

FDOT Entity Manager for Civil 3D



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Part One

Overview of Application

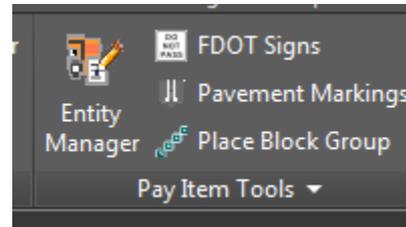


What is Entity Manager?

Entity Manager or “EMX” on the command line entry is a special FDOT application that the user can use to draw or place items with the appropriate pay items attached. If you receive a file from an outside source you can also use EMX to append pay items to those objects in the file. What are defined as objects?

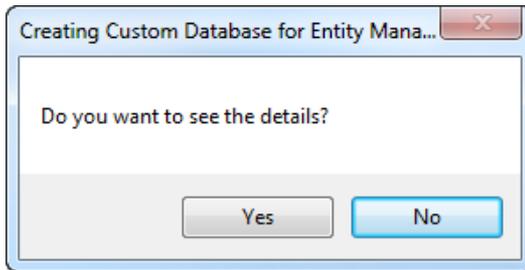
- Lines
- Polylines
- Arcs
- Circles
- Ellipses
- Alignments
- Feature Lines
- Multi Lines
- Geometric shapes
- Blocks
- Hatches
- Drainage Parts

You can find Entity Manager on the FDOT Ribbon in the Pay Item Tools Section



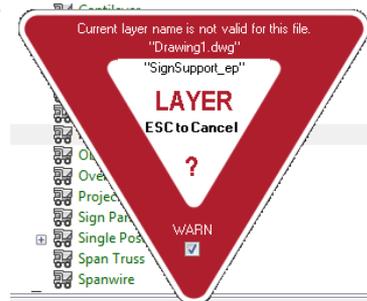
What is Entity Manager?

If this is the first time you launch the application in your file you will be asked if you want to see the details



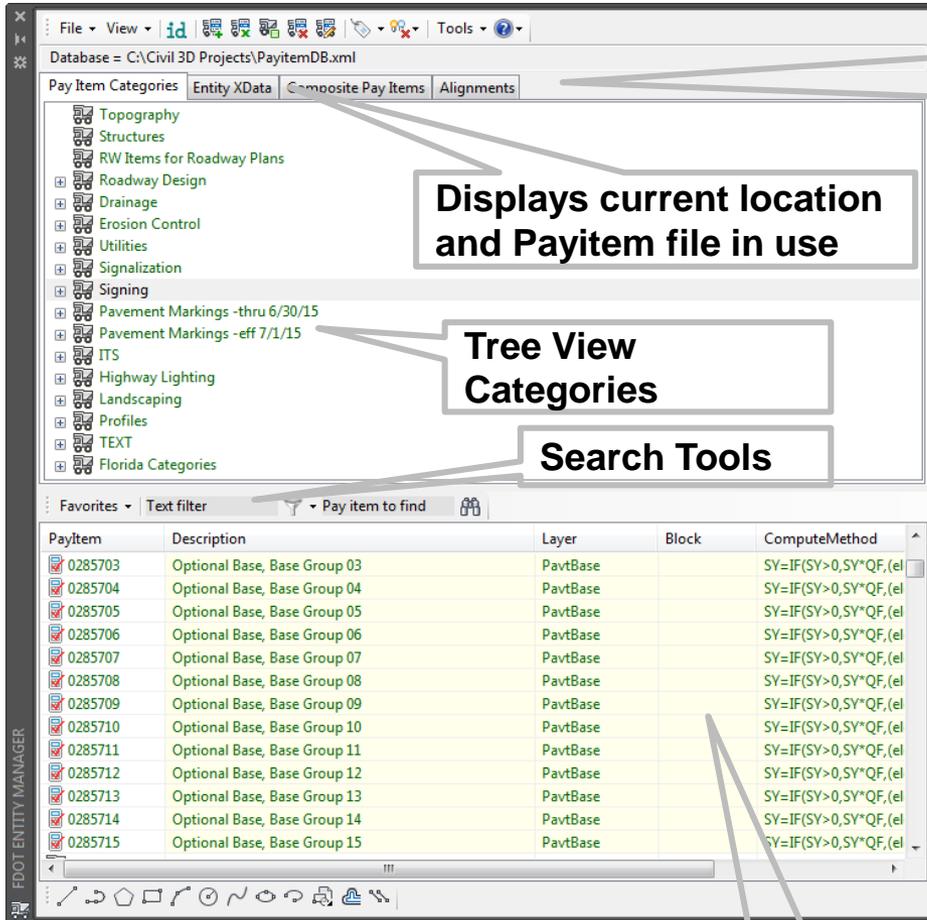
Click No to save time. All this is telling you is that it is loading all of the Active Pay Items from the AECMERGE.xml file and creating a custom file named PayitemDB.xml which you should save with your project. It also would be prudent to save the file with a project specific name. Each time that AECMERGE.xml is updated on your workstation it will want to update the PayitemDB file which you can overwrite.

EMX knows the proper layer that objects go on. If you go to place an item and you get this message it is telling you that the layer does not exist in the file. need to check and see if your drawing file with template.



If you see this you have set up the proper

The Interface



Displays current location and Payitem file in use

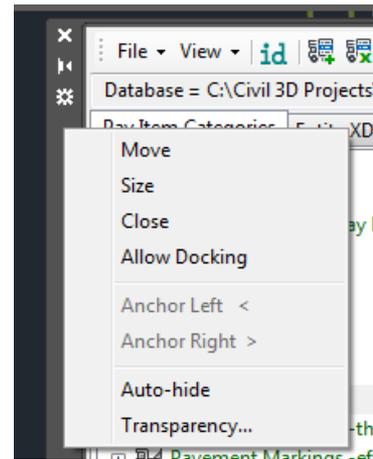
Tree View Categories

Search Tools

TIP – You can single click in this box to launch a dialog box to open a new payitem file

The interface behaves like any Civil 3D dialog box. You have the same behavior controls. Due to the size of the information I would recommend undocking and place on your second monitor.

