



LEAD/LAG FEATURES & USE

ACEIT Users Workshop
National – Public Audience
31 January – 2 February 2010
Daniel J. Garcia, SMC/GPP (Tecolote)
Mariam M. Uzunyan, SMC/FMC





AGENDA

- **What is it?**
- **Reasons for use**
- **How to specify in ACE**
- **Examples**



WHAT IS IT?

■ Lead/Lag feature

- Allows values (costs or quantities) to be “pushed”, “pulled” or spread across a year or years based on user-specified years & percentages
 - No special “ACE coding” or functions required
- Built-in function in column in Yearly Phasing workscreen
 - Flexibility to insert column into any workscreen
- Arguments are “Year(s), Percentage(s)”
 - Years can be +/- and non-consecutive
 - Percentages must be in decimal format
 - Arguments can contain equations & variables



WHAT IS IT? (cont.)

■ Lead/Lag (continued)

- Can be applied to any row with a methodology
 - Input values
 - Calculated values
 - Beta phased rows
 - Even where there's cost improvement or Learning

**Can be specified for either inputs or calculated values as:
“year(s), percentage(s)”**



WHAT IS IT? (cont.)

■ Yearly Phasing Workscreen

- Recall – Lead/Leag column can be added to any workscreen

The screenshot shows the ACE 7.2 software interface. The title bar reads "ACE 7.2 - [Session1.aceit - Yearly Phasing (BY2011\$M)]". The menu bar includes File, Edit, View, Documentation, Calc, Cases, Reports, Tools, Window, and Help. The toolbar contains various icons for file operations and calculations. The spreadsheet area shows a table with the following columns: WBS/CES Description, Phasing Method, Approp, Lead/Lag, FY 1976, FY 1977, FY 1978, FY 1979, FY 1980, and F. The "Lead/Lag" column header is highlighted in orange and circled in red. The rows are numbered 46 through 62.

| | WBS/CES Description | Phasing Method | Approp | Lead/Lag | FY 1976 | FY 1977 | FY 1978 | FY 1979 | FY 1980 | F |
|----|---------------------|----------------|--------|----------|---------|---------|---------|---------|---------|---|
| 46 | | | | | | | | | | |
| 47 | | | | | | | | | | |
| 48 | | | | | | | | | | |
| 49 | | | | | | | | | | |
| 50 | | | | | | | | | | |
| 51 | | | | | | | | | | |
| 52 | | | | | | | | | | |
| 53 | | | | | | | | | | |
| 54 | | | | | | | | | | |
| 55 | | | | | | | | | | |
| 56 | | | | | | | | | | |
| 57 | | | | | | | | | | |
| 58 | | | | | | | | | | |
| 59 | | | | | | | | | | |
| 60 | | | | | | | | | | |
| 61 | | | | | | | | | | |
| 62 | | | | | | | | | | |



WHAT IS IT? (cont.)

■ On FY Inputs tab of Input All Form (Advanced)

The screenshot shows the 'Input All Form' window in ACEIT 7.2. The 'FY Inputs' tab is selected, displaying the 'Yearly Inputs' table. The table has columns for Year, Value, and Sunk Cost. The 'Yearly Inputs' table is currently empty. Below it, the 'Lead/Lag' table is also empty. The 'Basic' button is circled in red.

| Year | Value | Sunk Cost |
|---------|-------|-----------|
| FY 1976 | | |
| FY 1977 | | |
| FY 1978 | | |
| FY 1979 | | |
| FY 1980 | | |
| FY 1981 | | |
| FY 1982 | | |
| FY 1983 | | |
| FY 1984 | | |
| FY 1985 | | |
| Totals | 0.000 | |

| | Lead/Lag | Fraction |
|---|----------|----------|
| 1 | | |
| 2 | | |



REASONS FOR USE

■ Long lead

- Pay/fund X% of unit's cost Y year(s) before unit buy

■ “Shifting” of values as a result of

- Unit buy schedule movement, fielding lags
- Headcounts moving
- Apply and/or shift percentages
- Many others...
- Values can be costs, quantities or results of a calculation



HOW TO SPECIFY IN ACE

- **Easy!**
- **Filtered Workscreen views or Input All Form**
- **Think “year(s) shifted, percentage(s) shifted”**
 - Years can be whole years, fractional years or equations
 - %s can be whole years, fractional years or equations
 - “ $3.1415926535 / 3.1415926535, 1 / 5$ ” = “1, 0.20”
 - “ $3/2, 1/2$ ” = “1.5, 0.50”
 - “Lead_Yr, Lead_%”
 - Where Lead_Yr = 1, Lead_% = 20% (or 0.20)



■ EXAMPLES



EXAMPLE 1

■ So we're...

