Discovering DECs

ACEIT Users Workshop
January 27, 2010
Chris Gardiner

Abstract

- **ACEIT includes many features and capabilities that once discovered begin to reveal the real power of ACEIT to the user. One such feature is the Dynamic Equation Columns (DECs). The discovery of DECs opens new frontiers to the estimator, enhances creativity, increases model efficiency, decreases model length and makes navigation easier, and decreases errors. This presentation will show an actual estimate example that is well suited for multiple uses of DECs. It will show the repetitious work and problems involved in building a model in the "pre-DEC discovery" period. Then the presentation will take an iterative look at the model evolution as DECs are discovered and additional DEC opportunities and application are realized and implemented.**

ACEIT
Automated Cost Estimating Integrated Tools

ALL DATA IN THIS PRESENTATION ARE ENTIRELY NOTIONAL AND DO NOT REPRESENT ACTUAL DATA OF ANY CONTRACTOR OR PROGRAM

Presentation Outline

- **Estimate Problem**
- **Pre-DEC Discovery ACEIT Sessions**
- **The Discovery of DECs**
  - What is a DEC
  - DEC Types
  - Adding DECs to Your Session
  - Referencing DEC Data
  - DEC Uses
    - Evolving ACE Sessions
  - Viewing DEC Results
- **New ACE 7.2 DEC Features**
- **Summary**

Discovering DECs – Estimate Problem

- **ABC Support Equipment cables are over 35 years old, wearing out, and causing work stoppages**
- **Procurement of replacement cables needed**
- **Develop short turn estimate for ABC Support Equipment cable spares, with funding limitations, that can easily and quickly run excursions for decision making**
- **Need to buy as many of the cables as possible, at the required quantities, within the available funding.**
- **If we determine we can't get all of the cables at the required quantities we have to prioritize and make a determination which cables we can get.**

Discovering DECs – Estimate Problem (cont)

- **There is limited procurement funding available**
- **Limited design and testing effort to be accomplished during FY2010**
  - Will use existing tech documents and drawings to extent possible
  - Will use procurement funding
- **Production effort during FY2011**
- **Finalization during first 7 months of FY2012**
- **There are 127 different cables, each with different spares quantity requirements**
- **Cost data available**
  - Initially - Two catalog systems
  - Later – Quantity Pricing Matrix

Pre-Dec Discovery

- **What if DECs didn't exist?**
  - Significantly more input variables
  - Significantly more unique IDs
  - Repetitious work and increased equation complexity
  - Less efficient and increased opportunity for error

- **Pre-DEC Discovery Cables Spares ACE Sessions**
  - Prior to Priority Level
  - With Priority Level

Pre-Dec Discovery ACE Sessions

- **Pre-DEC Discovery Cable Spares Estimate Model (prior to priority level).aceit**
  - Multiplies a unique ID for Price and a unique ID for Qty for each of 127 cables
  - 254 additional input variables and unique IDs
  - Number of Cables for calculating design/drawing costs entered as a constant

Pre-Dec Discovery ACE Sessions (cont)

Pre-DEC Discovery Cable Spares Estimate Model (prior to priority level).aceit

WBS/CES Description	Approp	Unique ID	Point Estimate	Phasing Method	Equation / Throughput	Fiscal Year	Units	Start Date	Finish Date
Production		Prod$	$ 7,833.1 *						
ABC Cables		ABCCables	$ 4,470.3 *						
XO1 Cable	3020		$ 2.8 *	F	XO1$ * XO1Qty	2004	$	2011	2011
XO11 Cable	3020		$ 5.6 *	F	XO11$ * XO11Qty	2004	$	2011	2011
XO12 Cable	3020		$ 6.7 *	F	XO12$ * XO12Qty	2004	$	2011	2011
XO13 Cable	3020		$ 3.6 *	F	XO13$ * XO13Qty	2004	$	2011	2011
XO2 Cable	3020		$ 4.0 *	F	XO2$ * XO2Qty	2004	$	2011	2011
XO23 Cable	3020		$ 10.2 *	F	XO23$ * XO23Qty	2009	$	2011	2011
XO23 J2 Cable	3020		$ 5.9 *	F	XO23J2$ * XO23J2Qty	2004	$	2011	2011
XO24 Cable	3020		$ 7.2 *	F	XO24$ * XO24Qty	2004	$	2011	2011

*INPUT VARIABLES		*IN_VAR							
*Cable Prices									
XO1 Price	3020	XO1$	$ 0.5 *	C	400	2004	$		
XO11 Price	3020	XO11$	$ 0.9 *	C	800	2004	$		
XO12 Price	3020	XO12$	$ 1.0 *	C	850	2004	$		
XO13 Price	3020	XO13$	$ 0.5 *	C	400	2004	$		
XO2 Price	3020	XO2$	$ 0.4 *	C	375	2004	$		
XO23 Price	3020	XO23$	$ 1.5 *	C	1450	2009	$		
XO23 J2 Price	3020	XO23J2$	$ 0.7 *	C	650	2004	$		
XO24 Price	3020	XO24$	$ 0.6 *	C	525	2004	$		
*Cable Quantities									
XO1 Quantity		XO1Qty	6.0 *	C	6				
XO11 Quantity		XO11Qty	6.0 *	C	6				
XO12 Quantity		XO12Qty	7.0 *	C	7				
XO13 Quantity		XO13Qty	8.0 *	C	8				
XO2 Quantity		XO2Qty	9.0 *	C	9				
XO23 Quantity		XO23Qty	7.0 *	C	7				
XO23 J2 Quantity		XO23J2Qty	8.0 *	C	8				
XO24 Quantity		XO24Qty	12.0 *	C	12				
Number of Unique Cables		NumCables	127.0 *	C	127				

Pre-Dec Discovery ACE Sessions (cont)

- **Pre-DEC Discovery Cable Spares Estimate Model (with priority level added).aceit**
  - We don't have enough funding to do all cables and associated quantities
  - We have to prioritize and determine which cables, in order of priority, we can get for the available funding
  - Requires 127 additional unique IDs for priority of each cable
  - Add a priority level input variable to be used to calculate cable price of all cables that have a higher priority
  - Eliminate "Number of Unique Cables" input variable and use Priority level to calculate design/drawing costs
  - Total additional input variables for Price, Qty, and Priority is 381

Pre-Dec Discovery ACE Sessions (cont)

Pre-DEC Discovery Cable Spares Estimate Model (with priority level added).aceit

WBS/CES Description	Approp	Unique ID	Point Estimate	Phasing Method	Equation / Throughput	Fiscal Year	Units	Start Date	Finish Date
Production		Prod$	$ 5,438.9 *						
ABC Cables		ABCCables	$ 2,315.5 *						
XO1 Cable	3020		$ 0.0 *	F	If(XO1Priority<PriorityLvl, XO1$ * XO1Qty,0)	2004	$	2011	2011
XO11 Cable	3020		$ 0.0 *	F	If(XO11Priority<PriorityLvl, XO11$ * XO11Qty,0)	2004	$	2011	2011
XO12 Cable	3020		$ 0.0 *	F	If(XO12Priority<PriorityLvl, XO12$ * XO12Qty,0)	2004	$	2011	2011
XO13 Cable	3020		$ 0.0 *	F	If(XO13Priority<PriorityLvl, XO13$ * XO13Qty,0)	2004	$	2011	2011
XO2 Cable	3020		$ 4.0 *	F	If(XO2Priority<PriorityLvl, XO2$ * XO2Qty,0)	2004	$	2011	2011
XO23 Cable	3020		$ 0.0 *	F	If(XO23Priority<PriorityLvl, XO23$ * XO23Qty,0)	2009	$	2011	2011
XO23 J2 Cable	3020		$ 0.0 *	F	If(XO23J2Priority<PriorityLvl, XO23J2$ * XO23J2Qty,0)	2004	$	2011	2011

*INPUT VARIABLES		*IN_VAR							
*Cable Prices									
XO1 Price	3020	XO1$	$ 0.5 *	C	400	2004	$		
XO11 Price	3020	XO11$	$ 0.9 *	C	800	2004	$		
XO12 Price	3020	XO12$	$ 1.0 *	C	850	2004	$		
XO13 Price	3020	XO13$	$ 0.5 *	C	400	2004	$		
XO2 Price	3020	XO2$	$ 0.4 *	C	375	2004	$		
XO23 Price	3020	XO23$	$ 1.5 *	C	1450	2009	$		
*Cable Quantities									
XO1 Quantity		XO1Qty	6.0 *	C	6				
XO11 Quantity		XO11Qty	6.0 *	C	6				
XO12 Quantity		XO12Qty	7.0 *	C	7				
XO13 Quantity		XO13Qty	8.0 *	C	8				
XO2 Quantity		XO2Qty	9.0 *	C	9				
XO23 Quantity		XO23Qty	7.0 *	C	7				
*Cable Priority									
Priority Level		PriorityLvl	47.0 *	C	47				
XO1 Priority		XO1Priority	95.0 *	C	95				
XO11 Priority		XO11Priority	103.0 *	C	103				
XO12 Priority		XO12Priority	104.0 *	C	104				
XO13 Priority		XO13Priority	66.0 *	C	66				
XO2 Priority		XO2Priority	43.0 *	C	43				
XO23 Priority		XO23Priority	91.0 *	C	91				

The Discovery of DECs

What is a DEC?

