

BASIC COST ESTIMATING FOR BUDGET ANALYSTS

Probably Everything You Ever
Wanted to Know About Cost
Estimating

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WHY SHOULD I CARE?

- Budget analysts execute “commitments, obligations, and expenditures”
- Obligation – the estimate of the actual amount of the cost of an item being ordered, or of authorized service. (SCEA Glossary)
- Executing and estimating are intertwined

FOUNDATION

- The estimating process generates the constant dollar requirements for the program work/cost breakdown structure ...
- Which are then time phased ...
- And inflated to then-year dollars ...
- ...
- The Budget is created

A GOOD COST ESTIMATE

- Uses Best Available Data
- Adjusts Data for Definitions, Accounting Changes, Time, Unit Number of Production
- Applies Appropriate Estimating Techniques
- Addresses Risk and Uncertainty
- Is Well Documented

DATA FOR ESTIMATING

- Market research
 - Commercial focus
- Prior DOD programs
- Current program
- Historical files

APPLES TO APPLES

- Adjust for price level changes
 - Constant Dollars
 - Then-year Dollars
 - Indices
 - Expenditure Profiles
- Adjust for quantity
 - Cost-Volume-Profit
 - Learning Curve

ESTIMATING TECHNIQUES

- Expert Opinion
 - Individual or Group
- Analogy
 - Cost of something comparable, adjusted for differences
- Parametric
 - Cost Estimating Relationships (equations)
- Engineered

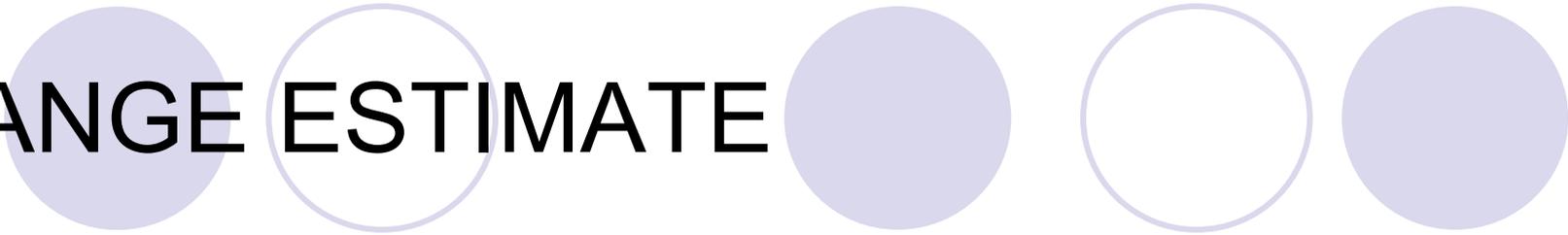
RESULT OF TECHNIQUE APPLICATION

- Point Estimate – a product of the cost estimate. Typically the sum of the most likely costs for each cost element
 - Example: most likely cost is \$1.33 M
- Point Estimate does not give a feeling for the possible dispersion of the cost

SENSITIVITY ANALYSIS

- Vary the assumptions one at a time, how much do they cause the estimated cost to change
- The estimated cost is “sensitive” to those assumptions that drive relatively significant changes