- Purchasing one unit
- One (1) unit costs \$100M, BY2011\$
- Full-fund in the buy year
- Long lead, 1-year prior, 25% of unit cost
- Remaining percentage in purchase year

■ How can we do that?

- Fat finger
- %-phase
- BY or TY-phase
- Lead/Lag



EXAMPLE 1 (cont.)

ACE 7.2 - [Session1.aceit - Methodology (BY2011\$M)]

Methodology

41

Session1.aceit - ...logy (BY2011\$M)

| | WBS/CES Description | Approp | Unique ID | Point Estimate | Phasing Method | Equation / Throughput | Fiscal Year | Units | Start Date | Finish Date | Lead/Lag |
|----|---------------------|--------|-----------|----------------|----------------|-----------------------|-------------|-------|------------|-------------|----------|
| 38 | | | | | | | | | | | |
| 39 | | | | | | | | | | | |
| 40 | | | | | | | | | | | |
| 41 | EXAMPLE 1 | 3600 | | \$ 100.000 * | F | 100 | 2011 | \$M | 2011 | 2011 | 1,0.25 |
| 42 | | | | | | | | | | | |

Decimal

ACE 7.2 - [Session1.aceit - Methodology (BY2011\$M)]

Methodology

41

Session1.aceit - ...logy (BY2011\$M)

| | WBS/CES Description | Approp | Unique ID | Point Estimate | Phasing Method | Equation / Throughput | Fiscal Year | Units | Start Date | Finish Date | Lead/Lag |
|----|---------------------|--------|-----------|----------------|----------------|-----------------------|-------------|-------|------------|-------------|----------|
| 38 | | | | | | | | | | | |
| 39 | | | | | | | | | | | |
| 40 | | | | | | | | | | | |
| 41 | EXAMPLE 1 | 3600 | | \$ 100.000 * | F | 100 | 2011 | \$M | 2011 | 2011 | 1, 1/4 |

Fraction



EXAMPLE 1 (cont.)

Input All Form

Title: EXAMPLE 1 Phasing Method: [v]

Unique ID: [] Replace Unique ID Phasing Wizard

Equation/Throughput: 100

Eq Builder...
CER Lib...

Summary Adjustments **FY Inputs** Learning Spread Total RI\$K DEC De [v]

Yearly Inputs

| Year | Value | Sunk Cost |
|---------|-------|-----------|
| FY 1976 | | |
| FY 1977 | | |
| FY 1978 | | |
| FY 1979 | | |
| FY 1980 | | |
| FY 1981 | | |
| FY 1982 | | |
| FY 1983 | | |
| FY 1984 | | |
| FY 1985 | | |
| Totals | 0.000 | |

Lead/Lag

| | Lead/Lag | Fraction |
|---|----------|----------|
| 1 | 1 | 1/4 |
| 2 | | |

Undo Redo Basic Close Help



EXAMPLE 1 (cont.)

BY\$ Results

ACE 7.2 - [Session1.aceit - Inputs/Results Viewer (BY2011\$M)]

BY Results | Phased by Case

200%

19

Session1.aceit - M...dology (BY2011\$M) | Session1.aceit ...ewer (BY2011\$M)

| Point Estimate | WBS/CES Description | FY 2008 | FY 2009 | FY 2010 | FY 2011 | FY 2012 | F |
|----------------|---------------------|---------|---------|-----------|-----------|---------|---|
| 19 | | | | | | | |
| 22 | | | | | | | |
| 23 | | | | | | | |
| 24 | | | | | | | |
| 25 | EXAMPLE 1 | | | \$ 25.000 | \$ 75.000 | | |
| 26 | | | | | | | |

TY\$ Results

ACE 7.2 - [Session1.aceit - Inputs/Results Viewer (TY)]

TY Results | Phased by Case

200%

23

Session1.aceit - M...dology (BY2011\$M) | Session1.aceit ...ults Viewer (TY)

| Point Estimate | WBS/CES Description | FY 2008 | FY 2009 | FY 2010 | FY 2011 | FY 2012 | F |
|----------------|---------------------|---------|---------|-----------|-----------|---------|---|
| 21 | | | | | | | |
| 22 | | | | | | | |
| 23 | | | | | | | |
| 24 | | | | | | | |
| 25 | EXAMPLE 1 | | | \$ 24.914 | \$ 75.725 | | |
| 26 | | | | | | | |



EXAMPLE 2

■ So for example 2 we're...