- **Dynamic Equation Columns (DECs) are user-created columns used for intermediate inputs or calculations on a row**
- **Makes session wider instead of longer**
- **Data stored in DECs should be static**
  - DEC columns evaluate as constants so data stored in DECs and equations evaluating in DECs are never time phased
  - Risk cannot be applied to data in DEC columns
  - What-if drills cannot be performed on DEC data

DEC Types

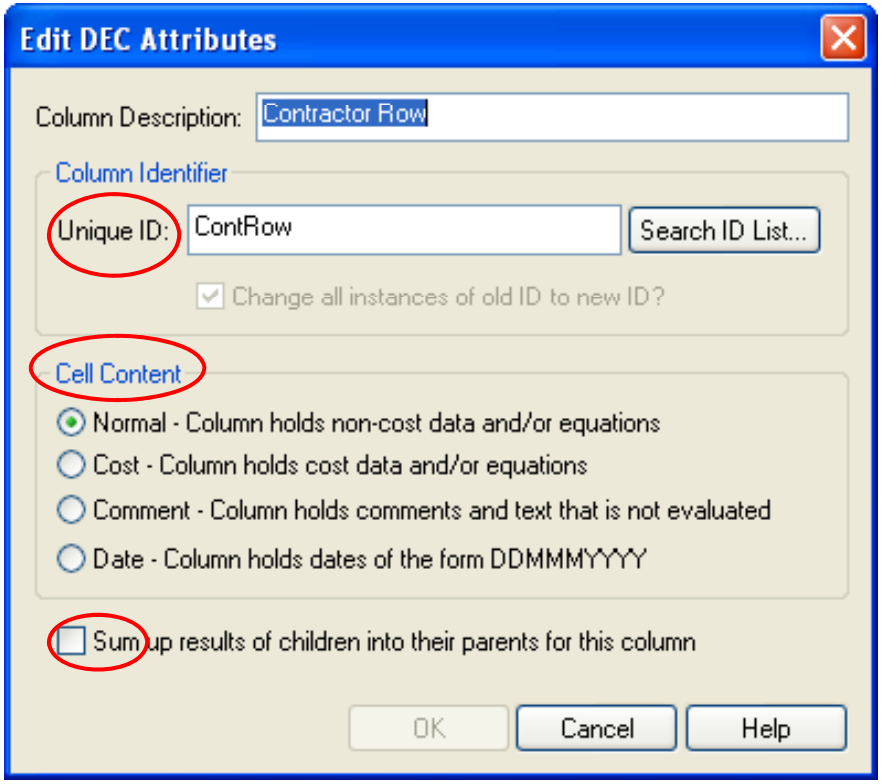
- **Normal – holds non-cost data and/or equations; excellent for marking rows and storing index vectors**
- **Cost – holds cost data and/or equations.**
- **Comment – holds/stores comments and text that is not evaluated or used in ACE calculations (i.e. model notes)**
- **Date – holds dates in the form ddMMMyyyy (i.e. Start and Finish Date Columns)**
- **For Normal and Cost DECs you can select to "Sum up results of children into their parents for this column"**
- **DEC Type Symbols – separate the column unique ID from the column description**

SYMBOL	MEANING
+	Summing Normal DEC
!	Non-Summing Normal DEC
$	Summing Cost DEC
!$	Non-Summing Cost DEC
*	Comment DEC
Date	Date DEC

Adding DECs to Your Session

- **Each DEC has a general title and an ID name that is used in equations to call information from the column**
- **Add New DEC and Edit DEC attributes dialogs**
  - Edit > Add DEC
  - Add New DEC icon  on the Session Construction toolbar
  - Edit > Edit Column Properties

ACE 7.1 Dialog Box



Referencing DEC Data

- **To use the values in the DEC columns:**
  - **On the current row – enter the DEC name in the Equation/Throughput column (e.g. DECID)**
  - **On a different row – using dot notation include the unique ID of the row being referenced followed by a . and the DEC name (e.g. UniqueID.DECID)**

DEC Uses

- **Use as an additional Equation/Throughput column**
- **Use when doing a simple total cost estimate that has no time phasing**
- **Use to store data to use in other equations**
  - Simply add DECs for the variables in your CERs
    - Quantity, Price, learning curve parameters, etc.
    - Creates a wider session (more columns) instead of a longer session (more rows)
- **Use with matrix type structures**
  - COEF function; MatVal function; MatColCol; MatColTot; etc.
  - See Tutorial – Basic Matrix Operations for an example of how to use DECs in matrix operations
  - You can also view the Example session entitled 98 - Implementing Matrix Functions to see how DECs are used with matrix functions

DEC Uses (cont)

- **Use to store information retrieved from 3rd party tools**
  - Example sessions 05a – MS Project Plug-In, 05b – SEER Plug-In, and 05c – Price Plug-In show how DECs are used to store information retrieved from Microsoft Project, SEER and Price

- **Use as an index in functions**
  - Use to store index data to use with the SUMIF function
  - Example session 06a – Creating Summary Sections

Using DECs as Variables or Factors to be used in Equations

- **ACE Session: Cable Estimate with DECs (Qty; Price).aceit**
  - Prior to addition of priority
    - No Priority – assumes design/drawing required for each cable
  - Rather than adding input variables for price and quantity for each of 127 cables – add a DEC for Qty and a DEC for Price
  - Eliminates 254 input variables and associated unique IDs
  - Simply multiply the two DECs together using the same equation on each row (Price * Qty)

Using DECs as Variables or Factors to be used in Equations (cont)