Now let's look in detail what each icon and tab has to offer

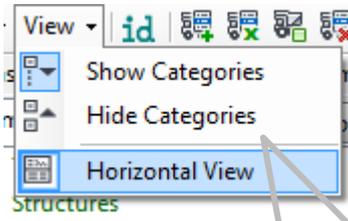
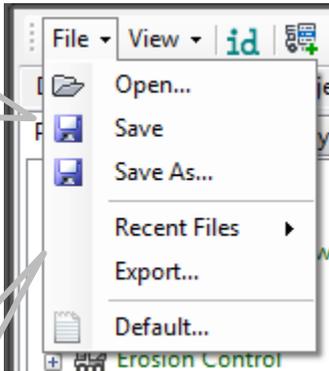


Drawing Tools

Pay Item Details



The Interface



Open – Opens PayitemDB file
Save – Saves PayitemDB file
Save As – Saves PayitemDB file as a different name

Recent Files – Lists most recent PayitemDB file used
Export – Exports current file in AECMERGE format
Default – Recreates a new PayitemDB file. Reverts all changes you have made back to the original version

Show Categories –
Hide Categories – Exports current file in AECMERGE format
Horizontal View – Recreates a new PayitemDB file

Appends selected pay item data to object

Removes already placed pay item data from object

Edits already placed pay item data on object, **also is a shortcut to get to the adhoc editor**

Id allows you to select an object in your file to read all of the Xdata attached. You can also click in the link to get to the adhoc data for editing
[PayItem](#) [0570_1_2](#)

Replaces already placed data with selected pay item data

Places a solid hatch pattern with selected pay item data



The Interface



When you select the id button and pick the pay item you have 4 options in the way the data is displayed. Typically displaying all data is the norm, however if you want to see less data the option exists (the Aeccxx data is used to quantify in QTO or TM)

FDOTEntityManager
All pay item data
FDOTEntityManager
AeccUiQTOPayItemFormulaParameters
AeccUiQTOEntityPayItemData

All pay item data	
Name	Value
1001	FDOTEntityManager
1070	12
PayItem	0715 19113
Description	High Mast Light Pole, F&I, Wind Speed 150 MPH, Pol...
Layer	PoleLightHM
Block	HighMastPole
ComputeMethod	EA=IF(EA>0,EA*QF,(element_count)*QF)
ComputeMethodT...	0
QuantityFactor	1.00000
BlockScale	1.000000
BlockLibrary	lj...

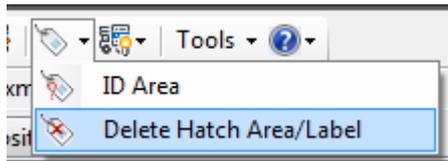
FDOTEntityManager	
Name	Value
1001	FDOTEntityManager
1070	12
PayItem	0715 19113
Description	High Mast Light Pole, F&I, Wind Speed 150 MPH, Po
Layer	PoleLightHM
Block	HighMastPole
ComputeMethod	EA=IF(EA>0,EA*QF,(element_count)*QF)
ComputeMethodT...	0
QuantityFactor	1.00000
BlockScale	1.000000

AeccUiQTOPayItemFormulaParameters	
Name	Value
1001	AeccUiQTOPayItemFormulaParamete
1070	1
1070	1
1000	0715 19113
1070	2
1000	EA
1040	0
1000	QF
1040	1

AeccUiQTOEntityPayItemData	
Name	Value
1001	AeccUiQTOEntityPayItemData
1070	2
1000	0715 19113

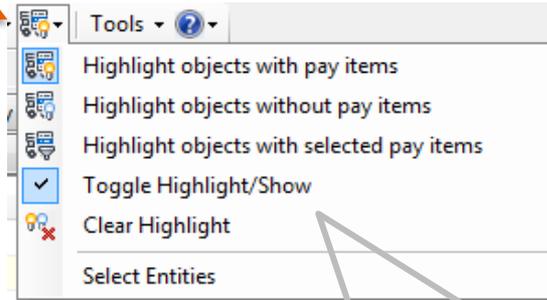


The Interface

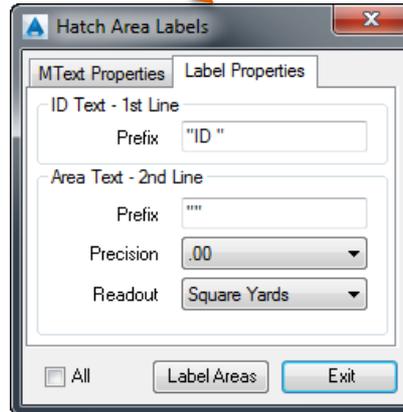
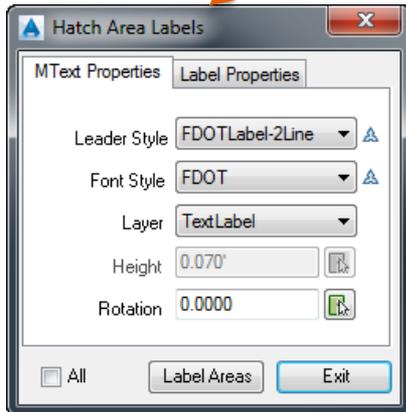


ID Area – Turns on the label which identifies the Area ID and area of hatch patterns
Delete Hatch Area/Label – When selected you can pick the hatch or label and both will be deleted from drawing

A **Single Click** brings up the Label Options where you can select universal Mtext label properties



Highlight objects with pay items – Highlights objects in the drawing that have payitem data attached
Highlight objects without pay items – Highlights objects in the drawing that have NO payitem data attached
Highlight objects with selected pay items – Highlights objects in the drawing that have a specific pay item selected
Toggle Highlight/Show – Turns on the option to allow highlighting
Clear Highlight – clears the highlighting from objects in the file. (Regen also clears highlighting)
Select Entities – When highlighted you can select such objects



The Interface

Show Layer Warning – Turns on the Red Layer warning Shield when trying to place an object on a non standard layer

Show Drawing Tools –Toggles the display of the drawing tools located on the bottom of the application

Show Tool Tips – Toggles the display of tool tips when hovering over icons

Show Object Properties – When hovering over an object the truck symbol appears and displays the XData

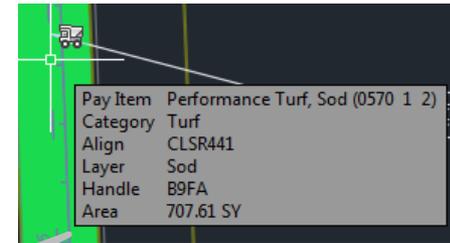
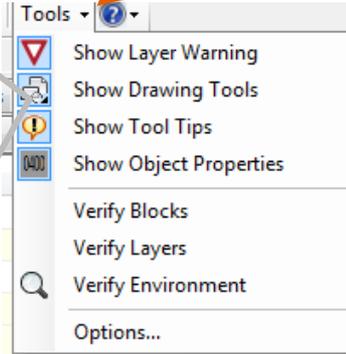
Verify Blocks – Verifies that all required blocks are in the block libraries that are called for and will report in the log file if any are missing

