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Faster & Better Ways to Determine an Engineering Labor Rate for Pre-Award Development Contract Cost Estimates

Presented by ESC/FMC

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Agenda

- Scope
- CPRs vs. FPRAs
- Fully-burdened rates
- ESC study
- Conclusion

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Scope

- **Pre-RFP estimate: what is an appropriate composite engineering labor rate to use?**
  - **Multiple qualified contractors expected to bid**
  - **Some insight about specifics of the program, e.g. number of labor hours, complexity**
  - **Some insight as to which contractors likely to bid**
  - **Limited data existing from potential bidders (past CPRs & current FPRAs only)**

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Available Methods

- **Analysis of Contract Performance Reports (CPRs)**
- **Study of Forward Pricing Rate Agreements (FPRAs)**

Contract Performance Reports

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- **Strengths**
  - **Most reliable sources of primary cost data available to analysts**
  - **Elements such as change over time easily identifiable**
  - **Wealth of recent CPRs from various programs available on DCARC EVM-CR**
- **Weaknesses**
  - **Format varies from program to program and contractor to contractor**
  - **Difficulties identifying and allocating all relevant costs to a direct labor rate**

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Forward Pricing Rate Agreements

- **Strengths**
  - **Burdening statistics explicitly stated, easy to apply**
  - **Figures are presented for various years into the future**
  - **Easily attainable via DCARC, DCMA Help Desk, local organizations**

- **Weaknesses**
  - **Only large contractors have FPRA negotiated with Government**
  - **Rates are subject to change**
  - **Most accurate in near term**
  - **Difficult to determine proper mixing of labor categories**

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Why Use FPRAs?

- **Format of CPRs can lead to many problems, likely errors**
- **FPRAs are easier to read, understand and apply; ultimately can lead to more accurately estimating rates in a shorter timeframe than CPRs**

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Formulating a Fully-Burdened Labor Rate

- **FPRAs provide analysts with all relevant information to devise a fully-burdened labor rate**

- **$LR_{Bur}=LR_{Dir}+(LR_{Dir}*OH)+(LR_{Dir}*GA)$, where**
  - **LR_{Bur} is the fully-burdened (loaded) labor rate**
  - **LR_{Dir} is the direct labor rate**
  - **OH is the overhead burdening rate (expressed as a decimal)**
  - **GA is the general and administrative costs burdening rate (expressed as a decimal)**

Fully-Burdened Rate Example

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	2009 Labor	2010 Labor	2011 Labor
Jr. Engineer	$40.00	$46.00	$50.00
Engineer	$50.00	$56.00	$60.00
Sr. Engineer	$65.00	$71.00	$74.00
O/H Burden	130%	128%	127%
G&A Burden	20%	19%	21%

Using 2010 data for a Sr. Engineer:

$$LR_{Bur}=LR_{Dir}+(LR_{Dir}*OH)+(LR_{Dir}*GA)$$
$$LR_{Bur=}71+(71*1.28)+(71*0.19)$$
$$LR_{Bur}=\$175.37$$

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ESC Labor Rates Study

- **ESC/FMC undertook effort to study best practices for labor rate formulation based on FPRAs**
- **Two datasets compiled**
  - **FPRA set gathered from DCARC and inputs from ESC organizations**
    - 14 FPRAs representing 5 contractors, 39 total observations, lognormal distribution
  - **Actual rates gathered from ESC organizations' inputs**
    - 27 total observations. One datapoint excluded as it was an extreme outlier representative of a sole-source environment on a highly specialized platform.
- **Primary challenge: Determining rate that accounts properly for labor/skill mixing**

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Comparison of Summary Statistics

	FPRA Set	Actuals Set
Mean	$130	$140
Median	$120	$145
Minimum	$65	$85
Maximum	$220	$200

- **In comparing the summary statistics of each group the major flaw of the FPRA is revealed: the aggregation of FPRA data does not accurately account for labor skill mixing**
  - **FPRA data clearly weighs too heavily the rates of junior-level laborers**
  - **Typically used method of applying mean or median of FPRA dataset flawed**