- **Cable Estimate with DECs (Qty; Price)**

WBS/CES Description	Approp	Unique ID	Point Estimate	Phasing Method	Equation / Throughput	Qty (+) Quantity	Price (!$) Unit Price	Fiscal Year	Units	Start Date	Finish Date
*ABC Cables Estimate		*Estimate									
Total ABC Cables Estimate			$ 12,573.1 *								
Design/Development		Dev$	$ 4,790.0 *								
Cable Design/Development	3020	Develop	$ 955.0 *	F	NumCables*AvgDevHrsCable*EngRate					2010	2010
Drawing Updates	3020	Drawings	$ 596.9 *	F	NumCables*DrawHrs*EngRate					2010	2010
ST&E	3020	STE	$ 179.5 *	F	Develop * STEFact					2010	2010
Program Support	3020	DevProgSupport	$ 3,058.5 *								
Contractor A Dev SE/PM	3020		$ 1,784.6 *	F	ContrAEH*ContrARate*AnnualHrs					2010	2010
Contractor B Dev SE/PM	3020		$ 794.9 *	F	ContrBEH*ContrBRate*AnnualHrs					2010	2010
Fee	3020		$ 479.0 *	F	(Develop+Drawings+STE+DevProgSupport)*F						
Production		Prod$	$ 7,756.0 *								
ABC Cables		ABCCables	$ 4,400.8 *								
XO1 Cable	3020		$ 2.7 *	F	Price * Qty						
XO11 Cable	3020		$ 5.4 *	F	Price * Qty	6	800	2004	$	2011	2011
XO12 Cable	3020		$ 6.7 *	F	Price * Qty	7	850	2004	$	2011	2011
XO13 Cable	3020		$ 3.6 *	F	Price * Qty	8	400	2004	$	2011	2011
XO2 Cable	3020		$ 3.8 *	F	Price * Qty	9	375	2004	$	2011	2011
XO23 Cable	3020		$ 10.2 *	F	Price * Qty	7	1450	2009	$	2011	2011
XO23 J2 Cable	3020		$ 5.9 *	F	Price * Qty	8	650	2004	$	2011	2011
XO24 Cable	3020		$ 7.1 *	F	Price * Qty	12	525	2004	$	2011	2011
XO29 Cable	3020		$ 6.8 *	F	Price * Qty	6	1125	2009	$	2011	2011
XO3 Cable	3020		$ 3.6 *	F	Price * Qty	8	400	2004	$	2011	2011
XO61 Cable	3020		$ 3.4 *	F	Price * Qty	8	375	2004	$	2011	2011
XO62 Cable	3020		$ 17.0 *	F	Price * Qty	6	2500	2004	$	2011	2011
XO63 Cable	3020		$ 22.5 *	F	Price * Qty	6	3750	2009	$	2011	2011
XOGRP1 Cable	3020		$ 2.8 *	F	Price * Qty	10	250	2004	$	2011	2011
XOGRP2 Cable	3020		$ 2.8 *	F	Price * Qty	10	250	2004	$	2011	2011
Accessory 1	3020		$ 128.0 *	F	Price * Qty	8	16000	2009	$	2011	2011
Accessory 10	3020		$ 942.5 *	F	Price * Qty	13	72500	2009	$	2011	2011
Accessory 2	3020		$ 88.0 *	F	Price * Qty	8	11000	2009	$	2011	2011
Accessory 22	3020		$ 104.0 *	F	Price * Qty	4	26000	2009	$	2011	2011
Accessory 3	3020		$ 52.0 *	F	Price * Qty	8	5750	2004	$	2011	2011
Accessory 4	3020		$ 260.0 *	F	Price * Qty	10	26000	2009	$	2011	2011
Accessory 5	3020		$ 172.0 *	F	Price * Qty	8	19000	2004	$	2011	2011
Switch Module	3020		$ 30.5 *	F	Price * Qty	12	2250	2004	$	2011	2011
Y201 Cable	3020		$ 27.0 *	F	Price * Qty	6	4500	2009	$	2011	2011
Y201A Cable	3020		$ 61.1 *	F	Price * Qty	9	6000	2004	$	2011	2011
Y202 Cable	3020		$ 4.3 *	F	Price * Qty	9	475	2009	$	2011	2011

Using DECs to store data to use in other equations

- **ACE Session: Cable Estimate with DECs (Qty; Price; Priority; Number Cables).aceit**
  - Not enough funding for all cables and associated quantities. Must prioritize and determine which cables, in order of priority, we can get for the available funding
  - In addition to Price and Qty DECs we add a Priority DEC to be used in calculation of Qty and/or total cost for each cable to be procured
  - Eliminates an additional 127 input variables and associated Unique IDs
  - Add a Number of Cables DEC which can use the Qty DEC or the Priority DEC to calculate the number of cables requiring design/ drawings
  - Add an input variable for priority level to be used to determine if any cost will be calculated for each cable (Use in the Qty DEC; could use in the Number Cable DEC and the Equation)
  - Uses the same equation in the Equation/Throughput column and DECs

Using DECs to store data to use in other equations (cont)

- **Cable Estimate with DECs (Qty; Price; Priority; Number Cables)**

WBS/CES Description	Unique ID	Point Estimate	Equation / Throughput	Priority (!)	Qty (+) Quantity	Price (!$) Unit Price	NumberCables (+) Cables
*ABC Cables Estimate	*Estimate						
Total ABC Cables Estimate		$ 9,017.5 *					
Design/Development	Dev$	$ 3,563.0 *					
Cable Design/Development	Develop	$ 345.9 *	ABCCables.NumberCables*AvgDevHrsCable*EngRate				
Drawing Updates	Drawings	$ 216.2 *	ABCCables.NumberCables*DrawHrs*EngRate				
ST&E	STE	$ 65.0 *	Develop * STEFact				
Program Support	DevProgSupport	$ 2,935.8 *					
Contractor A Dev SE/PM		$ 1,784.6 *	ContrAEH*ContrARate*AnnualHrs				
Contractor B Dev SE/PM		$ 794.9 *	ContrBEH*ContrBRate*AnnualHrs				
Fee		$ 356.3 *	(Develop+Drawings+STE+DevProgSupport)*Fee				
Production	Prod$	$ 5,427.4 *					
ABC Cables	ABCCables	$ 2,305.1 *					
XO1 Cable		$ 0.0 *	Price * Qty	95	If(Priority<PriorityLvl, 6, 0)	400	If(Qty=0,0,1)
XO11 Cable		$ 0.0 *	Price * Qty	103	If(Priority<PriorityLvl, 6, 0)	800	If(Qty=0,0,1)
XO12 Cable		$ 0.0 *	Price * Qty	104	If(Priority<PriorityLvl, 7, 0)	850	If(Qty=0,0,1)
XO13 Cable		$ 0.0 *	Price * Qty	66	If(Priority<PriorityLvl, 8, 0)	400	If(Qty=0,0,1)
XO2 Cable		$ 3.8 *	Price * Qty	43	If(Priority<PriorityLvl, 9, 0)	375	If(Qty=0,0,1)
XO23 Cable		$ 0.0 *	Price * Qty	91	If(Priority<PriorityLvl, 7, 0)	1450	If(Qty=0,0,1)
XO23 J2 Cable		$ 0.0 *	Price * Qty	118	If(Priority<PriorityLvl, 8, 0)	650	If(Qty=0,0,1)
XO24 Cable		$ 7.1 *	Price * Qty	38	If(Priority<PriorityLvl, 12, 0)	525	If(Qty=0,0,1)
XO29 Cable		$ 0.0 *	Price * Qty	105	If(Priority<PriorityLvl, 6, 0)	1125	If(Qty=0,0,1)
XO3 Cable		$ 0.0 *	Price * Qty	108	If(Priority<PriorityLvl, 8, 0)	400	If(Qty=0,0,1)
XO61 Cable		$ 0.0 *	Price * Qty	106	If(Priority<PriorityLvl, 8, 0)	375	If(Qty=0,0,1)
XO62 Cable		$ 0.0 *	Price * Qty	126	If(Priority<PriorityLvl, 6, 0)	2500	If(Qty=0,0,1)
XO63 Cable		$ 0.0 *	Price * Qty	127	If(Priority<PriorityLvl, 6, 0)	3750	If(Qty=0,0,1)
XOGRP1 Cable		$ 0.0 *	Price * Qty	48	If(Priority<PriorityLvl, 10, 0)	250	If(Qty=0,0,1)
XOGRP2 Cable		$ 2.8 *	Price * Qty	14	If(Priority<PriorityLvl, 10, 0)	250	If(Qty=0,0,1)
Accessory 1		$ 0.0 *	Price * Qty	54	If(Priority<PriorityLvl, 8, 0)	16000	If(Qty=0,0,1)
Accessory 10		$ 942.5 *	If(Priority<PriorityLvl, Price * Qty, 0)	13	13	72500	If(Qty=0,0,1)
Accessory 2		$ 88.0 *	Price * Qty	29	If(Priority<PriorityLvl, 8, 0)	11000	If(Qty=0,0,1)
Accessory 22		$ 0.0 *	Price * Qty	47	If(Priority<PriorityLvl, 4, 0)	26000	If(Qty=0,0,1)
Accessory 3		$ 0.0 *	Price * Qty	115	If(Priority<PriorityLvl, 8, 0)	5750	If(Qty=0,0,1)
Accessory 4		$ 260.0 *	Price * Qty	20	If(Priority<PriorityLvl, 10, 0)	26000	If(Qty=0,0,1)
*INPUT VARIABLES	*IN_VAR						
Priority Level	PriorityLvl	47.0 *	47				

Alternative Calculations Using DECS

Using DECs to store data to use in other equations - UDF

- **ACE Session: Cable Estimate with DECs and CER UDF.aceit**
  - This is a separate model - uses a CER rather than government catalog systems for Price
  - Developed a log-linear CER using 6 specific cables prices obtained from Contractor A as the independent variable and the corresponding prices from the government catalog system as the dependent variable
  - Used a User Defined Function (UDF) for the CER
  - The UDF is referenced on each row (same on all rows)
  - The CER UDF includes the arguments of Price and Qty which are contained in the same DECs used in the previous model