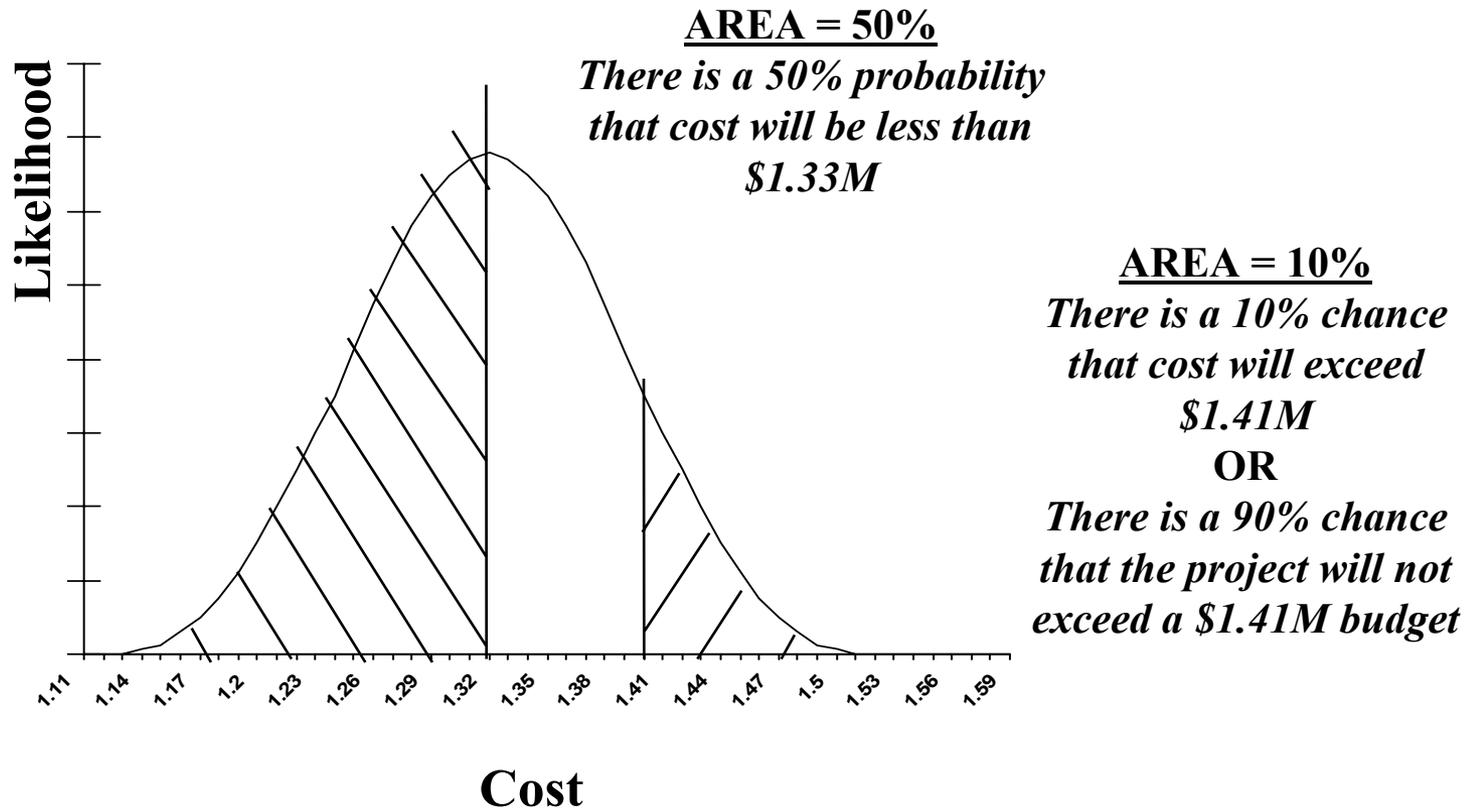
RANGE ESTIMATE



- Each cost element has a reasonable high and low value
- Add all the low values together to get a “lowest cost” value
- Add all the high values together to get a “highest cost” value
- Result – a very conservative range estimate