- Buying One (1) unit, costs \$100M, BY2011\$
- Full-fund in the buy year
- Long lead
 - 3-years prior, 20% of unit cost
 - 1-year prior, 15% of unit cost
- Remaining percentage in purchase or full fund year



EXAMPLE 2 (cont.)

ACE 7.2 - [Session1.aceit - Methodology (BY2011\$M)]

Methodology

43

3, 0.20, 1, 0.15

| | WBS/CES Description | Appr op | Unique ID | Point Estimate | Phasing Method | Equation / Throughput | Fiscal Year | Units | Start Date | Finish Date | Lead/Lag |
|----|---------------------|---------|-----------|----------------|----------------|-----------------------|-------------|-------|------------|-------------|------------------|
| 38 | | | | | | | | | | | |
| 39 | | | | | | | | | | | |
| 40 | | | | | | | | | | | |
| 41 | EXAMPLE 1 | 3600 | | \$ 100.000 * | F | 100 | 2011 | \$M | 2011 | 2011 | 1, 1/4 |
| 42 | | | | | | | | | | | |
| 43 | EXAMPLE 2 | 3600 | | \$ 100.000 * | F | 100 | 2011 | \$M | 2011 | 2011 | 3, 0.20, 1, 0.15 |
| 44 | | | | | | | | | | | |



EXAMPLE 2 (cont.)

Input All Form

Input All Form

Selected Row: 34
Goto

Move Item: [Up] [Down] [Left] [Right]
 Include Children

Title: EXAMPLE 2
Phasing Method: [Dropdown]

Unique ID: [Text] Replace Unique ID [Button] Phasing Wizard [Button]

Equation/Throughput: 100
Eq Builder... [Button]
CER Lib... [Button]

Summary Adjustments **FY Inputs** Learning Spread Total RI\$K DEC De [Dropdown]

Yearly Inputs

| Year | Value | Sunk Cost |
|---------|-------|-----------|
| FY 1976 | | |
| FY 1977 | | |
| FY 1978 | | |
| FY 1979 | | |
| FY 1980 | | |
| FY 1981 | | |
| FY 1982 | | |
| FY 1983 | | |
| FY 1984 | | |
| FY 1985 | | |
| Totals | 0.000 | |

Lead/Lag

| | Lead/Lag | Fraction |
|---|----------|----------|
| 1 | 3 | 0.20 |
| 2 | 1 | 0.15 |

Undo Redo Basic Close Help



EXAMPLE 2 (cont.)

Calculation Results

| Point Estimate | WBS/CES Description | FY 2008 | FY 2009 | FY 2010 | FY 2011 | FY 2012 |
|----------------|---------------------|-----------|---------|-----------|-----------|---------|
| 39 | | | | | | |
| 40 | | | | | | |
| 41 | EXAMPLE 1 | | | \$ 25.000 | \$ 75.000 | |
| 42 | | | | | | |
| 43 | EXAMPLE 2 | \$ 20.000 | | \$ 15.000 | \$ 65.000 | |
| 44 | | | | | | |

Utilize Lead/Lag to move costs to/across multiple and non-consecutive years!



EXAMPLE 3

■ So for example 3 we're...

- Purchasing many units over multiple years
- There is a one-year fielding lag in getting units fielded

| | FY2010 | FY2011 | FY2012 | FY2013 | FY2014 | FY2015 | FY2016 |
|-----------------------|--------|--------|--------|--------|--------|--------|--------|
| BUY SCHEDULE | 108 | 125 | 82 | 93 | 112 | 255 | - |
| FIELD SCHEDULE | - | 108 | 125 | 82 | 93 | 112 | 255 |



EXAMPLE 3 (cont.)