Using DECs to store data to use in other equations – UDF (cont)

- **Cable Estimate with DECs and CER UDF**

WBS/CES Description	Unique ID	Point Estimate	Equation / Throughput	Priority (!)	Price (!$) Unit Price	Qty (+) Quantity	NumberCables (+) Cables	Fiscal Year	Units	Start Date	Finish Date
Production	Prod$	$ 6,360.4 *									
ABC Cables	ABCCables	$ 3,144.8 *									
XO1 Cable		$ 0.0 *	CERUDF(Price, Qty)	95	400	If(Priority<PriorityLvl, 6, 0)	If(Qty=0,0,1)	2004	$	2011	2011
XO11 Cable		$ 0.0 *	CERUDF(Price, Qty)	103	800	If(Priority<PriorityLvl, 6, 0)	If(Qty=0,0,1)	2004	$	2011	2011
XO12 Cable		$ 0.0 *	CERUDF(Price, Qty)	104	850	If(Priority<PriorityLvl, 7, 0)	If(Qty=0,0,1)	2004	$	2011	2011
XO13 Cable		$ 0.0 *	CERUDF(Price, Qty)	66	400	If(Priority<PriorityLvl, 8, 0)	If(Qty=0,0,1)	2004	$	2011	2011
XO2 Cable		$ 17.6 *	CERUDF(Price, Qty)	43	375	If(Priority<PriorityLvl, 9, 0)	If(Qty=0,0,1)	2004	$	2011	2011
XO23 Cable		$ 0.0 *	CERUDF(Price, Qty)	91	1450	If(Priority<PriorityLvl, 7, 0)	If(Qty=0,0,1)	2009	$	2011	2011
XO23 J2 Cable		$ 0.0 *	CERUDF(Price, Qty)	118	650	If(Priority<PriorityLvl, 8, 0)	If(Qty=0,0,1)	2004	$	2011	2011
XO24 Cable		$ 28.9 *	CERUDF(Price, Qty)	38	525	If(Priority<PriorityLvl, 12, 0)	If(Qty=0,0,1)	2004	$	2011	2011
XO29 Cable		$ 0.0 *	CERUDF(Price, Qty)	105	1125	If(Priority<PriorityLvl, 6, 0)	If(Qty=0,0,1)	2009	$	2011	2011
XO3 Cable		$ 0.0 *	CERUDF(Price, Qty)	108	400	If(Priority<PriorityLvl, 8, 0)	If(Qty=0,0,1)	2004	$	2011	2011
XO61 Cable		$ 0.0 *	CERUDF(Price, Qty)	106	375	If(Priority<PriorityLvl, 8, 0)	If(Qty=0,0,1)	2004	$	2011	2011
XO62 Cable		$ 0.0 *	CERUDF(Price, Qty)	126	2500	If(Priority<PriorityLvl, 6, 0)	If(Qty=0,0,1)	2004	$	2011	2011
XO63 Cable		$ 0.0 *	CERUDF(Price, Qty)	127	3750	If(Priority<PriorityLvl, 6, 0)	If(Qty=0,0,1)	2009	$	2011	2011
XOGRP1 Cable		$ 0.0 *	CERUDF(Price, Qty)	48	250	If(Priority<PriorityLvl, 10, 0)	If(Qty=0,0,1)	2004	$	2011	2011
XOGRP2 Cable		$ 15.2 *	CERUDF(Price, Qty)	14	250	If(Priority<PriorityLvl, 10, 0)	If(Qty=0,0,1)	2004	$	2011	2011
J-Box 1		$ 0.0 *	CERUDF(Price, Qty)	54	16000	If(Priority<PriorityLvl, 8, 0)	If(Qty=0,0,1)	2009	$	2011	2011
J-Box 10		$ 601.3 *	CERUDF(Price, Qty)	13	72500	If(Priority<PriorityLvl, 13, 0)	If(Qty=0,0,1)	2009	$	2011	2011
*INPUT VARIABLES	*IN_VAR										
Priority Level	PriorityLvl	47.0 *	47								
CER UDF	CERUDF(a,b)		42.55 * a^.6247 * b		1000	1		2009	$		

UDF Arguments:
a = Price
b = Qty

CER

Using DECs with Matrix Type Structures

- **MatVal, MatColCol, MatColTot , COEF functions can be used similar to the MatDecVal function except they use the FY columns for the matrix rather than unique DEC columns**
- **Example – Matrix Value Function**

Mat Val (@Matrix, Row, Col)

@Matrix

This argument is a matrix of x-rows and y-columns. As with all ACE matrices, the row address @Matrix is the row preceding the actual matrix data and is just a marker for the beginning of the matrix.

Row

This argument is the matrix row where the value is stored. This argument can either be a value or a variable, but must be an integer.

Col

This argument is the matrix column where the value is stored. This argument can either be a value or a variable, but must be an integer.

Using Matrix Structures – MatVal

- **ACE Session: Cable Estimate with DECs and Matrix.aceit**
  - This is a separate model - uses quantity pricing matrix rather than government catalog system
  - Contractor A Quantity Pricing Matrix – Price based on quantity purchased
  - Used FY columns on Yearly Phasing Workscreen for matrix
  - Each of 127 cables into one of six categories
  - Added a Category DEC that ties each cable to the Quantity Pricing matrix
  - Use the Matrix Value (MatVal) function in the Price DEC to pull the price, based on the quantity of each cable to be purchased, from the matrix

Using Matrix Structures – MatVal (cont)

- **Quantity Pricing Matrix Stored in FY Columns**

*Manufacturing Representative Cable Bids Matrix				5 Unit Pricing	10 Unit Pricing	15Unit Pricing
Contractor A Quantity Pricing Matrix	PriceMatrix					
Category 1		BY	3020	35000	32000	31000
Category 2		BY	3020	3150	2900	2700
Category 3		BY	3020	17500	17250	17000
Category 4		BY	3020	6500	6250	6000
Category 5		BY	3020	5000	4250	4000
Category 6		BY	3020	4750	4500	4400

- **Use Function MatVal to retrieve price from Quantity Pricing Matrix based on quantity and category of each cable to be purchased**