Verify Layers – Verifies that the appropriate layers are present and will report in the log file if missing

Verify Environment – Used by the development team at ECSO to troubleshoot the users system environment



Drawing Tools

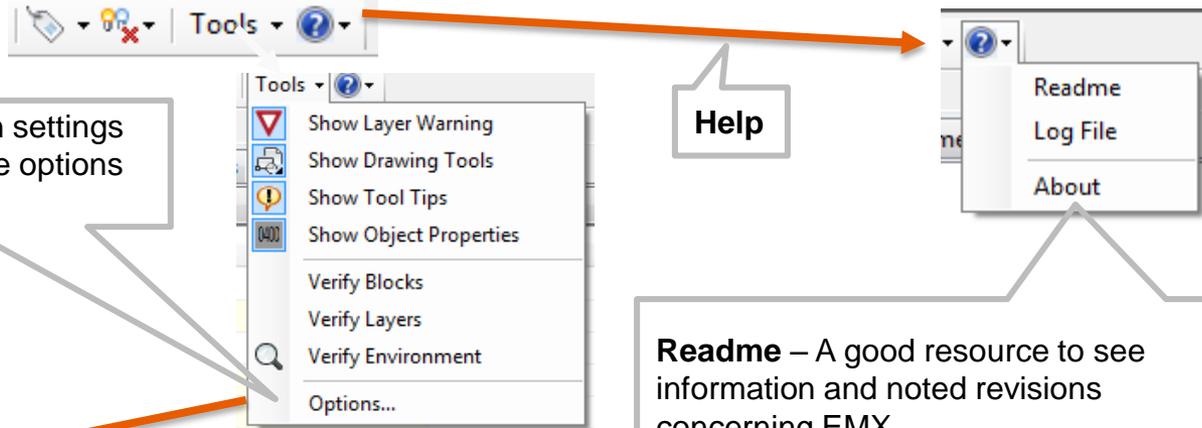


Object XData

Verify System Environment

FDOT Environment Inspector	
Constants	
Release Version:	FDOT2015.C3D
Profile Name:	FDOT2015C3D
Plot Device Name:	FDOTPDF.pc3
Media Name:	ANSI_B_(11.00_x_17.00_Inches)
Registry Variables	
Installation Location:	C:\Program Files\Autodesk\AutoCAD 2015\
ProgId:	AutoCAD.Application.20.0
Local Directory:	C:\FDOT2015.C3D\
Projects Directory:	C:\Civil 3D Projects\
Server Directory:	C:\FDOT2015.C3D\
Environment Variables	
Local Directory:	C:\FDOT2015.C3D\
Projects Directory:	C:\Civil 3D Projects\
Server Directory:	C:\FDOT2015.C3D\
Directory Variables	
Apps Directory:	C:\FDOT2015.C3D\APPS\
Apps UI Directory:	C:\FDOT2015.C3D\APPS\UTL\
Data Directory:	C:\FDOT2015.C3D\Data\
Templates Directory:	C:\FDOT2015.C3D\Data\Templates\
Project Template Directory:	C:\FDOT2015.C3D\FDOT Project Template\
Support Directory:	C:\FDOT2015.C3D\Support\
Profile Directory:	C:\FDOT2015.C3D\Support\Profiles\
Plot Directory:	C:\FDOT2015.C3D\Support\Plot\

User Options

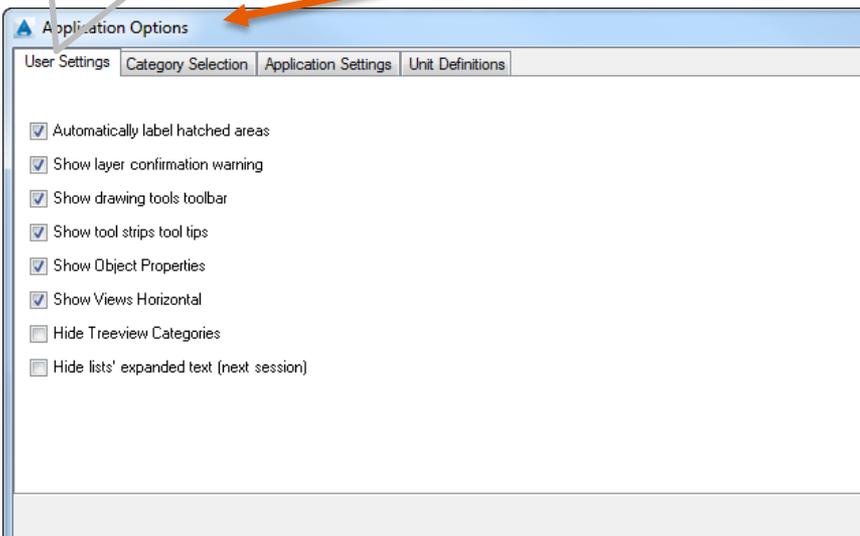


Options – Application settings so user can customize options

User Settings Tab, another location to change some of the settings that were shown earlier