TERMINOLOGY

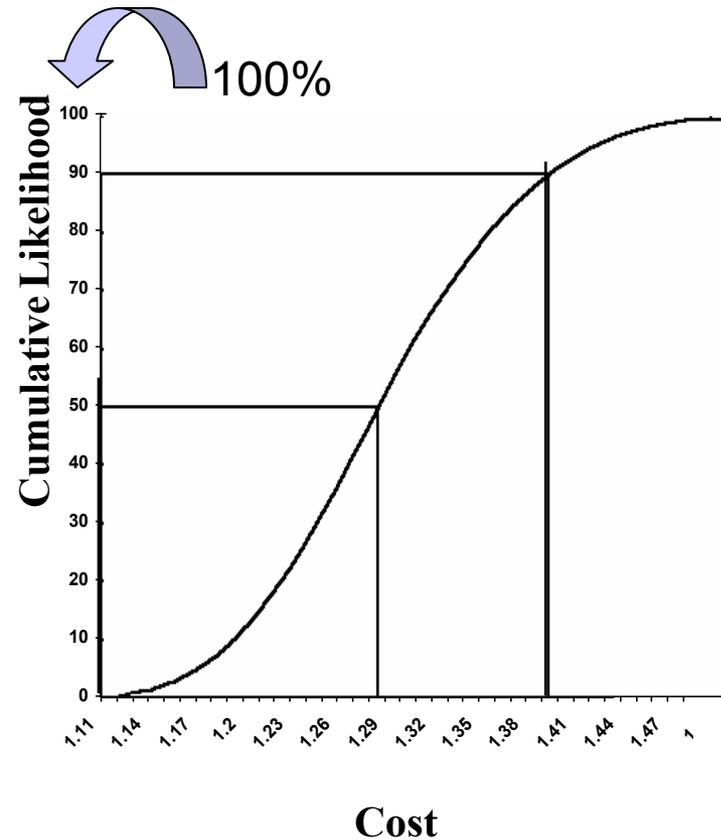
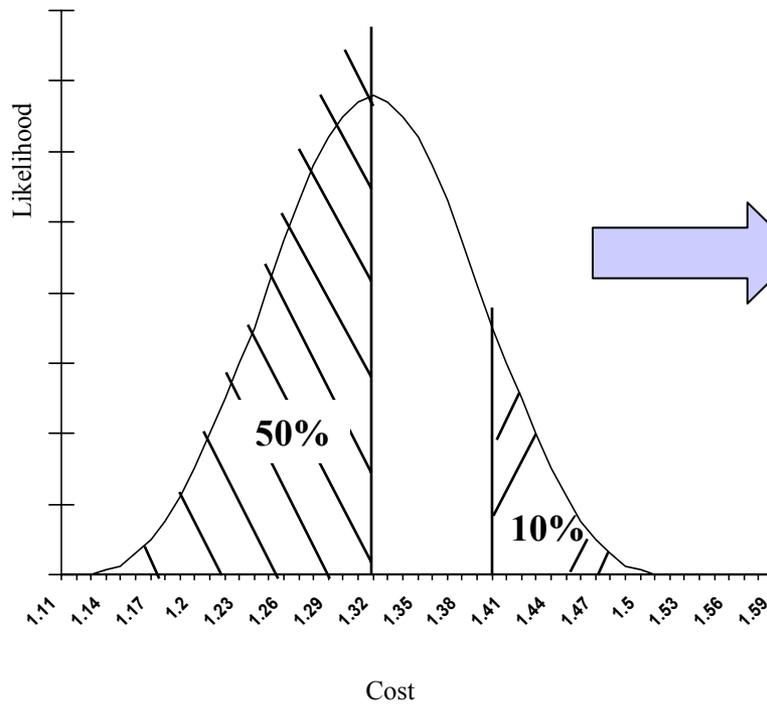
● Probability Density Function



