Cost Estimating Format (CEF) for Large Projects

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Introduction - Peer Review

- The CEF is a standardized format for estimating the cost of large projects.
- Developed as a result of the Northridge Earthquake recovery effort.
- The CEF received a peer review by the American Society of Civil Engineers (ASCE) in the spring of 1998.
During the redesign of the Public Assistance Program, FEMA developed a scope of work for the conduct of an independent peer review, to determine if:

- the CEF is adequate for use nationally;
- the risk for the estimating methodology is low enough to pass on to the applicant in a disaster environment;
- if the two items above are not true, what revisions to the CEF are required to make the CEF usable nationally;
Peer Review Focus (additional items)

- What technical expertise is required to correctly apply the CEF system?
- What level of system maintenance is required to maximize the accuracy of the CEF?
- What level of training and written guidance is required to maximize the accuracy of the CEF?
- What level of public education is necessary to have the CEF system accepted by applicants?
Three professional organizations were solicited to respond to the scope of work.

ASCE was selected to conduct the peer review because of its responsive proposal within the specified time limits.

ASCE provided a three-person review Committee.
Peer Review Committee

- Thomas D. Wosser, P.E., Chairman
  - Structural Engineer and Senior Principal
  - Degenkolb Engineers,
  - San Francisco, CA

- Thomas E. Cooper, P.E., Ph.D.
  - Associate Professor, Auburn University

- G. E. “Jim” Mulford, P.E., Cost Engineer
  - HQ, US Army Corps of Engineers,
  - Washington, D.C.
Peer Review Process

- Began February 3, 1998 with a series of joint FEMA/TAC/Committee meetings.
- Continued with independent work by the Peer Review Committee.
- Ended with submission of the final peer review report dated April 24, 1998.
ASCE concluded that the CEF will:

- Be adequate for use nationally;
- Provide a methodology with a risk low enough to be assumed by the applicants;
- Meet the requirements of items 1 & 2 upon incorporating comments presented by the Committee;
- Require a high level of expertise with a well-qualified Project officer and supporting staff.
Peer Review Recommendations

- Consolidate the two separate, but parallel systems into a single CEF program –
  - completed for all categories of permanent work;

- Clarify the scope of the CEF –
  - new training and guidelines have been adopted in-line with the ASCE recommendations;

- Designate the Project Officer (PO) as being responsible for the determination of the total project cost –
  - under the redesigned PA program this responsibility resides with the PO.
The CEF in Detail

- The purpose of CEF
- The components of CEF
- CEF application during project formulation
- When is the CEF appropriate for a project?
Background

- Inadequacies of the PA Program Large Project estimating process
  - Damage Survey Reports
  - Northridge

- Improvements
  - Grants Acceleration Program
  - Project Formulation Process
CEF is . . .

- An Excel™ spreadsheet for:
  - Organizing items of work
  - Applying factors
  - Deriving a cost estimate
  - Summarizing a cost estimate

- An uniform method for preparing estimates

- A forward-pricing tool
CEF is not . . .

- An “expert” system
- A shortcut to developing good estimates
- A replacement for professional cost estimating expertise
Advantages of CEF

- Provides a uniform means of estimating
- Greater degree of applicant confidence
- Conducive to more effective project management
- Reduced FEMA administrative costs
Future Goal

Use as a final cost settlement instrument
Introduction - Cost Estimating Format (CEF) for Large Projects

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Project Formulation

- Qualify project for CEF
- Develop damage description
- Develop scope of work
- Identify unit cost data
- Complete CEF Spreadsheet
- Complete Project Worksheet
- Project approval and obligate funds
Application Criteria

- Large projects
- Permanent work (Categories C-F)
- Eligible work
- Project less than 50 percent complete
- 4+ months to reach 90 percent project completion
CEF Spreadsheet Components

- CEF Fact Sheet
- Part A (base costs only)
- Summary of Completed Work
- Summary of Uncompleted Work
- Total Project Summary
- CEF Notes
EF Spreadsheet Capabilities

- Categorizing work
- Manipulating Part A
- Assigning factors
- Adding subtotals
- Links between spreadsheets
Project Worksheet Documentation

- Damage description and scope of work
- Photographs, maps, plans, specifications
- Permits and clearances
- Special Considerations
- CEF spreadsheet
- Cost summary sheets
The Project Worksheet

- Completed by Project Officer

- Components
  - damage description and scope of work
  - work activities
  - itemized unit costs
  - project related b/u information

- Submitted to PAC with supporting documentation
Sources of Eligibility Criteria

- Stafford Act
- 44 CRF:
  - Part 206: PA Program eligibility
  - Part 13: Allowable costs
- FEMA policies
Eligibility Criteria for Scope of Work