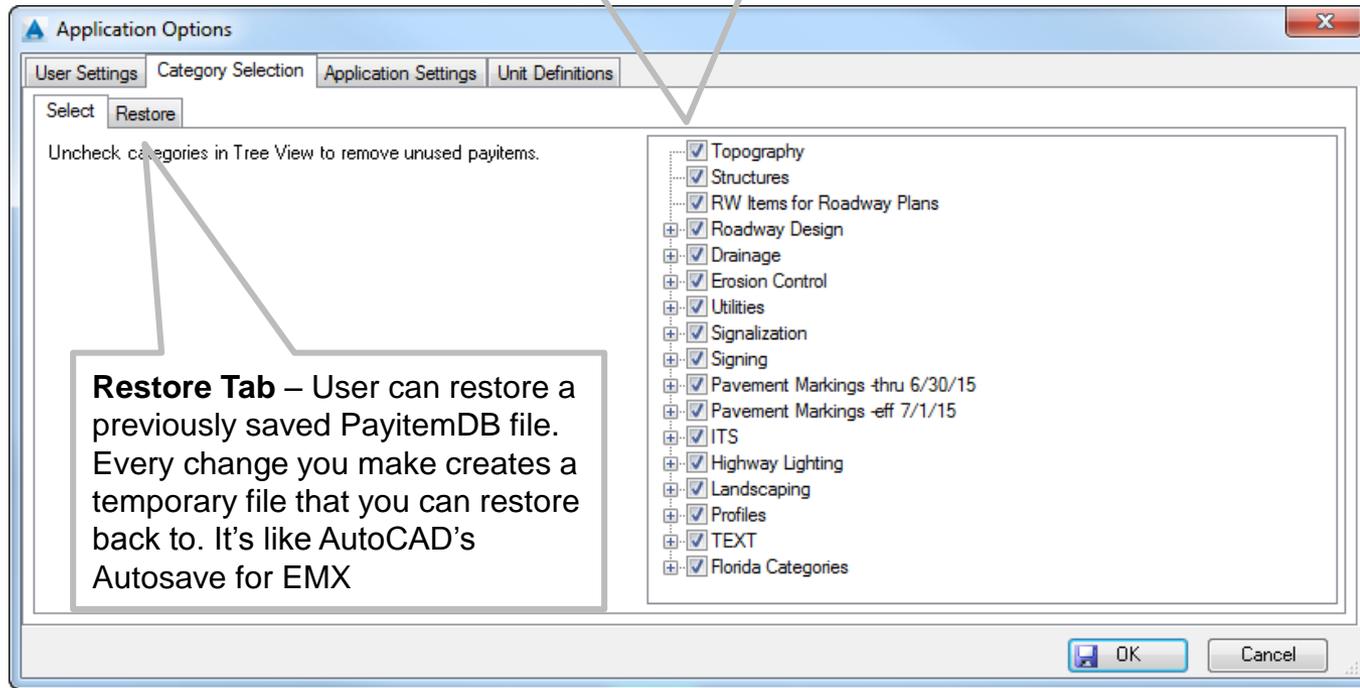
Help

Readme – A good resource to see information and noted revisions concerning EMX
Log File – This is where all of your verify reports, error messages go. It creates a text file that you can open. During support calls we may ask you to send us this file so the developer can address errors
About – Displays the version number

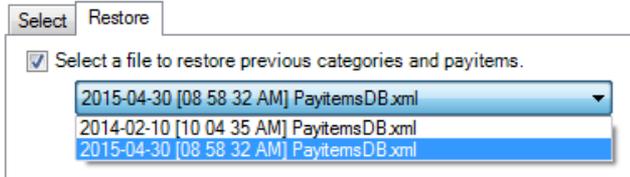


User Options

Category Selection – User can customize which categories show in the category view tree if working with a select group of pay items. By default all categories are displayed

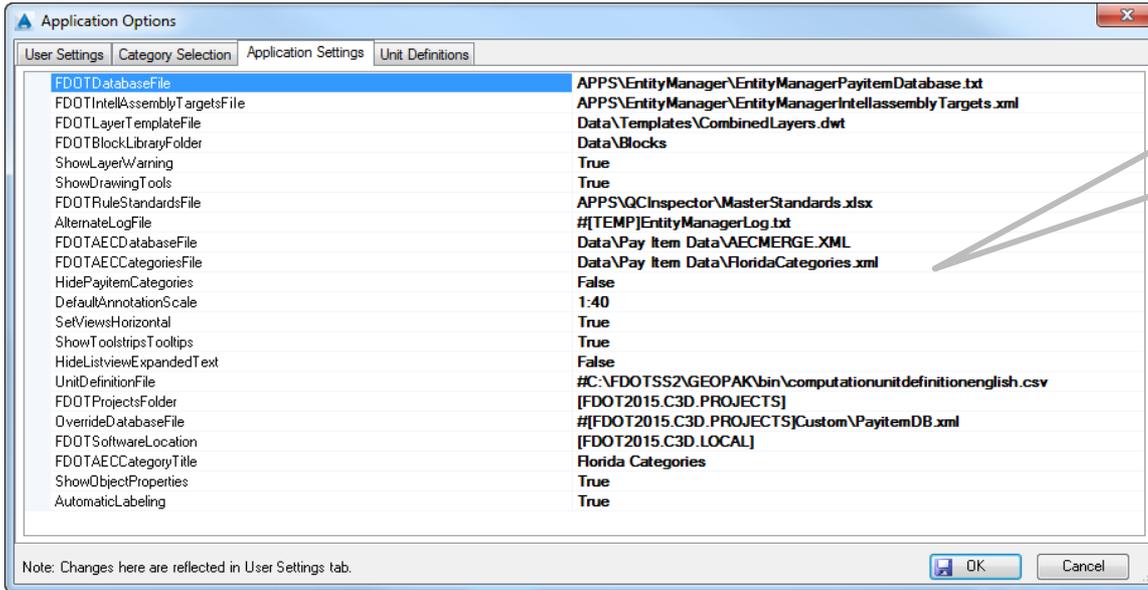


Restore Tab – User can restore a previously saved PayitemDB file. Every change you make creates a temporary file that you can restore back to. It's like AutoCAD's Autosave for EMX



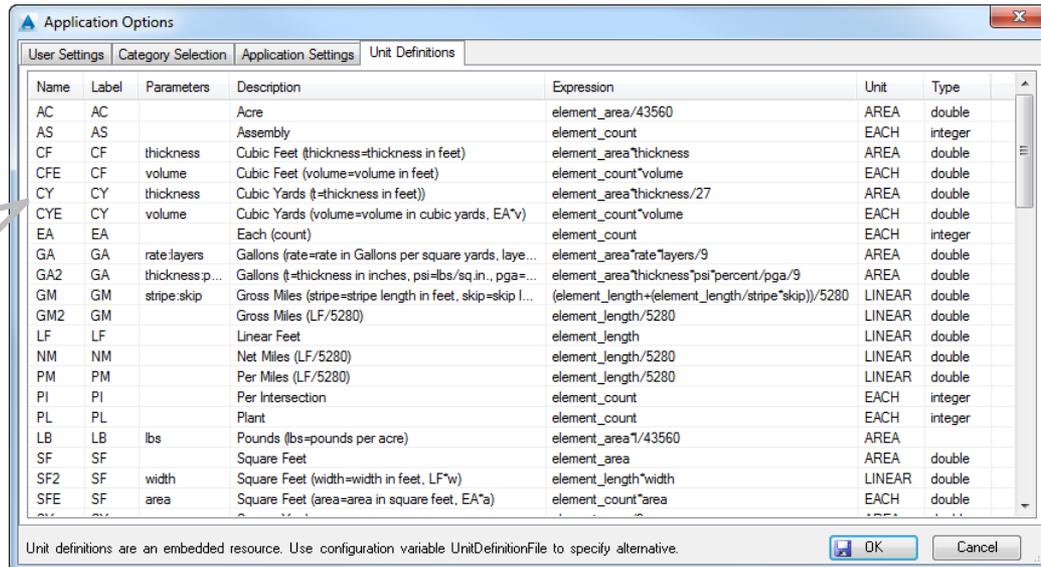
Note- Florida Categories can not be unchecked

User Options



Application Settings Tab –
Shows a summary of all current settings in the file, used by support to verify settings

Unit Definitions Tab – A good resource to see how quantities are calculated and what formula is used along with the unit and definition. Note- This is for reference only, do not edit unless a special need.