ACE 7.2 - [Session1.aceit - Methodology (BY2011\$M)]

Methodology

53

Session1.aceit -...logy (BY2011\$M)

| | WBS/CES Description | App rop | Unique ID | Point Estimate | Phasing Method | Equation / Throughput | Fiscal Year | Units | Start Date | Finish Date | Lead/Lag |
|----|---------------------|---------|-----------|----------------|----------------|-----------------------|-------------|-------|------------|-------------|----------|
| 50 | | | | | | | | | | | |
| 51 | BUY SCHED | | BuySched | 775.000 * | IS | [Input Throughput] | | | | | |
| 52 | | | | | | | | | | | |
| 53 | FIELDING SCHED | | | 775.000 * | F | BuySched | | | | | -1, 1 |



EXAMPLE 3 (cont.)

Calculation Results

The screenshot shows the ACE 7.2 software interface. The title bar reads "ACE 7.2 - [Session1.aceit - Inputs/Results Viewer (BY2011\$M)]". The menu bar includes File, Edit, View, Mode, Calc, Cases, Reports, Tools, Window, and Help. The toolbar shows various icons for file operations and viewing. The main window displays a table with the following data:

| Point Estimate | WBS/CES Description | FY 2011 | FY 2012 | FY 2013 | FY 2014 | FY 2015 | FY 2016 | FY 2017 | FY 2018 |
|----------------|---------------------|---------|---------|---------|---------|---------|---------|---------|---------|
| 50 | | | | | | | | | |
| 51 | BUY SCHED | 108.000 | 125.000 | 82.000 | 93.000 | 112.000 | 255.000 | | |
| 52 | | | | | | | | | |
| 53 | FIELDING SCHED | | 108.000 | 125.000 | 82.000 | 93.000 | 112.000 | 255.000 | |
| 54 | | | | | | | | | |
| 55 | | | | | | | | | |



EXAMPLE 4

■ Example 4:

- Using same *buy* schedule as Ex. 3
- Except... we're also going to assume:
 - Theoretical first unit (T1) costs \$100M, BY2011\$
 - Cost Improvement on 91% slope
 - Long lead 25% of each unit's costs 1-yr prior



EXAMPLE 4 (cont.)

Learning Workscreen

ACE 7.2 - [Session1.aceit - Learning (BY2011\$M)]

File Edit View Documentation Calc Cases Reports Tools Window Help

Learning

58

Session1.aceit - ...ning (BY2011\$M) Session1.aceit - I... Viewer (BY2011\$M)

| | WBS/CES Description | Phasing Method | Approp | Prior Qty | Buy Qty | Curve Slope | Theory | Reference Cost Type | Lead/Lag |
|----|---------------------|----------------|--------|-----------|----------|-------------|--------|---------------------|----------|
| 43 | | | | | | | | | |
| 44 | | | | | | | | | |
| 45 | | | | | | | | | |
| 46 | EXTENDED \$ | R | 3020 | 0 | BuySched | 91 | U | UC,1 | 1, 0.25 |
| 47 | | | | | | | | | |

Methodology Workscreen

ACE 7.2 - [Session1.aceit - Methodology (BY2011\$M)]

File Edit View Documentation Calc Cases Reports Tools Window Help

Methodology

46

Session1.aceit - ...logy (BY2011\$M) Session1.aceit - I... Viewer (BY2011\$M)

| | WBS/CES Description | Approp | Unique ID | Point Estimate | Phasing Method | Equation / Throughput | Fiscal Year | Units | Lead/Lag |
|----|---------------------|--------|-----------|-----------------|----------------|-----------------------|-------------|-------|----------|
| 45 | | | | | | | | | |
| 46 | EXTENDED \$ | 3020 | | \$ 51,127.348 * | R | 100 | 2011 | \$M | 1, 0.25 |
| 47 | | | | | | | | | |



EXAMPLE 4 (cont.)

Calculation Results

ACE 7.2 - [Session1.aceit - Inputs/Results Viewer (BY2011\$M)]

File Edit View Mode Calc Cases Reports Tools Window Help

BY Results Phased by Case

200%

55

Session1.aceit - M...dology (BY2011\$M) Session1.aceit ...ewer (BY2011\$M)

| Point Estimate | WBS/CES Description | FY 2010 | FY 2011 | FY 2012 | FY 2013 | FY 2014 | FY 2015 | FY 2016 | FY 2017 |
|----------------|---------------------|--------------|--------------|--------------|--------------|--------------|--------------|---------------|---------|
| 45 | | | | | | | | | |
| 46 | EXTENDED \$ | \$ 2,056.447 | \$ 8,309.321 | \$ 7,773.351 | \$ 5,563.970 | \$ 6,289.019 | \$ 9,283.866 | \$ 11,851.374 | |
| 47 | | | | | | | | | |
| 51 | BUY SCHED | | 108.000 | 125.000 | 82.000 | 93.000 | 112.000 | 255.000 | |
| 52 | | | | | | | | | |

