight</td>
<td>33,473 lbs</td>
</tr>
<tr>
<td>Final Distributor Weight</td>
<td>15,020 lbs</td>
</tr>
<tr>
<td>Length of Paving</td>
<td>12,713 ft</td>
</tr>
<tr>
<td>Width of Paving</td>
<td>12 ft</td>
</tr>
<tr>
<td>Required Application Rate</td>
<td>0.05 lbs/sq ft</td>
</tr>
</tbody>
</table>

#### Given the data above, determine the following:

<table>
<thead>
<tr>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Residual Asphalt Applied</td>
<td>7750 lbs</td>
</tr>
<tr>
<td>Actual Residual Asphalt Application Rate</td>
<td>0.0508 lbs/sq ft</td>
</tr>
<tr>
<td>Theoretical Residual Asphalt</td>
<td>7628 lbs</td>
</tr>
<tr>
<td>Max Pay Residual Asphalt</td>
<td>8009 lbs</td>
</tr>
<tr>
<td>Pay Quantity</td>
<td>7750 lbs</td>
</tr>
</tbody>
</table>
1. Wt. Applied = (Initial Wt.) – (Final Wt.) = 33,473 lbs – 15,020 lbs = 18,453 lbs

2. % Emulsion = (Wt. Emulsion) / (Total Wt.) = 35,200 lbs / 50,280 lbs = 0.70

3. Wt. Emulsion Applied = (Wt. Applied) x (% Emulsion) = 18,453 lbs x 0.70 = 12,917 lbs

4. Wt. Residual Asphalt = (Wt. Emulsion Applied) x (% Residue) = 12,917 lbs x 0.60 = 7750 lbs

5. Application Area = (Length) x (Width) = 12,713 ft x 12 ft = 152,556 sq ft

6. Actual Application Rate = (Wt. Residual Asphalt) / (Area) = 7750 lbs / 152,556 sq ft = 0.0508 lbs/sq ft

7. Theo. Wt. Residual Asphalt = (Area) x (Application Rate) = 152,556 sq ft x 0.05 lbs/sq ft = 7628 lbs

8. Max Pay = (Theoretical) x 105% = 7628 lbs x 1.05 = 8009 lbs

9. Pay Quantity = 7750 lbs
### PAVEMENT PATCHING 10

<table>
<thead>
<tr>
<th>Patch #</th>
<th>TYPE 2</th>
<th>TYPE 3</th>
<th>CALCULATIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>11</td>
<td>10.7</td>
<td>12.0</td>
<td>(\frac{8.0 \times 12.0}{9} = 10.7) S.Y.</td>
</tr>
<tr>
<td>12</td>
<td>12.0</td>
<td>9.0' x 12.0' x 1/9 = 12.0 S.Y.</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>16.9</td>
<td>11'.0 x 12'.0 x 1/9 = 14.7 S.Y.</td>
<td></td>
</tr>
</tbody>
</table>

**15% Increase of S.Y.**

- Increase Qty by 15%
- Pay = 14.7 x 1.15
  - = 16.9 S.Y.

<table>
<thead>
<tr>
<th>PAGE</th>
<th>TOTALS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>39.6</td>
</tr>
<tr>
<td>S.Y.</td>
<td>0</td>
</tr>
</tbody>
</table>

---

**Evidence of Mat'l Insp:** Plant Report, Tickets & Test

**Meas. By:**

**Date:**

**Calc. By:**

**Chkd. By:**

---

**15% Increase of S.Y.**

- Increase Qty by 15%
- Pay = 14.7 x 1.15
  - = 16.9 S.Y.

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**Evidence of Mat'l Insp:** Plant Report, Tickets & Test

**Meas. By:**

**Date:**

**Calc. By:**

**Chkd. By:**

---

**15% Increase of S.Y.**

- Increase Qty by 15%
- Pay = 14.7 x 1.15
  - = 16.9 S.Y.

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**Evidence of Mat'l Insp:** Plant Report, Tickets & Test

**Meas. By:**

**Date:**

**Calc. By:**

**Chkd. By:**

---

**15% Increase of S.Y.**

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  - = 16.9 S.Y.

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**Evidence of Mat'l Insp:** Plant Report, Tickets & Test

**Meas. By:**

**Date:**

**Calc. By:**

**Chkd. By:**

---

**15% Increase of S.Y.**

- Increase Qty by 15%
- Pay = 14.7 x 1.15
  - = 16.9 S.Y.

---

**Evidence of Mat'l Insp:** Plant Report, Tickets & Test

**Meas. By:**

**Date:**

**Calc. By:**

**Chkd. By:**

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**Meas. By:**

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**Chkd. By:**
### PAVEMENT PATCHING 10

<table>
<thead>
<tr>
<th>Patch #</th>
<th>TYPE 2</th>
<th>TYPE 3</th>
<th>CALCULATIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>11</td>
<td>10.7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1246+52</td>
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<tr>
<td>12</td>
<td>12.0</td>
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<tr>
<td>1247+23</td>
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</tr>
<tr>
<td>13</td>
<td>13.2</td>
<td></td>
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</tr>
<tr>
<td>1247+79</td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

**CALCULATIONS**

- **Type 2**: 10.7 S.Y.
  - Formula: \( \frac{8.0' \times 12.0'}{9} = 10.7 \text{ S.Y.} \)
- **Type 3**: 12.0 S.Y.
  - Formula: \( 9.0' \times 12.0' \times \frac{1}{9} = 12.0 \text{ S.Y.} \)
- No adjustment
- **Type 3**: 13.2 S.Y.
  - Formula: \( \frac{11.0' \times 12.0' \times \frac{1}{9}}{10'} = 14.7 \text{ S.Y.} \)
  - Patch Depth Decrease: \( \frac{8.2'' + 10''}{10''} = -18\% \)

- **10% Decrease of S.Y.**
  - Decrease Qty by 10%
  - Pay = \( 14.7 \times (1 - 0.10) = 13.2 \text{ S.Y.} \)

**PAGE TOTALS**

- S.Y.: 35.9
- 0

**Evidence of Mat’l Insp:** Plant Report, Tickets & Test

**Meas. By:**
**Date:**
**Calc. By:**
**Chkd. By:**
Answer to Workbook Page 23 - HMA Surface Max Pay

\[
\frac{112 \text{ lbs/sy-in} \times 10,110 \text{ ft} \times 24 \text{ ft} \times 1.5 \text{ in}}{9 \text{ sf/sy} \times (2000 \text{ lbs/ton})} = 2264.6 \text{ tons}
\]

\[
C = \frac{2.360 \times 46.8}{112} = 0.986
\]

Adjusted Qty: \(0.986 \times 2264.6 = 2232.9 \text{ tons}\)

2232.9 theoretical tons for the surface area

\[1.03 \times 2232.9 \text{ tons} = 2299.9 \text{ tons}\]

Contractor is exceeding the maximum amounts