Main Options

Pay Item Categories Tab –
Displays the tree list of categories. As seen here you expand a sub category to get to the type of item you want to place.

With the item selected in the above tree view the individual items appear here.

The screenshot shows a software window titled 'Database = C:\Civil 3D Projects\PayitemDB.xml'. The 'Pay Item Categories' tab is active, displaying a tree view of categories. The 'Pavement Markings - thru 6/30/15' category is expanded, showing sub-categories like 'Pavement Markers', 'Audible Pavement Markings', 'Two Reactive Components', 'Painted Pavement Markings', 'Thermoplastc Pavement Markings', and 'Preformed Tape'. Below the tree view, a table displays the individual items for the selected category. The table has columns for 'PayItem', 'Description', 'Layer', 'Block', and 'ComputeMethod'. The selected item is '0706 3 Retro-Reflective Pavement Marker (MD/W)'. The table also shows other items like '0706 3 Retro-Reflective Pavement Marker (Separated)', '0706 3 Retro-Reflective Pavement Marker (MD/Y)', '0706 3 Retro-Reflective Pavement Marker (Y/Y)', '0706 3 Retro-Reflective Pavement Marker (W/R)', and '0706 3 Retro-Reflective Pavement Marker (Y/R)'. The 'ComputeMethod' for these items is 'EA=IF(EA>0,EA*QF,(e...'. The interface also includes a 'Favorites' dropdown, a 'Text filter' field, and a 'Pay item to find' field.

PayItem	Description	Layer	Block	ComputeMethod
Pavement M...	Pavement Markings - thru 6/30/15\Pavement Markers			
0706 3	Retro-Reflective Pavement Marker	RPM3		EA=IF(EA>0,EA*QF,(e
0706 3	Retro-Reflective Pavement Marker (Separated)	RPM3		EA=IF(EA>0,EA*QF,(e
0706 3	Retro-Reflective Pavement Marker (MD/W)	RPM1	RPMWhtM...	EA=IF(EA>0,EA*QF,(e
0706 3	Retro-Reflective Pavement Marker (MD/Y)	RPM3	RPMYelMo...	EA=IF(EA>0,EA*QF,(e
0706 3	Retro-Reflective Pavement Marker (Y/Y)	RPM4	RPMYelYel	EA=IF(EA>0,EA*QF,(e
0706 3	Retro-Reflective Pavement Marker (W/R)	RPM2	RPMWhtRed	EA=IF(EA>0,EA*QF,(e
0706 3	Retro-Reflective Pavement Marker (Y/R)	RPM5	RPMYelRed	EA=IF(EA>0,EA*QF,(e
Audible Pav...	Pavement Markings - thru 6/30/15\Audible Pavemen...			
Open Graded	Pavement Markings - thru 6/30/15\Audible Pavemen...			

Main Options

Entity XData Tab – Displays the individual components that make up the Xdata of each item. The blue number represents a link that you can click on to edit adhoc data. This will be covered in detail later

Selected Tab – Allows user to build a list of Pay Items that can be appended to one object. For example if you had an object with 3 different pay items you could add them all here and then draw, place, or append. **To add items select and right click.** To place items make sure they are checked. User will be warned if this option is active.

Name	Value
1001	FDOTEntityManager
1070	13
PayItem	0570_1_2
Description	Performance Turf, Sod
Layer	Sod
Block	
ComputeMethod	SY=IF(SY>0,SY*QF,(element_area/9)*QF)
ComputeMethodT...	0
QuantityFactor	1.00000
BlockScale	
BlockLibrary	
CategoryPath	Roadway Design\Quantity Features\Turf
AlignmentName	CLSR441
adhoc	"DESIGN NOTES",1,0,""
adhoc	"SY",5,1,"0"

Pay Item Id	Description
<input checked="" type="checkbox"/> 0570 1 1	Performance Turf
<input type="checkbox"/> 0162 1 12	Prepared Soil Layer, Finish Soil Layer, 12"
<input type="checkbox"/> 0107 2	Mowing

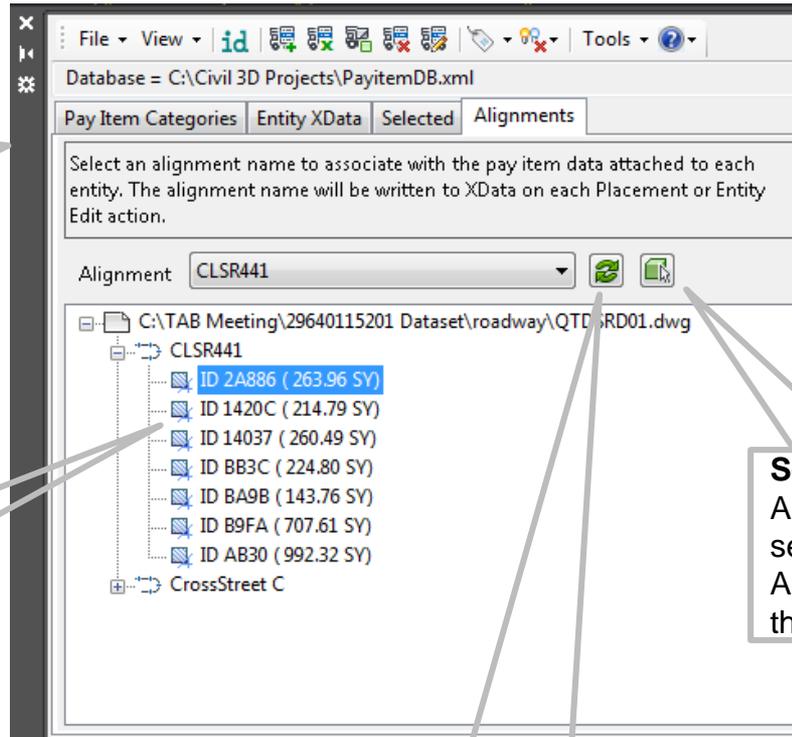
Alternate Category- Shows you the same item inside the Florida Categories which reads the AECMERGE file