TERMINOLOGY

Cumulative Density Function

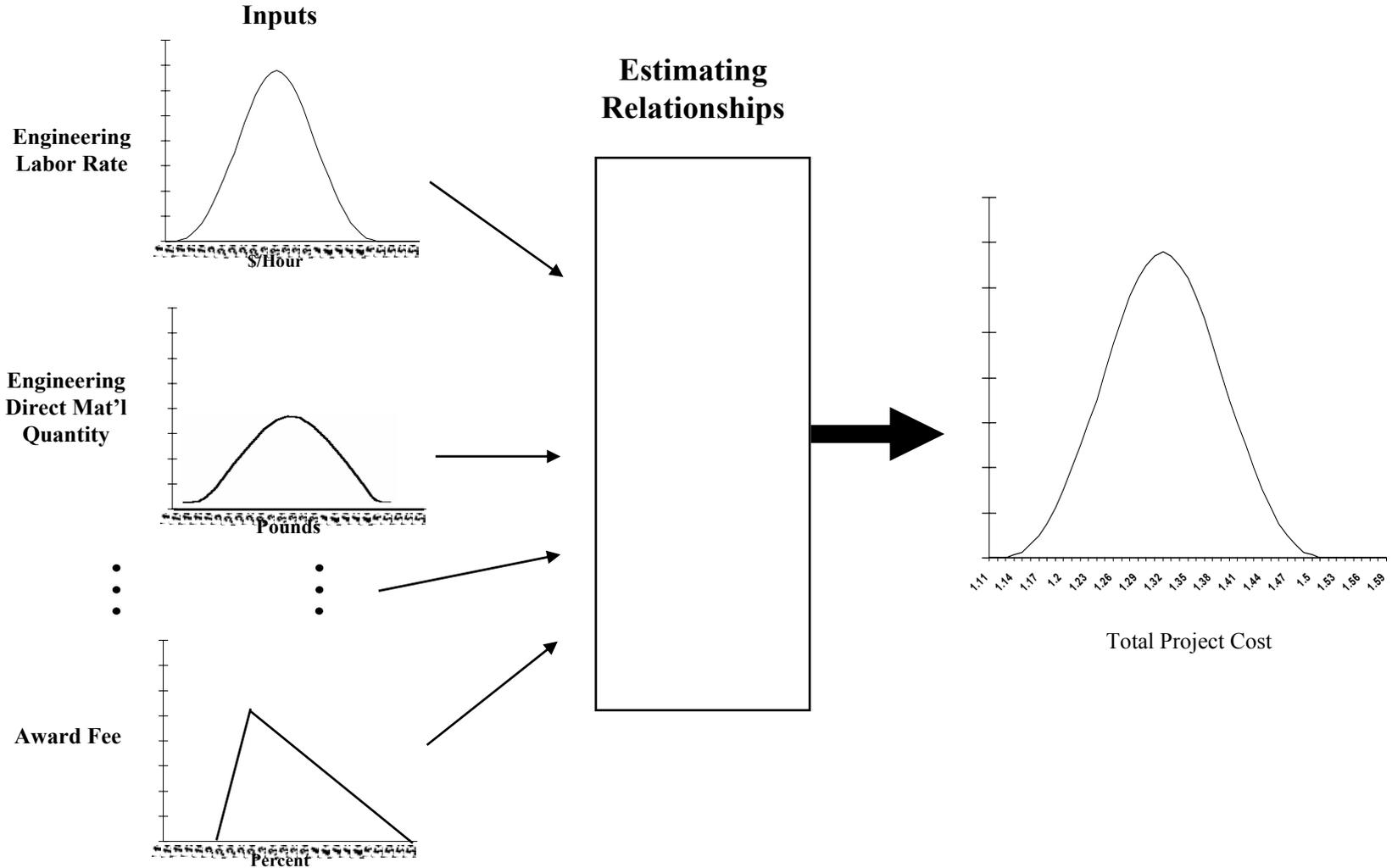
Probability Density Function



RISK AND UNCERTAINTY

- RISK – we don't know what will happen, but we know the likelihood of outcomes
 - Example: roll a pair of dice
- UNCERTAINTY – we don't know what will happen, we don't even know the likelihood of outcomes

ADDRESS RISK



TIME PHASING

- RDT&E – INCREMENTALLY FUNDED
 - Resource Requirements by fiscal year
- PROCUREMENT – FULLY FUNDED
 - Funds required to cover the total cost incurred in completing delivery of a given quantity of usable end items

DOCUMENTATION

- Idea – tracks in the sand
- For the analyst – what data was used, where did it come from, what decisions were made in the estimating process, why, alternatives considered, etc. Facilitate what-if studies.
- For other analysts – allow replication
- For the user – applicability, limitations

SUMMARY

- The cost estimating process includes:
 - Determining the elements for which estimates are needed
 - Gathering and adjusting data
 - Selecting and applying estimating techniques
 - Addressing sensitivity, risk, and uncertainty
 - Time phasing total costs over time
 - Documenting the estimates

CONCLUSION

- Anyone who works with numbers can be described as a QUANTOID
- Budget analysts, cost estimators, and cost analysts are all QUANTOIDS
- QUANTOIDS OF THE WORLD—UNITE!!
 - Cost estimators need to understand more about Budgeting (obligations, laws, bona fide need, antideficiency, color of money)
 - Budget analysts need to understand more about estimating