



COCOMO II / SEER

Rosetta Stone

Don Reifer

Ray Madachy

USC Center for Software Engineering

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Research Introduction

- Rosetta Stone devised in support of Army Future Combat Systems (FCS) project
 - crosscheck multiple estimation methods
- Model information from public sources
 - COCOMO II book
 - SEER User's Manual
- USC runs USC COCOMO II
- SEER runs made by the prime contractor Boeing

Rosetta Stone Purposes

- Convert COCOMO II estimate inputs into corresponding SEER inputs
- Convert SEER project data files so they can be used with COCOMO II
 - use Boeing SEER data to calibrate COCOMO II for FCS
- Understand the differences in the models so that we can understand why estimates vary



Presentation Goals

- Overview model conversion issues
- Provide examples of cost driver mappings
- Give current status of research usage

Scope and Labor Categories

- Scope of two models is almost identical
 - Some very minor differences in labor category definitions
 - Both use base of 152 hours/staff month
 - There is a major difference in how WBS formulas allocate effort
- Counting conventions
 - Do not include optional activities in estimates
 - Do not include QA and CM effort that is done outside of software organizations in estimate
 - Make sure that the base effort estimate has not been modified by the model as it allocates effort to WBS tasks

Sizing

- SEER

- Counts deleted lines
- Linear reuse model
- Adjustments made for reuse in size math
 - Based on whether designed for reuse and language level
- Permits proxy sizing
- Feature point sizing used to size COTS

- COCOMO II

- No deleted lines
- Non-linear reuse model
- Multiplier used to make design for reuse adjustments
- COCOTS used for handling COTS
 - No feature point size adjustment
- No proxies

Cost Drivers (Scale Factors)

- SEER
 - Has the following multiplier that is similar to PMAT:
 - Process Improvement
 - Driver rates impact of improvement instead of CMM level

Not comparable

- COCOMO II
 - PREC
 - FLEX
 - RESL
 - TEAM
 - PMAT

The size is raised to a power computed as the sum of the values for these factors

Scale Factor Ratings

- Must rate these factors uniquely when using COCOMO II

- Guidelines
 - Rate scale factors in COCOMO II at the project level
 - Develop default rating based on:
 - CMM level
 - Type of application involved (precedented/unprecedented)
 - Typical project of moderate size (100 KSLOC)
 - Use defaults to simplify data entry

Cost Driver Ratings

- Must convert SEER ratings to COCOMO II values for parameters that are similar
- Must rate the remaining COCOMO II drivers

- Guidelines
 - Convert similar parameters using the procedures that follow in this briefing
 - Rate the remaining COCOMO II drivers
 - If have no knowledge of projects, rate them Nominal
 - Treat the remaining drivers in SEER as a constant used to bias COCOMO II estimates to reflect SEER predictions