PayItem	Description	Layer	Block
<input checked="" type="checkbox"/> 0107 1	Litter Removal and Disposal	MowingArea...	
<input checked="" type="checkbox"/> 0107 2	Mowing	MowingArea...	
<input checked="" type="checkbox"/> 0162 1 11	Prepared Soil Layer, Finish Soil Layer, 12"	Sod	
<input checked="" type="checkbox"/> 0162 1 12	Prepared Soil Layer, Finish Soil Layer, 12"	Sod	
<input checked="" type="checkbox"/> 0162 1 21	Prepared Soil Layer, Finish Soil Layer, 12"	Sod	
<input checked="" type="checkbox"/> 0162 1 23	Prepared Soil Layer, Finish Soil Layer, 12"	Sod	
<input checked="" type="checkbox"/> 0162 1 31	Prepared Soil Layer, Finish Soil Layer, 12"	Sod	
<input checked="" type="checkbox"/> 0162 1 32	Prepared Soil Layer, Finish Soil Layer, 12"	Sod	
<input checked="" type="checkbox"/> 0162 1 33	Prepared Soil Layer, Finish Soil Layer, 12"	Sod	
<input checked="" type="checkbox"/> 0570 1 1	Performance Turf	Sod	



Main Options

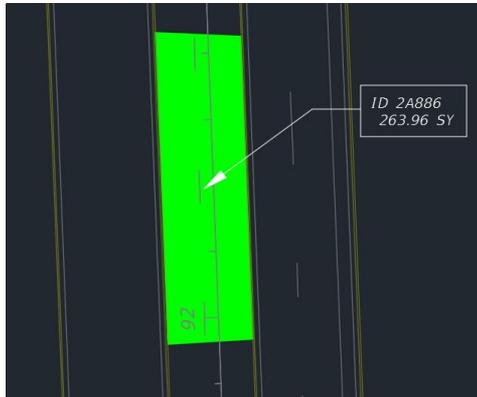
Alignments Tab – Shows user what shapes are associated with the Alignments in the file.



You can select a shape to activate the “zoom to” feature

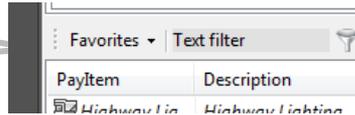
Selection – Allows user to select the Alignment in the file

Refresh – If new items are placed in a file refreshing will re populate the list with new shape Id's and areas. **You can select a shape to activate the zoom to feature**

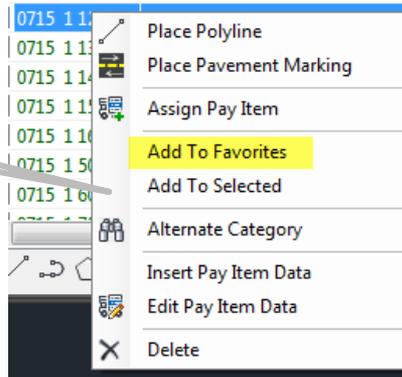


Favorites

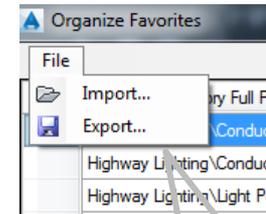
Favorites – Located next to the search tools there is a Favorites option



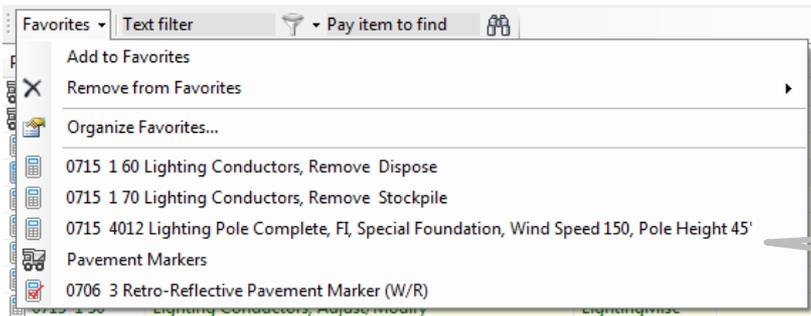
To add items make a selection and right click & Add to Favorites



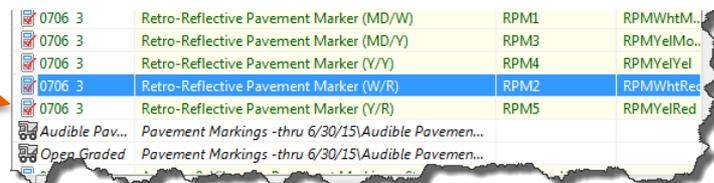
You can add individual Pay Items or Categories to your favorites list.



Organize Favorites – Provides a list where you can add or delete. You can also Import/Export your list for future use or to transfer to another PC or user.

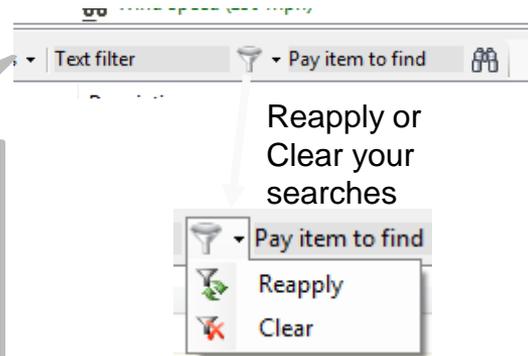


Favorites Pull-down – Options allow users to Add, Remove, & Organize. If you pick one of your favorites it will take you to your selection in the list

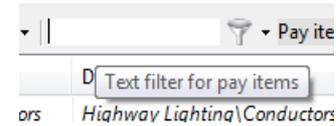


Search & Drawing Tools

Search – You can search two ways. You can enter a partial description using the text filter on the left or if you know the exact pay item number use the pay item to find on the right



TIP - If you undock the EMX application and want to perform a search you have to click inside the text filter box and let your mouse hover inside of it to be able to enter text.