WBS/CES Description	Priority (!)	Qty (+) Quantity	Price (!$) Unit Price	Cat (!) Mfg
Production				
ABC Cables				
XO1 Cable	95	If(Priority<PriorityLvl, 6, 0)	IF(Qty<10,MatVal(@PriceMatrix, 2,1),IF(And(Qty>9, Qty<15),MatVal(@PriceMatrix, 2,2),IF(Qty>=15,MatVal(@PriceMatrix, 2,3),0)))	2
XO13 Cable	66	If(Priority<PriorityLvl, 8, 0)	IF(Qty<10,MatVal(@PriceMatrix, 2,1),IF(And(Qty>9, Qty<15),MatVal(@PriceMatrix, 2,2),IF(Qty>=15,MatVal(@PriceMatrix, 2,3),0)))	2
XO2 Cable	43	If(Priority<PriorityLvl, 9, 0)	IF(Qty<10,MatVal(@PriceMatrix, 2,1),IF(And(Qty>9, Qty<15),MatVal(@PriceMatrix, 2,2),IF(Qty>=15,MatVal(@PriceMatrix, 2,3),0)))	2
XO23 Cable	91	If(Priority<PriorityLvl, 7, 0)	IF(Qty<10,MatVal(@PriceMatrix, 6,1),IF(And(Qty>9, Qty<15),MatVal(@PriceMatrix, 6,2),IF(Qty>=15,MatVal(@PriceMatrix, 6,3),0)))	6
XOGRP2 Cable	14	If(Priority<PriorityLvl, 10, 0)	IF(Qty<10,MatVal(@PriceMatrix, 6,1),IF(And(Qty>9, Qty<15),MatVal(@PriceMatrix, 6,2),IF(Qty>=15,MatVal(@PriceMatrix, 6,3),0)))	6
J-Box 1	54	If(Priority<PriorityLvl, 8, 0)	IF(Qty<10,MatVal(@PriceMatrix, 1,1),IF(And(Qty>9, Qty<15),MatVal(@PriceMatrix, 1,2),IF(Qty>=15,MatVal(@PriceMatrix, 1,3),0)))	1
J-Box 10	13	If(Priority<PriorityLvl, 13, 0)	IF(Qty<10,MatVal(@PriceMatrix, 1,1),IF(And(Qty>9, Qty<15),MatVal(@PriceMatrix, 1,2),IF(Qty>=15,MatVal(@PriceMatrix, 1,3),0)))	1
J-Box 2	29	If(Priority<PriorityLvl, 8, 0)	IF(Qty<10,MatVal(@PriceMatrix, 1,1),IF(And(Qty>9, Qty<15),MatVal(@PriceMatrix, 1,2),IF(Qty>=15,MatVal(@PriceMatrix, 1,3),0)))	1
Switch Module	11	If(Priority<PriorityLvl, 12, 0)	IF(Qty<10,MatVal(@PriceMatrix, 2,1),IF(And(Qty>9, Qty<15),MatVal(@PriceMatrix, 2,2),IF(Qty>=15,MatVal(@PriceMatrix, 2,3),0)))	2
Y201 Cable	78	If(Priority<PriorityLvl, 6, 0)	IF(Qty<10,MatVal(@PriceMatrix, 4,1),IF(And(Qty>9, Qty<15),MatVal(@PriceMatrix, 4,2),IF(Qty>=15,MatVal(@PriceMatrix, 4,3),0)))	4
Y201A Cable	62	If(Priority<PriorityLvl, 9, 0)	IF(Qty<10,MatVal(@PriceMatrix, 4,1),IF(And(Qty>9, Qty<15),MatVal(@PriceMatrix, 4,2),IF(Qty>=15,MatVal(@PriceMatrix, 4,3),0)))	4
Y202 Cable	15	If(Priority<PriorityLvl, 9, 0)	IF(Qty<10,MatVal(@PriceMatrix, 4,1),IF(And(Qty>9, Qty<15),MatVal(@PriceMatrix, 4,2),IF(Qty>=15,MatVal(@PriceMatrix, 4,3),0)))	4
Y203 Cable	81	If(Priority<PriorityLvl, 7, 0)	IF(Qty<10,MatVal(@PriceMatrix, 6,1),IF(And(Qty>9, Qty<15),MatVal(@PriceMatrix, 6,2),IF(Qty>=15,MatVal(@PriceMatrix, 6,3),0)))	6
Y3101 Cable	17	If(Priority<PriorityLvl, 13, 0)	IF(Qty<10,MatVal(@PriceMatrix, 4,1),IF(And(Qty>9, Qty<15),MatVal(@PriceMatrix, 4,2),IF(Qty>=15,MatVal(@PriceMatrix, 4,3),0)))	4
Y3112 Cable	71	If(Priority<PriorityLvl, 9, 0)	IF(Qty<10,MatVal(@PriceMatrix, 5,1),IF(And(Qty>9, Qty<15),MatVal(@PriceMatrix, 5,2),IF(Qty>=15,MatVal(@PriceMatrix, 5,3),0)))	5

- **MatVal function used to determine price in Unit Price DEC**

Use to store index data (Use with the SUMIF function)

- **ACE Session: Cable Estimate with DECs and Matrix and SUMIF.aceit**
  - Add Summary Section to summarize cost of each cable category
  - Use SUMIF function with Category DEC to summarize cost for each of the 6 cable categories

Use to store index data (Use with the SUMIF function)

- **Use the SumIf function to add together desired rows for Summary Sections**

WBS/CES Description	Approp	Unique ID	Point Estimate	Phasing Method	Category (!) Mfg Category	Equation / Throughput
Production		Prod$	$ 6,743.2 *			
ABC Cables		ABCCables	$ 3,489.4 *			
XO1 Cable	3020		$ 0.0 *	F	2	If(Priority<PriorityLvl, Price * Qty, 0)
XO11 Cable	3020		$ 0.0 *	F	2	If(Priority<PriorityLvl, Price * Qty, 0)
XO12 Cable	3020		$ 0.0 *	F	2	If(Priority<PriorityLvl, Price * Qty, 0)
XO23 Cable	3020		$ 0.0 *	F	6	If(Priority<PriorityLvl, Price * Qty, 0)
XOGRP2 Cable	3020		$ 44.6 *	F	6	If(Priority<PriorityLvl, Price * Qty, 0)
J-Box 1	3020		$ 0.0 *	F	1	If(Priority<PriorityLvl, Price * Qty, 0)
J-Box 10	3020		$ 411.9 *	F	1	If(Priority<PriorityLvl, Price * Qty, 0)
Switch Module	3020		$ 34.5 *	F	2	If(Priority<PriorityLvl, Price * Qty, 0)
Y201 Cable	3020		$ 0.0 *	F	4	If(Priority<PriorityLvl, Price * Qty, 0)
Y201A Cable	3020		$ 0.0 *	F	4	If(Priority<PriorityLvl, Price * Qty, 0)
Y202 Cable	3020		$ 57.9 *	F	4	If(Priority<PriorityLvl, Price * Qty, 0)
Y203 Cable	3020		$ 0.0 *	F	6	If(Priority<PriorityLvl, Price * Qty, 0)
Y204 Cable	3020		$ 32.9 *	F	6	If(Priority<PriorityLvl, Price * Qty, 0)
Y3112 Cable	3020		$ 0.0 *	F	5	If(Priority<PriorityLvl, Price * Qty, 0)
Cable Category Summaries			3,489.4 *			
Sum for Category 1 Cables			1,283.2 *	F		SUMIF(Category,1,@ABCCables)
Sum for Category 2 Cables			97.0 *	F		SUMIF(Category,2,@ABCCables)
Sum for Category 3 Cables			0.0 *	F		SUMIF(Category,3,@ABCCables)
Sum for Category 4 Cables			1,208.9 *	F		SUMIF(Category,4,@ABCCables)
Sum for Category 5 Cables			92.6 *	F		SUMIF(Category,5,@ABCCables)
Sum for Category 6 Cables			807.7 *	F		SUMIF(Category,6,@ABCCables)

Viewing DEC Results

- **Methodology Reports show DEC results**
  - Go to the Reports Menu and set the Report Type to Methodology
  - Each DEC Reported with two columns: Equation and Result

WBS/CES Description	NumberCables (+) Cables	Result: NumberCables	Priority (!) Priority	Result: Priority (!)	Category (!) Mfg Category	Result: Category	Qty (+) Quantity	Result: Qty (+)	Price (!$) Unit Price	Result: Price (!$)
Production		46.0						465.0		
ABC Cables		46.0						465.0		
XO1 Cable	If(Qty=0,0,1)		95	95.0	2	2.0	If(Priority<PriorityLvl, 6, 0)		,2),IF(Qty>=15,MatVal(@PriceMatrix, 2,3),0)))	$ 3.1
XO11 Cable	If(Qty=0,0,1)		103	103.0	2	2.0	If(Priority<PriorityLvl, 6, 0)		,2),IF(Qty>=15,MatVal(@PriceMatrix, 2,3),0)))	$ 3.1
XO12 Cable	If(Qty=0,0,1)		104	104.0	2	2.0	If(Priority<PriorityLvl, 7, 0)		,2),IF(Qty>=15,MatVal(@PriceMatrix, 2,3),0)))	$ 3.1
XO13 Cable	If(Qty=0,0,1)		66	66.0	2	2.0	If(Priority<PriorityLvl, 8, 0)		,2),IF(Qty>=15,MatVal(@PriceMatrix, 2,3),0)))	$ 3.1
XO2 Cable	If(Qty=0,0,1)	1.0	43	43.0	2	2.0	If(Priority<PriorityLvl, 9, 0)	9.0	,2),IF(Qty>=15,MatVal(@PriceMatrix, 2,3),0)))	$ 3.1
XO23 Cable	If(Qty=0,0,1)		91	91.0	6	6.0	If(Priority<PriorityLvl, 7, 0)		,2),IF(Qty>=15,MatVal(@PriceMatrix, 6,3),0)))	$ 4.7
XO23 J2 Cable	If(Qty=0,0,1)		118	118.0	2	2.0	If(Priority<PriorityLvl, 8, 0)		,2),IF(Qty>=15,MatVal(@PriceMatrix, 2,3),0)))	$ 3.1
XO24 Cable	If(Qty=0,0,1)	1.0	38	38.0	2	2.0	If(Priority<PriorityLvl, 12, 0)	12.0	,2),IF(Qty>=15,MatVal(@PriceMatrix, 2,3),0)))	$ 2.9
XO29 Cable	If(Qty=0,0,1)		105	105.0	2	2.0	If(Priority<PriorityLvl, 6, 0)		,2),IF(Qty>=15,MatVal(@PriceMatrix, 2,3),0)))	$ 3.1
XO3 Cable	If(Qty=0,0,1)		108	108.0	2	2.0	If(Priority<PriorityLvl, 8, 0)		,2),IF(Qty>=15,MatVal(@PriceMatrix, 2,3),0)))	$ 3.1
XO61 Cable	If(Qty=0,0,1)		106	106.0	2	2.0	If(Priority<PriorityLvl, 8, 0)		,2),IF(Qty>=15,MatVal(@PriceMatrix, 2,3),0)))	$ 3.1
XO62 Cable	If(Qty=0,0,1)		126	126.0	2	2.0	If(Priority<PriorityLvl, 6, 0)		,2),IF(Qty>=15,MatVal(@PriceMatrix, 2,3),0)))	$ 3.1
XO63 Cable	If(Qty=0,0,1)		127	127.0	2	2.0	If(Priority<PriorityLvl, 6, 0)		,2),IF(Qty>=15,MatVal(@PriceMatrix, 2,3),0)))	$ 3.1
XOGRP1 Cable	If(Qty=0,0,1)		48	48.0	2	2.0	If(Priority<PriorityLvl, 10, 0)		,2),IF(Qty>=15,MatVal(@PriceMatrix, 2,3),0)))	$ 3.1
XOGRP2 Cable	If(Qty=0,0,1)	1.0	14	14.0	6	6.0	If(Priority<PriorityLvl, 10, 0)	10.0	,2),IF(Qty>=15,MatVal(@PriceMatrix, 6,3),0)))	$ 4.5
J-Box 1	If(Qty=0,0,1)		54	54.0	1	1.0	If(Priority<PriorityLvl, 8, 0)		,2),IF(Qty>=15,MatVal(@PriceMatrix, 1,3),0)))	$ 35.0