**25% Long Lead for 108 units
Calculated on 91% Unit Learning Curve**

**25% Long Lead for 125 units +
75% Full Fund for 108 units
Calculated on 91% Unit Learning Curve**



EXAMPLE 5

- **Phasing of costs across multiple years**
- **Specify yearly percentages of values/costs**
- **Similar to % phasing method**
 - Flexibility to change utilizing variables



EXAMPLE 5 (cont.)

ACE 7.2 - [Session1 (Saved Fri Jan 14 06.41.03 2011).aceit - Methodology (BY2011\$M)]

Methodology

69 -1,0.15,-2,0.15,-3,0.20,-4,0.15,-5,0.15,-6,0.10

Session1 (Save...ogy (BY2011\$M) Session1 (Saved F...viewer (BY2011\$M)

| | WBS/CES Description | Appr op | Unique ID | Point Estimate | Phasing Method | Equation / Throughput | Fiscal Year | Units | Lead/Lag |
|-----|---------------------|---------|-----------|----------------|----------------|-----------------------|-------------|-------|---|
| 61 | | | | | | | | | |
| 69 | EXAMPLE 5 | 3600 | | \$ 100.000 * | F | 100 | 2011 | \$M | -1,0.15,-2,0.15,-3,0.20,-4,0.15,-5,0.15,-6,0.10 |
| 150 | | | | | | | | | |

Lead/Lag are entered in ordered pairs of “Year, Percentage” seperated by a comma “,”



EXAMPLE 5 (cont.)

Input All Form

Different view for multiple years

Variables can be used here too!

Selected Row: 90
Move Item: [Left] [Up] [Down] [Right]
Goto
Include Children:

Title: EXAMPLE 5
Unique ID:
Equation/Throughput: 100
Phasing Method: [Dropdown]
Replace Unique ID
Phasing Wizard
Eq Builder...
ER Lib...

Lead/Lag dialog box instructions:
Enter number of years to advance or lag your FY inputs in Lead/Lag column. A positive number (e.g., 1) shifts inputs to earlier years; a negative number (e.g., -1) shifts inputs to later years. Enter portion (0 to 1) of FY inputs to slide in Fraction column (e.g., 0.5). You may also enter variables and equations in both columns.

| | Lead/Lag | Fraction |
|---|----------|----------|
| 1 | -1 | 0.15 |
| 2 | -2 | 0.15 |
| 3 | -3 | 0.20 |
| 4 | -4 | 0.15 |
| 5 | -5 | 0.15 |
| 6 | -6 | 0.10 |

Portion Remaining in Current Year: 0.10

Eq Builder...
Add Row
Insert Row
Delete Row
OK
Cancel
Help

Lead/Lag table in main window:
1 -1 0.15
2 -2 0.15



EXAMPLE 5 (cont.)

Calculation Results

ACE 7.2 - [Session1 (Saved Fri Jan 14 06.41.03 2011).aceit - Inputs/Results Viewer (BY2011\$M)]

File Edit View Mode Calc Cases Reports Tools Window Help

BY Results Phased by Case

69

Session1 (Saved F...dology (BY2011\$M)) Session1 (Save...wer (BY2011\$M))

| Point Estimate | WBS/CES Description | FY 2010 | FY 2011 | FY 2012 | FY 2013 | FY 2014 | FY 2015 | FY 2016 | FY 2017 | FY 2018 | F |
|----------------|---------------------|---------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|---------|---|
| 69 | EXAMPLE 5 | | \$ 10.000 | \$ 15.000 | \$ 15.000 | \$ 20.000 | \$ 15.000 | \$ 15.000 | \$ 10.000 | | |



Summary

- **Enlighten on little-used, highly flexible column**

- **Many, many uses for unique Lead/Lag feature**
 - Phase values
 - Re-phase or shift values
 - Leag/Lag portions costs



THANK YOU! QUESTIONS?

Daniel Garcia
dgarcia@tecolote.com
310.536.0011 ext 195

Mariam Uzunyan
mariam.uzunyan@losangeles.af.mil
310.653.1729