Drawing Tools in order from Left to Right

- Line
- Polyline
- Polygon
- Rectangle
- Arc
- Circle
- Ellipse
- Ellipse Arc
- Block Insert
- Offset
- Multi Lines



Drawing Tools – Provides user ability to use AutoCAD commands to draw entities while having the pay item Xdata attached

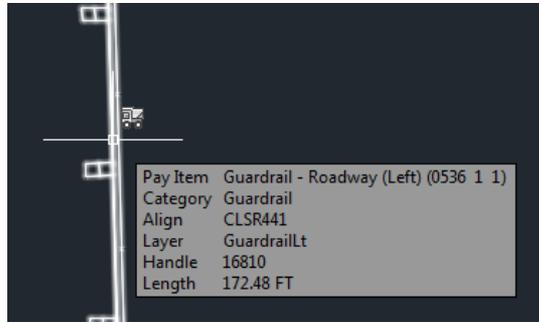
Part Two

Using Entity Manager



Drawing Items

1. Expand Categories to Guardrail
2. Select Pay Item # 0536 1 1 Roadway (Left)
3. Select the Polyline option from the drawing tools and draw in the file
4. Hover over the Guardrail and look at the Xdata attached

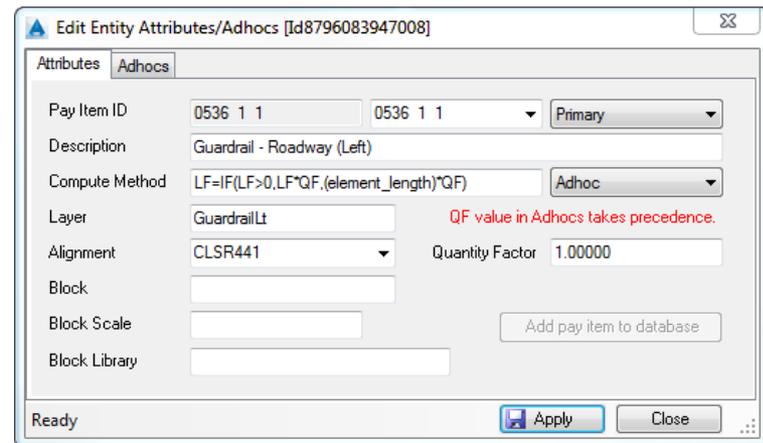
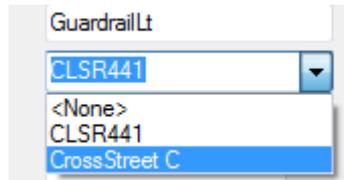


5. Now select the [id](#) button and look at your command line for instructions.

 FDOT_EMX_IDENTIFYENTITY Select objects:

Pick the guardrail and press enter

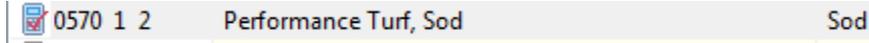
6. The Entity XData tab should be active now. Select the blue link [0536 1 1](#) . The Edit Attributes/Adhocs dialog box should be open
7. Under Alignment you now re assign Alignment Association



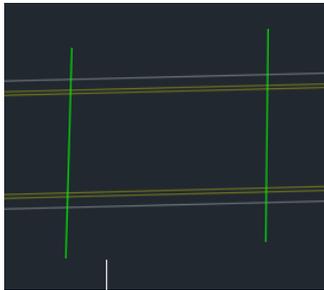
Attributes	Adhocs
Pay Item ID	0536 1 1 Primary
Description	Guardrail - Roadway (Left)
Compute Method	LF=IF(LF>0,LF*QF,(element_length)*QF) Adhoc
Layer	GuardrailLt <i>QF value in Adhocs takes precedence.</i>
Alignment	CLSR441 Quantity Factor 1.00000
Block	
Block Scale	Add pay item to database
Block Library	

Working with Shapes

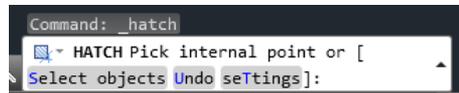
1. Using the text search option type in sod. Select the following



2. You can either flood a closed area by picking on the screen or draw some temporary lines to close an area so you can flood it. **Be careful not to draw a polygon (with the drawing tools) with the sod selection selected because the area will be counted twice unless you delete the polygon.** You can pick areas to flood from an Xref file too!
3. For this example just draw 2 temp. construction lines to create a closed region. In the example below we will place a sod hatch in a median from an Xref file. Pick the Truck Symbol with  the Green Hatch Box



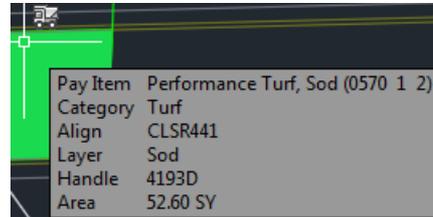
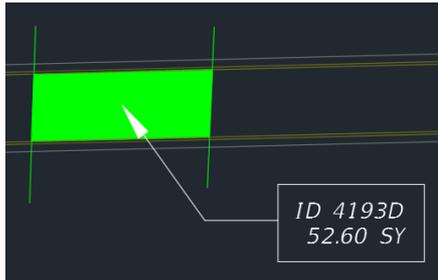
4. Look at your command line for input, by default you can select a point inside your boundary region. Pick a point inside the median between the two construction lines.



If you had a defined boundary you would type "S" for Select Objects on the command line.

Working with Shapes

- Once you left click to hatch inside the area press enter and a label appears that you can drag out of the way.



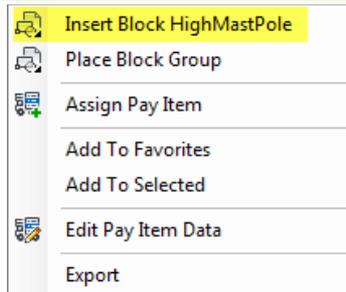
Looking at the Xdata attached to the hatch just placed you can see the alignment associated. If you need to change association it is the identical process as shown earlier with the guardrail example.