DEC Equation

DEC Result

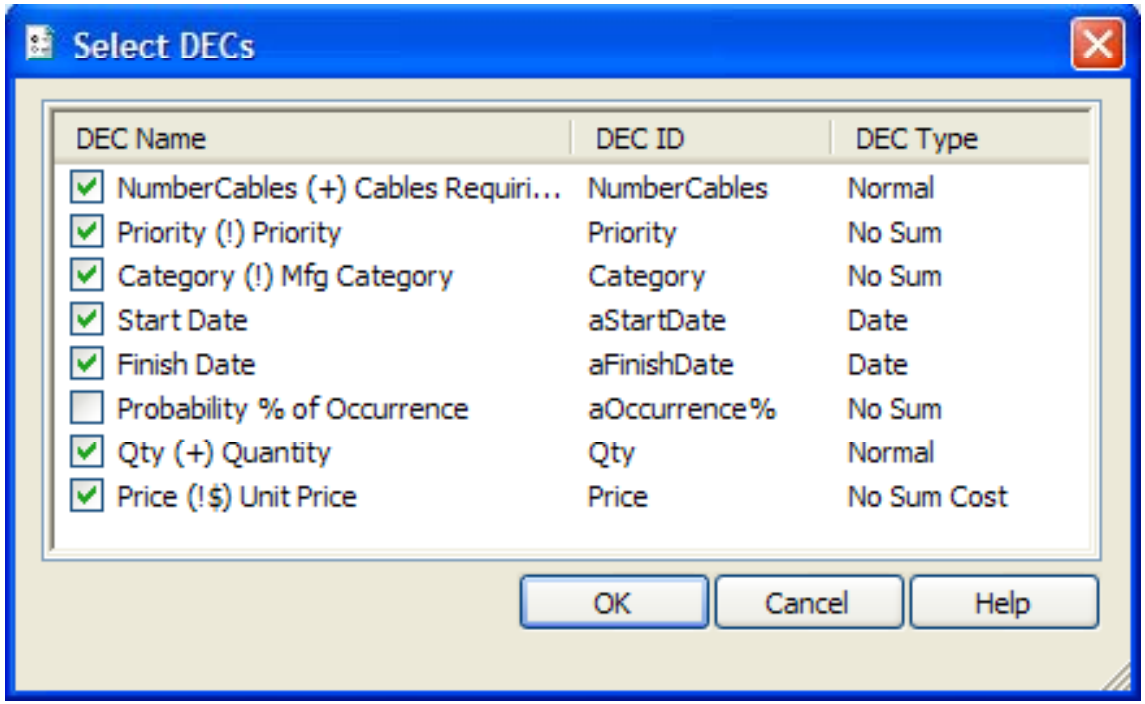
- **New ACEIT 7.2 DEC Reports**

New ACE 7.2 DEC Features

- **DEC Results can be viewed in the Inputs/Results Viewer (IRV)**
- **New optional DEC Description field to the Add New DEC and Edit DEC attributes dialogs (Edit > Add DEC)**
- **New DEC Reports shows DEC column results**

DEC Results can be viewed in the IRV

- Select DECs dialog
- Allows you to select which DEC columns to view in the Inputs/Results Viewer (IRV)
- Opens when you have selected to View > BY DEC Results from within the Inputs/Results Viewer and you select View > Select DECs from the menu



DEC Results can be viewed in the IRV (cont)

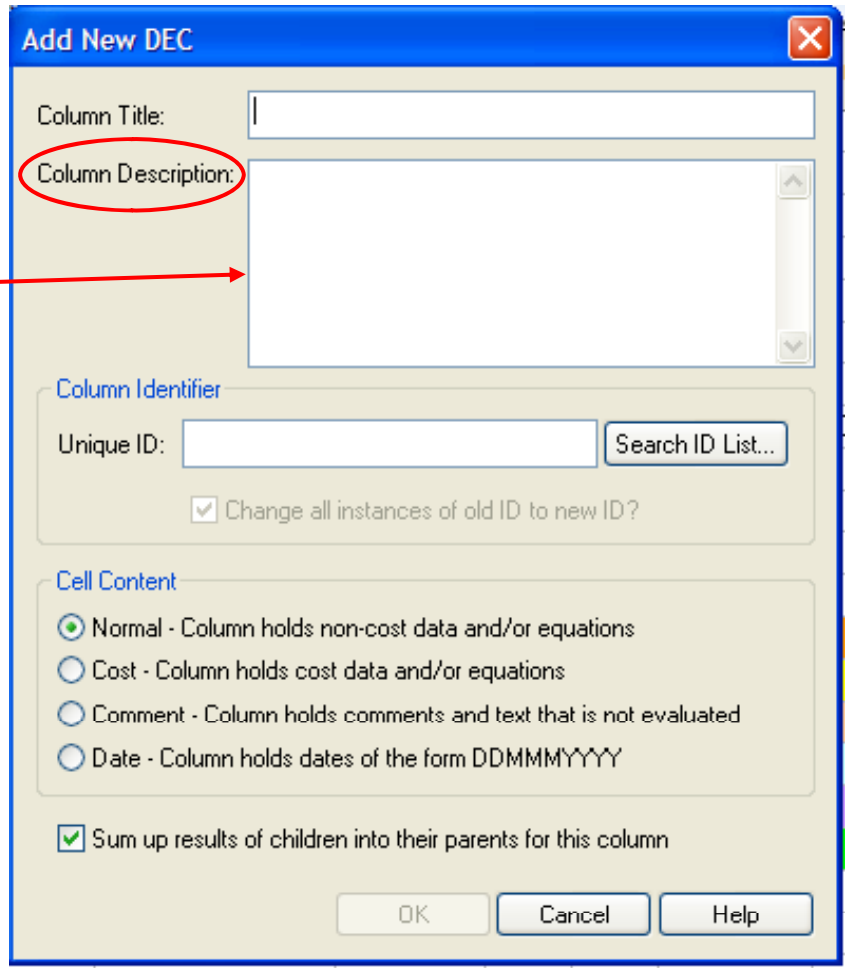
	WBS/CES Description	NumberCables (+) Cables	Priority (!) Priority	Category (!) Mfg	Start Date	Finish Date	Qty (+) Quantity	Price (!$) Unit Price
14	*ABC Cables Estimate							
15	Total ABC Cables Estimate	46.0					465.0	
16	Proposal Prep							
17	Design/Development							
18	Cable Design/Development				2010	2010		
19	Drawing Updates				2010	2010		
20	ST&E				2010	2010		
21	Program Support							
22	Contractor A Dev SE/PM				2010	2010		
23	Contractor B Dev SE/PM				2010	2010		
24	Fee							
25	Production	46.0					465.0	
26	ABC Cables	46.0					465.0	
27	X01 Cable		95.0	2.0	2011	2011		$ 3.1
28	X011 Cable		103.0	2.0	2011	2011		$ 3.1
29	X012 Cable		104.0	2.0	2011	2011		$ 3.1
30	X013 Cable		66.0	2.0	2011	2011		$ 3.1
31	X02 Cable	1.0	43.0	2.0	2011	2011	9.0	$ 3.1
32	X023 Cable		91.0	6.0	2011	2011		$ 4.7
33	X023 J2 Cable		118.0	2.0	2011	2011		$ 3.1
34	X024 Cable	1.0	38.0	2.0	2011	2011	12.0	$ 2.9

