

# FEMA's Comparative Analysis

**J. David Duffer**

**Federal Emergency Management Agency**

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# Panel Tasking

- Q1 – Does FEMA’s CEF parallel the ASPE Level 3 (L3) estimating approach?
- Q2 – Would CEF (at L3) provide a level of confidence that meets the ASPE L5 ( $\pm 10\%$ ) floor and ceiling thresholds selected by the panel?



# Introduction

- Accuracy of an estimate is governed by:
  - Clear definition of the scope-of-work
  - Level of completion of A&E effort
  - Estimating technique employed
  - Skill of estimator / team



# CEF Part A

- Part A – Construction Costs



# CEF Parts B - E

- Part B – General Requirements
- Part C – Design and Construction Cost Contingencies
- Part D – Overhead & Profit
- Part E – Escalation



# CEF Parts F - H

- Part F – Plan Review and Permits
- Part G – Owners Reserve
- Part H – Management & Design Costs



# When are the factors used?

CEF Part	Nature of costs used in Part A			
	Complete	Bid	Local	Means
A	-	-	-	Y
B	-	-	-	Y
C	-	-	-	Y
D	-	-	-	Y
E	-	-	Y	Y
F	-	Y	Y	Y
G	-	Y	Y	Y
H	Y	Y	Y	Y



# ASPE Estimating Procedures

- Level 1 – Order of Magnitude Estimate
- Level 2 – Schematic Design Concept
- Level 3 – Design Development (25%)
- Level 4 – Project Control (75%)
- Level 5 – Construction Documents (90%)
- Level 6 – Bid Documents



# Findings - Q1

- Does FEMA's CEF parallel the ASPE Level 3 (L3) estimating approach?
- Yes, the CEF process does parallel the ASPE L3 process, both in:
  - level of contingency, e.g., design phase scope contingency, and
  - type and level of design documentation



# Design Phase Scope Contingency

- Comparison of four estimating methods and their contingencies at different design stages:

Stage	CEF	BCH	DOE	AACE
Preliminary Engineering Analysis	15 to 20%	10 to 15%	15 to 25%	+25 / - 15%
Working Drawing Stage	2 to 10%	2 to 7%	5 to 15%	+10 / - 5%



# Type of Design Documentation

## ■ Similarities...

### ASPE L3 Requirements

General site description

Preliminary structural design

Site dimensions

Elevations

Roads

Impounds & fences

General arrangements

Architectural construction

### CEF Guidelines

Site map or location plan

Photographs and sketches

Measurements & calculations

Applicable codes & standards

Schematic drawings, plans



# Type of Design Documentation

## ■ Differences...

### ASPE L3 Requirements

Applicable for all size projects

Named plans or drawings:

- Preliminary building equipment
- Soil bearing condition
- Preliminary plumbing
- Preliminary mechanical
- Preliminary electrical

### CEF Guidelines

Applicable for large projects

(>\$50,600 FY 2001)

Other data sources:

- “As-built” plans
- 406 hazard mitigation proposals
- Force account summary sheets



# Work Type versus Accuracy

- Repair Work
- Other Discrete Work Elements
- Retrofit / Upgrade
- Hazard Mitigation
- New Construction

**HIGHER**



**LOWER**



# Category of Projects and % Permanent Work

■ Cat. C - Roads & Bridges	57%
■ Cat. D - Water Control Facilities	6%
■ Cat. E - Buildings & Equipment	16%
■ Cat. F - Utilities	12%
■ Cat. G - Parks, Recreation & Other	9%



# Findings Summary - Q1

- Does FEMA's CEF parallel the ASPE Level 3 (L3) estimating approach?
- Yes, similar requirements and only minor differences. Key points:
  - Itemized base costs (CEF Part A)
  - Confidence in Part A - use of factors
  - Risk to applicant depends on type of work and availability of applicant supplied information



# Findings - Q2

- Would CEF (at L3) provide a level of confidence that meets the ASPE L5 ( $\pm 10\%$ ) floor and ceiling thresholds selected by the panel?
- Under post disaster conditions, a CEF estimate will compare favorably with the other cost estimating methodologies (depicted at slide 10), and produce an estimate of approximately the same magnitude and confidence level.



# Ensuring Level of Confidence

- The following actions could provide a higher level of confidence that actual project costs will fall closer to the target thresholds:
  - Clear definition of the scope-of-work
  - Increased applicant participation (team approach to estimating)
  - Refine the project qualification criteria to include all large permanent work projects



# Ensuring Level of Confidence

## ■ Actions (continued)

- Update the CEF Instructional Guide to include lessons learned in the field
- Expand DFTO CEF Training for Cost Estimators to include PAO, PAC's, and PO's
- Measure the performance of CEF to the 10% floor and ceiling thresholds by all of an applicant's large permanent work projects, rather than by a single project



# Questions and Comments



# Engineering and Design Services (Curves A & B) Status

- **1975** - ASCE originally published curves A and B in Manual 45 that is entitled, "Consulting Engineering: A Guide for the Engagement of Engineering Services"
- **1982** - nationwide survey of A&E firms performed to update the curves
- **1988** - 2<sup>nd</sup> edition of Manual 45 published
- **1996** - 3<sup>rd</sup> edition of Manual 45 published
- **2001** - ASCE Committee on Professional Practice meeting in San Antonio, TX



# Questions and Comments



# Recommendation Report

## ■ Development

- Foreword
- Introduction
  - ◆ curriculum vitae of each Panel member
- Charter and Duties



# Recommendation Report (continued)

## ■ Development

- Executive Summary (establish tone)
  - ◆ estimating business practices and discuss design contingencies, etc.
  - ◆ level of effort put into CEF and its germaneness to the PA Program
  - ◆ GAP background and early-CEF development during the Northridge Earthquake



# Recommendation Report (continued)

- Development

- Executive Summary (continued)

- ◆ ASCE Independent Peer Review of CEF developed during the redesign of the PA Program



# Recommendation Report (continued)

## ■ Development

### ➤ Recommendations

- ◆ recommended cost estimating methodology
- ◆ the level of technical expertise required to uniformly apply it
- ◆ the type of training guidance to make available to users to maximize its' accuracy and national applicability
- ◆  $\pm 10\%$  floor and ceiling thresholds



# Recommendation Report

- Development

- Appendices

- ◆ activities and accomplishments
- ◆ charter of the Expert Panel
- ◆ others (meeting notes and appendices, etc.)?