The Area ID (same as the handle designation in the Xdata hover) is used to identify the shape and will appear in the "Summary of Performance Turf" Excel Spreadsheet

Placing Blocks

1. To place blocks with pay items browse to the appropriate item and right click < Insert Block.

PayItem	Description	Layer	Block	ComputeMethod
ELP	Street Light Pole	Luminaire_ep	LP	
LP	Street Light Pole	PoleLight	PoleLum	
0715 19111	High Mast Light Pole, F&I, Wind Speed 150 MPH, Pol...	PoleLightHM	HighMastPole	EA=IF(EA>0,EA*QF,(element_count)*QF)
0715 19112	High Mast Light Pole, F&I, Wind Speed 150 MPH, Pol...	PoleLightHM	HighMastPole	EA=IF(EA>0,EA*QF,(element_count)*QF)
0715 19113	High Mast Light Pole, F&I, Wind Speed 150 MPH, Pol...	PoleLightHM	HighMastPole	EA=IF(EA>0,EA*QF,(element_count)*QF)
0715 19119	High Mast Light Pole, F&I, Wind Speed 150 MPH, Cu...	PoleLightHM	HighMastPole	EA=IF(EA>0,EA*QF,(element_count)*QF)



Right Click Shortcut Menu

Insert Block "Name" – Inserts selected block . You can also use the Insert block button on the drawing tools toolbar to use the AutoCAD method

Place Block Group – Opens the "Place Block Group" application to place using that method. ***TIP- depending on the item you select "Pavement Markings Tool" maybe an option***

Assign Pay Items – Applies the selected pay item data to objects selected in drawing

Add To Favorites – Adds selection to your favorites list

Add To Selected – Adds to your selected group so you can add all at once

There is good information visible in the above list.

- PayItem Number
- Description from BOE
- Layer it is assigned to
- Block Name that is used
- Formula used for Calculation

Subtleties

Paint Brush Symbol reflects that a Formula is not assigned but item can still be drawn or placed with associated block and layer

Gold Color text reflects drafting elements that can be drawn or placed, however if you need to use a Gold colored item as a pay item, that represents a problem and you should notify ECSO

PayItem	Description	Layer	Block	ComputeMethod
 ELP	Street Light Pole	Luminaire_ep	LP	
 LP	Street Light Pole	PoleLight	PoleLum	
 0715 19111	High Mast Light Pole, F&I, Wind Speed 150 MPH, Pol...	PoleLightHM	HighMastPole	EA=IF(EA>0,EA*QF,(element_count)*QF)
 0715 19112	High Mast Light Pole, F&I, Wind Speed 150 MPH, Pol...	PoleLightHM	HighMastPole	EA=IF(EA>0,EA*QF,(element_count)*QF)
 0715 19113	High Mast Light Pole, F&I, Wind Speed 150 MPH, Pol...	PoleLightHM	HighMastPole	EA=IF(EA>0,EA*QF,(element_count)*QF)
 0715 19119	High Mast Light Pole, F&I, Wind Speed 150 MPH, Cu...	PoleLightHM	HighMastPole	EA=IF(EA>0,EA*QF,(element_count)*QF)

Calculator with Red Check Mark reflects items with Adhocs (other than default)

Calculator with No Red Check Mark reflects Pay Item with Formula and associated layer

Green Color text reflects drafting elements that can be drawn or placed with associated layer, block, & formula attached

 0711 16131	Thermoplastic, Std - Other Surfaces, White, Skip, 6" (...)	PMStripe6W(3-9)	GM=IF(G
---	--	-----------------	---------

Paint Brush Symbol with Green text reflects an item with a pay item and associated layer but no Formula

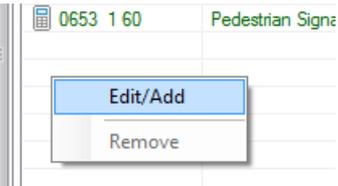
 0711 16131	Thermoplastic, Std - Other Surfaces, White, Skip, 6"	PMStripe6W(3-9)	
---	--	-----------------	--

Editing the PayItemDB file



To **EDIT** an existing Pay Item Highlight it and right click < Edit/Add

The rule of thumb used to **Edit** items is if you are using custom Adhocs that will be used project wide and you only want to “edit once used many”.

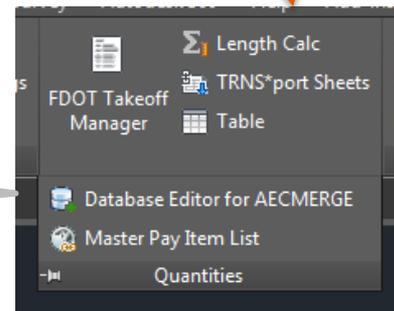


To **ADD** a new item DO NOT Highlight a item. Right click over a blank space <Edit/Add

The rule of thumb used to **ADD** items is if a new item is introduced that is not included in your AECMerge or Categories file and you don’t want to wait for an update. You would also update the **AECMerge.xml** and rebuild your PayitemDB file for project use.

Required Data Tab – This is where you can change the pay item number, the formula, description, and Quantity Factor

TIP – The same procedures apply to the AECMERGE editor as described in the PayitemDB editor



Editing the PayItemDB file

Pay Item Edit / Add [EMX]

Required Data Graphical Data Adhoc Data

Data Required for Entity Manager to Place Entities with Pay Item Data.

Layer PedHead_ep

Block Ped1_2

Block Library signalization.dwg

Block Scale 1.000000

Ready OK Cancel

Graphical Data Tab – This is where you can change the Layer, Block, Block Library File, & Block scale

Adhoc Tab – This is where you can change or add particular Adhoc data

Pay Item Edit / Add [EMX]

Required Data Graphical Data Adhoc Data

Name	Type	Locked	Value
AS	Quantity	<input checked="" type="checkbox"/>	0
*		<input type="checkbox"/>	

Ready OK Cancel

Adding Data – When you select the add data option the main difference is all of the options are blank. You have to make all of the selections. The example to the right displays all of the compute methods available

Pay Item Edit / Add [EMX]

Required Data Graphical Data Adhoc Data

Minimum Data Required to Run Quantities.

Pay Item ID - Enter Pay Item ID - Add Pay Item

Compute Method - Select Compute Method -

Description - Enter Description -

Quantity Factor 1 * Warning: QF variable in Adhocs takes precedence.

Ready OK Cancel

```

Compute Method EA=IF(EA>0,EA*QF,(element_count)*QF)
Description - Select Compute Method -
AC=IF(AC>0,AC*QF,(element_area/43560)*QF)
AS=IF(AS>0,AS*QF,(element_count)*QF)
CY=IF(CY>0,CY*QF,(element_area*thickness/12/27)*QF)
CY=IF(CY>0,CY*QF,(element_area*thickness/27)*QF)
EA=IF(EA>0,EA*QF,(element_count)*QF)
ED=IF(ED>0,ED*QF,(1*days)*QF)
GM=IF(GM>0,GM*QF,((element_length+element_length*stape*skin)
    
```