New optional DEC Description field

- **Found in the Add New DEC and Edit DEC attributes dialogs**
  - Edit > Add DEC
  - Edit > Edit Column Properties

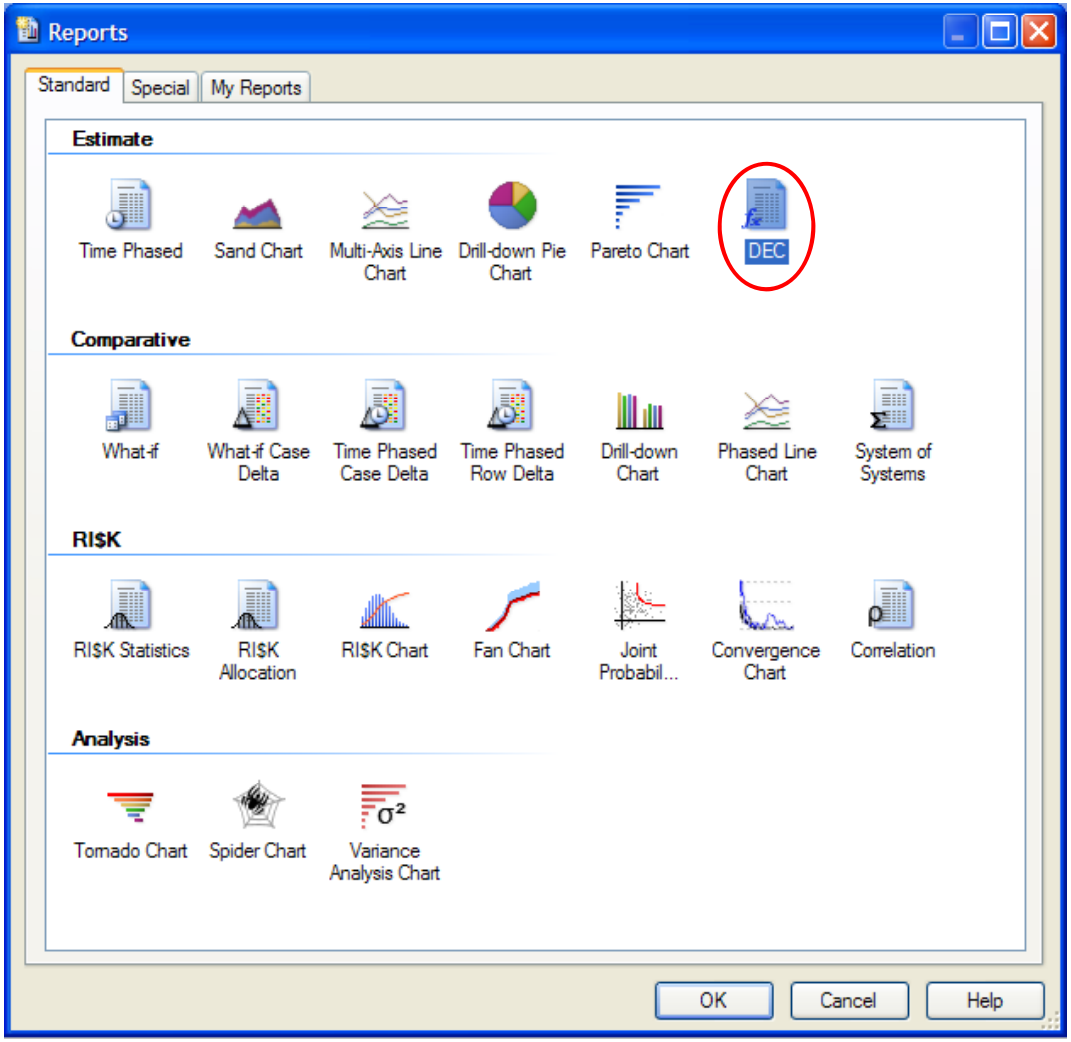
New Description Field

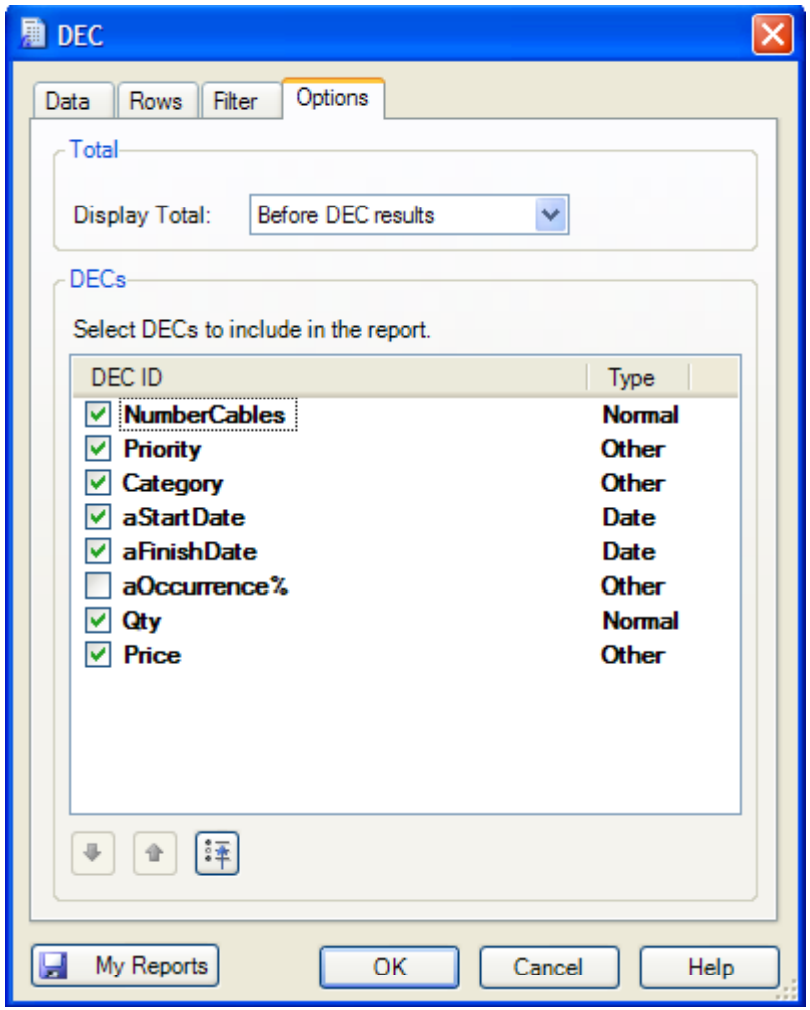
ACE 7.2 Dialog Box



New POST DEC Reports

- **POST > Reports > New > DEC**





New POST DEC Reports (cont)

- **POST DEC Report shows DEC column results**

DEC Report for Point Estimate in Final Cable Estimate with DECs Matrix and SumIF.aceit