Cost Drivers - Product Factors

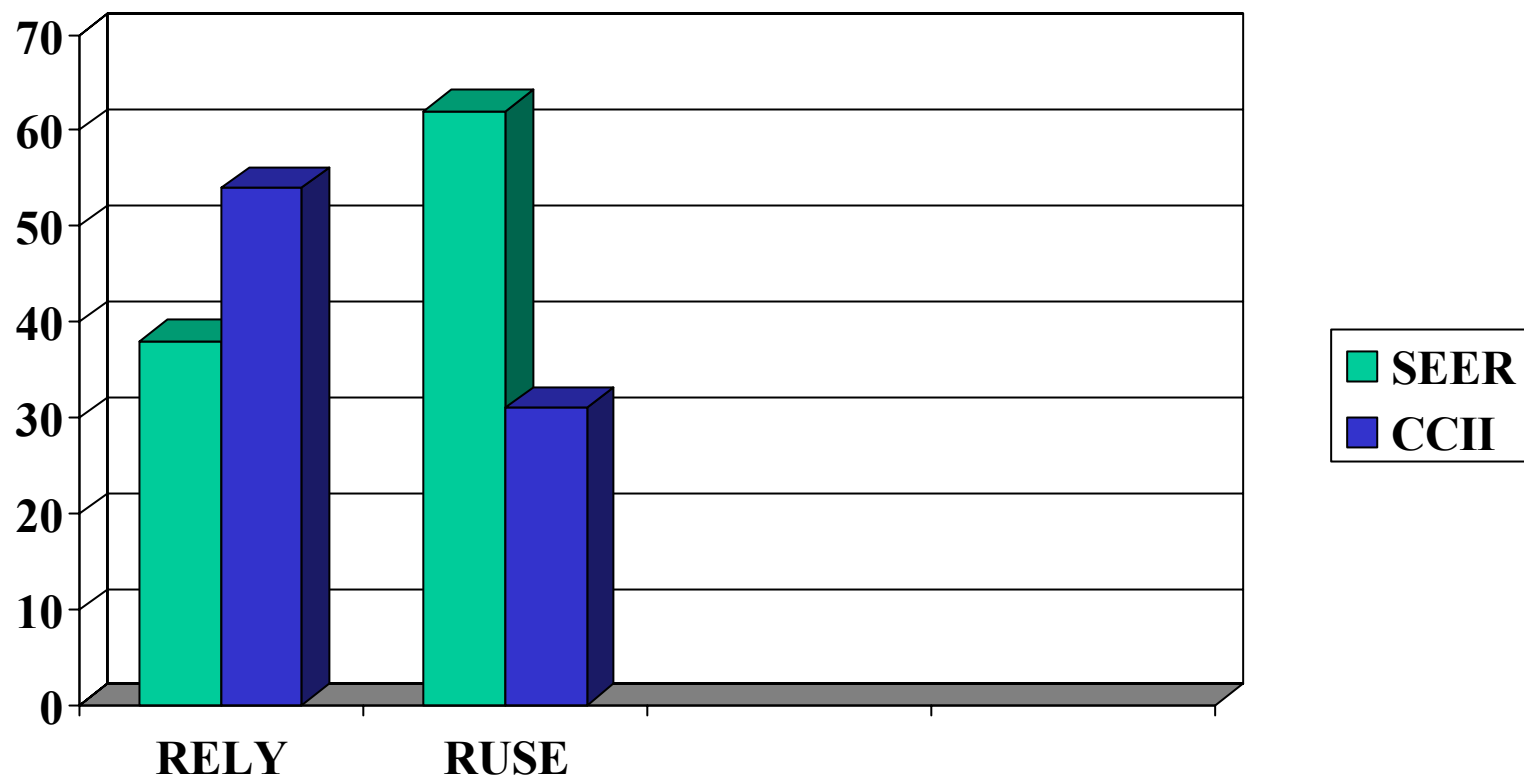
- SEER
 - Product Development Requirements
 - **Requirements Volatility**
 - **Specification Level - Reliability**
 - Test Level
 - Quality Assurance Level
 - Rehost from Development to Target
 - Product Reusability Requirements
 - **Reusability Level Required**
 - Software Impacted by Reuse

- COCOMO II
 - RELY
 - DATA
 - CPLX
 - RUSE
 - DOCU

COCOMO handles requirements volatility via size adjustments, not driver ratings



Variation in Comparable Parameters



RELY

- SEER
 - VH = public safety
 - H = major financial loss
 - N = moderate loss
 - L = easy to recover from loss
 - VL = slight inconvenience

- COCOMO II
 - VH = risk to human life
 - H = high financial loss
 - N = moderate loss
 - L = easy to recover from loss
 - VL = slight inconvenience

** Models are consistent*
** Use Table that follows to convert from one to the other*

RUSE

- SEER (2 drivers)

- Reusability Level

- XH = Across organization
 - VH = Across product line
 - H = Across project
 - N = No requirements

- Software Impacted by Reuse (% reusable)

- 100%
 - 50%
 - 25%
 - 0%-

- COCOMO II

- XH = Across multiple product lines
 - VH = Across product line
 - H = Across program
 - N = Across project
 - L = None

** Models are consistent*

**Use Table that follows to convert from one to the other*

SEER to COCOMO Conversion

- **RELY**

- VH = use 1.22 in CCII
- H = H in COCOMO II
- N = N in COCOMO II
- L = L in COCOMO II
- VL = use 0.88 in COCOMO II

- **RUSE**

- XH = XH in COCOMO II
 - 100% reuse level = 1.50
 - 50% reuse level = 1.40
 - 25% reuse level = 1.32
 - 0% reuse level = 1.25
- VH = VH in COCOMO II
 - 100% reuse level = 1.32
 - 50% reuse level = 1.26
 - 25% reuse level = 1.22
 - 0% reuse level = 1.16
- H = N in COCOMO II
- N = L in COCOMO II

Other Attributes

- Similar SEER -> COCOMO II mappings created for Personnel, Platform and Project Factors
- Mappings also devised for COCOMO II -> SEER
- Still have unique factors in both models

Current Status

- Two-way conversions have been developed for all similar factors in models
- Still analyzing differences in initial effort and schedule estimates, and reviewing assumptions
- Three estimating iterations have brought initial estimates closer
 - process anchor points useful for comparing different lifecycle variations between tools
 - next iteration will attempt to subtract out SEER-unique factors
- Strong user desire for model conversion support