- Basic eligibility criteria
  - Damage must be disaster-related
  - Restoration to pre-disaster condition

- Improvements may be eligible as:
  - codes and standards upgrades
  - hazard mitigation

- Scope does not include ineligible items of work
Scope of Work (continued)

An eligible facility must:

- be the responsibility of an eligible applicant
- be located in a designated disaster area
- not be under the specific authority of another Federal agency
- be in active use at the time of the disaster
Damage Description and Scope of Work Components

- Location
- Damage cause and description
- Damage dimensions
- Scope of work to repair damage:
  - Work items
  - Dimensions and quantities
EF Parts

A  Scope of Work
B  General Requirements
C  Cost Contingencies
D  GC’s Overhead / Profit
E  Cost Escalation
F  Plan Review, Permits and Fees
G  Reserve for Change Orders
H  Project Management / Design
Completed versus Uncompleted Work

Permanent versus Non-permanent Work
Stages of Completion

- No work completed
- A&E report available
- Bid/contract available
- Partially completed work
Type of work

- Repair
- Retrofit
- New Construction
- Hazard Mitigation
- Other
Construction Cost Estimating

CSI Division 1 – General Requirements

OWNERS’ RESERVE FOR CHANGE ORDERS

WORK-IN-TRADES

Div. 2 - Site Work
Div. 3 - Concrete
Div. 4 - Masonry
Div. 5 - Metals
Div. 6 - Carpentry
Div. 7 - Moisture Control
Div. 8 - Doors, Windows, Glass
Div. 9 - Finishes
Div. 10 - Specialties
Div. 11 - Equipment
Div. 12 - Furnishings
Div. 13 - Special Construction
Div. 14 - Conveying Systems
Div. 15 - Mechanical
Div. 16 - Electrical

OWNER’S SOFT COSTS
A&E, Permits, Plan Review, Project Management
Organize by CSI Division

Components include:
- Description and code
- Quantity and units
- Unit price
- City adjustment factor
CEF, Organizing Part A (continued)

- Low bids or construction contracts
- Force account costs
- Local unit cost information
- R.S. Means Company, Inc. cost data
- FEMA Cost Codes
- USCOE Cost Information
- Other commercial cost estimating sources as approved by the PAO
Analyzing Unit Cost Data

- In-place costs
- Overhead and profit
- Union and non-union rates
- Disaster-related changes
- Lump sum items
- City adjustment factor
EF, Part B - General Requirements

- Safety and security measures
- Temporary services and utilities
- Quality control
- Submittals
- On-site project management
EF, Part C - Cost Contingencies

- Level of design work completed
  - preliminary engineering analysis
  - working stage drawing
- Facility or project “constructability”
- Site access, staging, and storage
- Economy of scale
CEF, Part D - GC’s Overhead & Profit

- Home office overhead
- Insurance and bonds
- Profit
Duration of:
- Design
- Bid/award
- Construction

Midpoint of uncompleted construction
Plan review fees

Construction permit fees

Fee waivers
The applicant controls the reserve

It is for approved changes to eligible scope of work

Incidental costs incurred after construction contract award

Not used for:
- Upgrades
- Ineligible work
Applicant’s project development and management costs throughout the design and construction phases for:

- Managing the design process
- Basic design and inspection services normally performed by an A&E firm
- Managing the construction phase (third party or in-house)
Force Account

- If work is force account: adjust factors
- If combination of contract and force account: prepare separate Part A’s
- Lack of information: assume contract work
Must be eligible, cost effective, feasible

For cost-benefit analysis:
- Use construction costs (Part A) only

After approval:
- Add mitigation items to Part A
- Run CEF to determine final estimate
Improved Project

- Restoration to pre-disaster design is eligible
- Cost of improvements borne by applicant
- Prepare Part A without improvements
- Run CEF to determine final estimate
- Grant capped at final estimate amount
Alternate Project

- Restoration to pre-disaster design is eligible
- Applicant may request alternate project
- Prepare Part A for eligible work only
- Run CEF to determine final estimate
- Grant capped at 75% of Federal share of the estimate (a 25% reduction of FEMA funding from original project estimate - excepting for publicly-owned facilities with unstable soils at the original site, then FEMA funding reduced by 10%).
- Excess costs borne by applicant
Repair Versus Replacement

- If repair >50% of replacement cost, replacement is eligible
- Repair: does not include current codes/standards
- Replacement: pre-disaster design using current codes/standards
- Comparison: use construction costs (Part A) only
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