Costs in BY2009 $K, 500 iterations

Thursday, 10 December 2009, 10:01 am

Rows | Filter | Case | DECs

DEC Results for Point Estimate

WBS, Filtered by Appropriation (3020)	Appropriation	Total	Cables Requiring Development	Priority	Mfg Category	Start Date	Finish Date	Quantity	Unit Price
Total ABC Cables Estimate	3020	$ 10,647.52							
Design/Development	3020	$ 3,562.97							
Cable Design/Development	3020	$ 345.92				2010	2010		
Drawing Updates	3020	$ 216.20				2010	2010		
ST&E	3020	$ 65.03				2010	2010		
Program Support	3020	$ 2,935.82							
Contractor A Dev SE/PM	3020	$ 1,784.64				2010	2010		
Contractor B Dev SE/PM	3020	$ 794.88				2010	2010		
Fee	3020	$ 356.30							
Production	3020	$ 6,798.71							
ABC Cables	3020	$ 3,539.31							
XO1 Cable	3020			95	2	2011	2011		$ 3.13
XO11 Cable	3020			103	2	2011	2011		$ 3.13
XO12 Cable	3020			104	2	2011	2011		$ 3.13
XO13 Cable	3020			66	2	2011	2011		$ 3.13
XO2 Cable	3020	$ 28.18	1	43	2	2011	2011	9	$ 3.13
XO23 Cable	3020			91	6	2011	2011		$ 4.70
XO23 J2 Cable	3020			118	2	2011	2011		$ 3.13
XO24 Cable	3020	$ 34.81	1	38	2	2011	2011	12	$ 2.90
XO29 Cable	3020			105	2	2011	2011		$ 3.13
XO3 Cable	3020			108	2	2011	2011		$ 3.13
XO61 Cable	3020			106	2	2011	2011		$ 3.13
XO62 Cable	3020			126	2	2011	2011		$ 3.13
XO63 Cable	3020			127	2	2011	2011		$ 3.13
XOGRP1 Cable	3020			48	2	2011	2011		$ 3.13
XOGRP2 Cable	3020	$ 45.24	1	14	6	2011	2011	10	$ 4.52

Summary

- **Exploring and learning the capabilities and features of ACEIT, such as DECs, will lead to the discovery of untapped power of ACEIT.**
- **DEC Uses Explored:**
  - Use to store and/or calculate data (quantity; price; priority; number of cables) to use in other equations, including UDFs
  - Use with matrix type structures (MatDecVal; MatVal)
  - Use as an index in functions (SumIF)
- **Data stored in DECs should be static**
- **DECs reduce the number of input variables, eliminate repetitious work, simplifies equations, increase efficiency, and decreases error**
- **View DEC Results in Methodology Report, ACEIT 7.2 POST DEC Report, and ACEIT 7.2 IRV**

Backup Slides

DEC Uses – Start Date and Finish Date

- **Start Date and Finish Date columns behave much like a DEC -- reported as a DEC -- but you cannot rename or delete the column.**
  - Equations on the same row may access the Start Date and Finish Date results using the following IDs: aStartDate and aFinishDate.
  - Equations on other rows may access the Start Date and Finish Date results using dot notation to include the unique ID of the row being referenced followed by the " . " and the DEC name aStartDate and aFinishDate (e.g. UniqueID.aStartDate).
    - This is useful because you can have schedule-like equations that link time phasing from one row to another. (UniqueID.afinishdate+30)

Using DECs with Matrix Type Structures (As Lookup Functions)

- **Matrix DEC Value function allows you to easily retrieve data from a DEC column**
  - Similar to the MatVal function except that it requires a DEC ID instead of a year index to access the result.

MatDecVal (*@Matrix, Index, @DECId*)

@Matrix

This argument is the row address of a table of values used in ACE like a matrix. The elements of the matrix are always indented one level more than the row with the unique ID.

Index

This argument is the number of rows down the matrix to access. It should be a number between 1 and the last row in the matrix.

@DECId

This argument refers to the DEC column where the value is located for row Index. The "@" tells ACE to pass in a column address.

Using DECs as Lookup Functions Example

- **Aircraft Equipment weights are stored in a DEC**
- **Average Cost/Pound is a variable**

WBS/CES Description	Unique ID	ACWt (+) Aircraft 1 Equipment Weights
Aircraft Average Cost/Pound	ACCP$	
Aircraft Equipment Data	ACEqp	
AIRFRAME	AF	1000
PROPULSION		.25 * AF.ACWt
COMM/IDENT		.10 * AF.ACWt
NAVIGATION/GUIDANCE		300
CENTRAL COMPUTER		50
FIRE CNTL SYSTEM		450
DATA DISPL & CNTLS		50
RECONN EQUIP		750
AUTO FLT CONTROLS		.20 * AF.ACWt

Some weights are factors of the Airframe Weight

- **The Equipment Cost can be calculated easily using the DEC**

WBS/CES Description	Unique ID	ACWt (+) Aircraft 1 Equipment Weights	Approp	Phasing Method	Equation / Throughput
Aircraft Equipment Data	ACEqp				
AIRFRAME	AF	1000	3010	C	ACCP$*ACWt
PROPULSION		.25 * AF.ACWt	3010	C	ACCP$*ACWt
COMM/IDENT		.10 * AF.ACWt	3010	C	ACCP$*ACWt
NAVIGATION/GUIDANCE		300	3010	C	ACCP$*ACWt
CENTRAL COMPUTER		50	3010	C	ACCP$*ACWt
FIRE CNTL SYSTEM		450	3010	C	ACCP$*ACWt
DATA DISPL & CNTLS		50	3010	C	ACCP$*ACWt
RECONN EQUIP		750	3010	C	ACCP$*ACWt
AUTO FLT CONTROLS		.20 * AF.ACWt	3010	C	ACCP$*ACWt

Same Equation goes on all rows

Using DECs as Lookup Functions Example (cont)

- Use Function MatDECVal to retrieve weight data and multiply it by the average cost/pound on a different row

WBS/CES Description	IVAL (+) Counter	ACWt (+) Aircraft 1 Equipment Weights	Approp	Unique ID	Point Estimate	Phasing Method	Equation / Throughput
* DEC Example							
Aircraft Navigation Weight (using Standard Unique ID)					300.000 *	C	NavEqp.ACWt
Aircraft Navigation Weight (using MatDecVal)	4				300.000 *	C	MatDecVal(@ACEqp, IVAL, @ACWt)
Aircraft Equipment Weights					157,500.000 *		
AIRFRAME	1		3010		50,000.000 *	C	MatDecVal(@ACEqp, IVAL, @ACWt) * ACCP$
PROPULSION	2		3010		12,500.000 *	C	MatDecVal(@ACEqp, IVAL, @ACWt) * ACCP$
COMM/IDENT	3		3010		5,000.000 *	C	MatDecVal(@ACEqp, IVAL, @ACWt) * ACCP$
NAVIGATION/GUIDANCE	4		3010		15,000.000 *	C	MatDecVal(@ACEqp, IVAL, @ACWt) * ACCP$
CENTRAL COMPUTER	5		3010		2,500.000 *	C	MatDecVal(@ACEqp, IVAL, @ACWt) * ACCP$
FIRE CNTL SYSTEM	6		3010		22,500.000 *	C	MatDecVal(@ACEqp, IVAL, @ACWt) * ACCP$
DATA DISPL & CNTLS	7		3010		2,500.000 *	C	MatDecVal(@ACEqp, IVAL, @ACWt) * ACCP$
RECONN EQUIP	8		3010		37,500.000 *	C	MatDecVal(@ACEqp, IVAL, @ACWt) * ACCP$
AUTO FLT CONTROLS	9		3010		10,000.000 *	C	MatDecVal(@ACEqp, IVAL, @ACWt) * ACCP$
Aircraft Average Cost/Pound			3010	ACCP$	$ 50.000 *		50
Aircraft Equipment Data				ACEqp	$ 157,500.000 *		
AIRFRAME		1000	3010	AF	$ 50,000.000 *	C	ACCP$*ACWt
PROPULSION		.25 * AF.ACWt	3010		$ 12,500.000 *	C	ACCP$*ACWt
COMM/IDENT		.10 * AF.ACWt	3010		$ 5,000.000 *	C	ACCP$*ACWt
NAVIGATION/GUIDANCE		300	3010	NavEqp	$ 15,000.000 *	C	ACCP$*ACWt
CENTRAL COMPUTER		50	3010		$ 2,500.000 *	C	ACCP$*ACWt
FIRE CNTL SYSTEM		450	3010		$ 22,500.000 *	C	ACCP$*ACWt
DATA DISPL & CNTLS		50	3010		$ 2,500.000 *	C	ACCP$*ACWt
RECONN EQUIP		750	3010		$ 37,500.000 *	C	ACCP$*ACWt
AUTO FLT CONTROLS		.20 * AF.ACWt	3010		$ 10,000.000 *	C	ACCP$*ACWt