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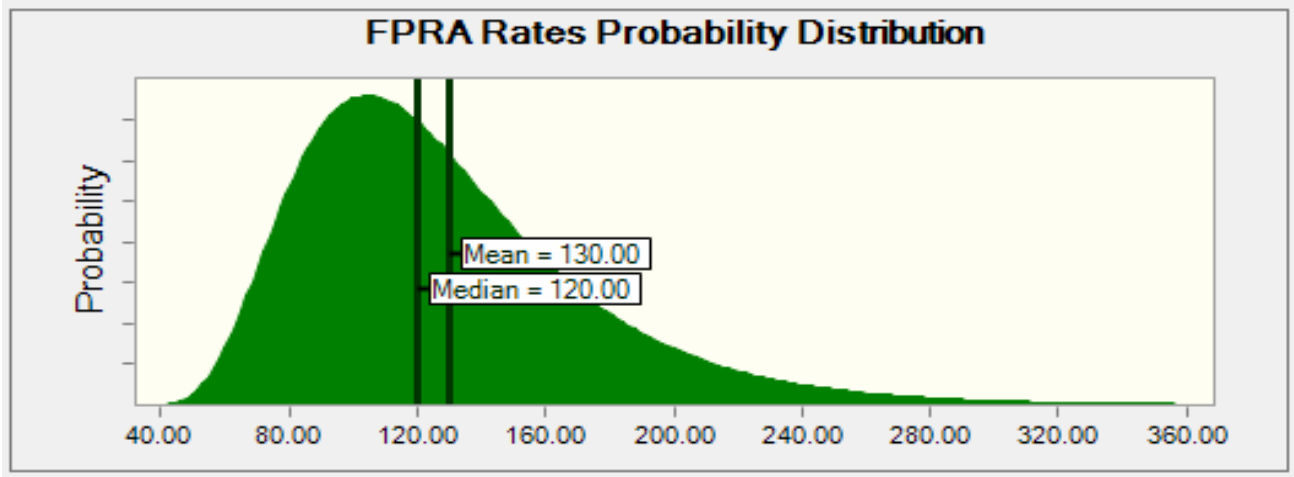
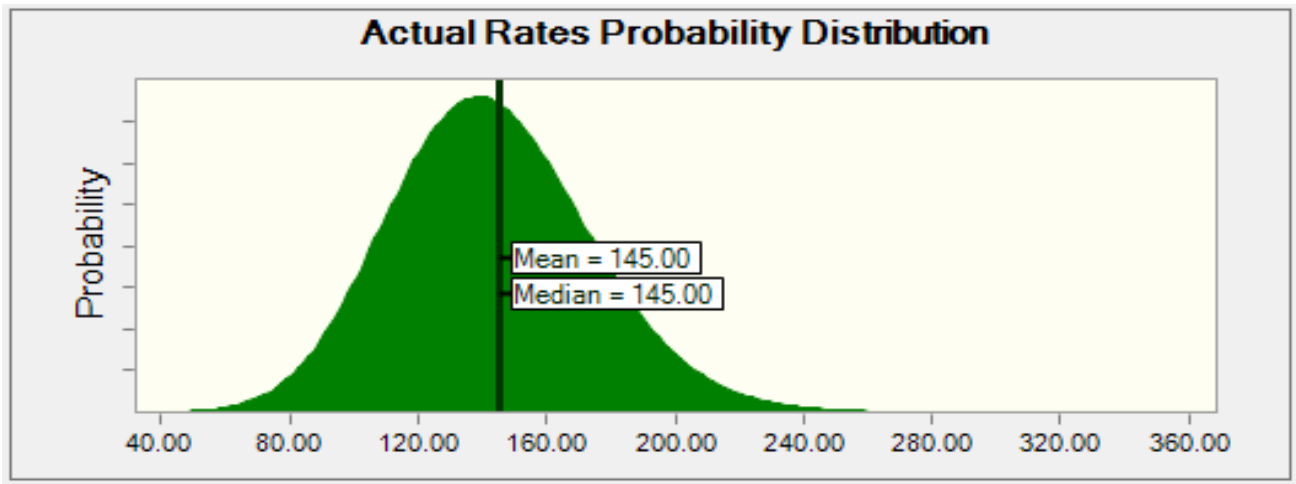
Comparison Cont.





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Correcting the Labor Skill Mixing Problem

- **Different statistical method must be applied to the dataset**
- **63rd percentile of the FPRA dataset has been found to be the closest match to the mean of the actuals, a statistic which inherently incorporates skill mixing**
- **Easy to calculate using Microsoft Excel**

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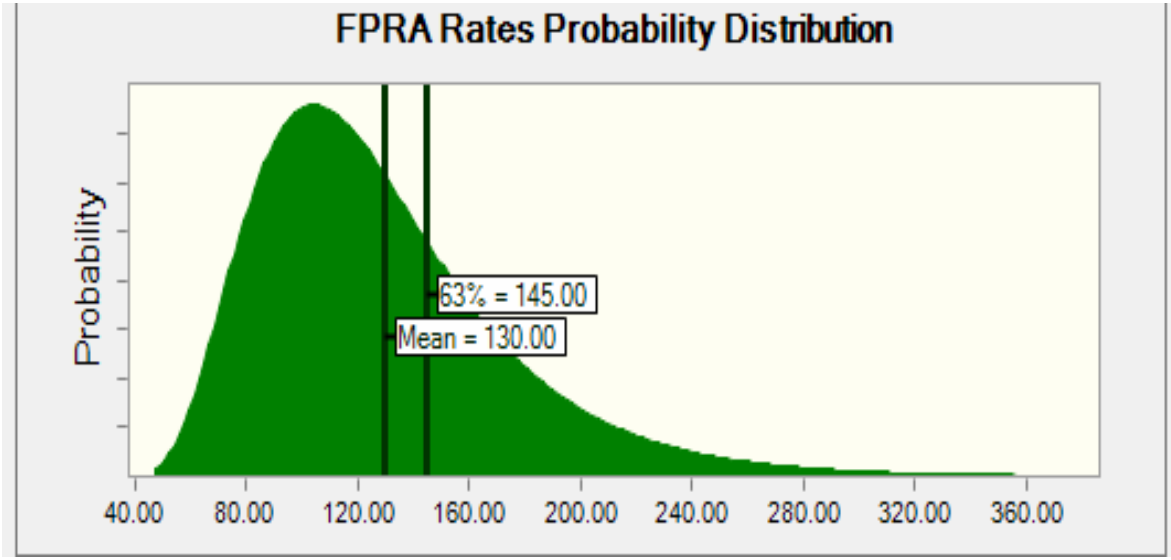
FPRA Mean vs. FPRA 63d



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Limitations

- **Limited dataset**
- **Reliance on local program offices to provide data**
- **Analysis only done on composite engineering data, did not study whether practices would be applicable for other labor categories**
- **Devised as a better alternative to current methods being used— but still not to be a perfect approach!**

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Conclusion

- **Better methodologies exist for estimating labor rates based on FPRAs**
  - **63rd percentile method allows for up to 15-20% more accuracy compared to using mean or median against several ongoing programs**
- **Use intuition: when something looks wrong, it probably is; question it!**

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Special Thanks

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Questions?