Revised January 2001

# PART 9

## COST ENGINEERING BRANCH

## TABLE OF CONTENTS

The following guidelines are provided and shall be followed in the preparation of the construction cost estimates for Baltimore District Corps of Engineers.

I. GENERAL:

A. Cost Estimates will be prepared using the MicroComputer Aided Cost Estimating System (MCACES). MCACES for Windows, Ver. 1.2, is the estimating software package for use on IBM compatible microcomputers and supersedes the CACES system referenced in TM 5-800-2 (Appendices A, B, and F). The Architect-Engineer shall contact the Cost Engineering Branch directly @ (410) 962-6723 or 3995 to coordinate the delivery, release, installation, and training on the MCACES. Attachment 1 will be completed by the A-E and returned after successful installation of the MCACES software.

B. Exceptions to the use of MCACES in the preparation of construction cost estimates:

1. Projects in early stages of design prior to concept submittal, including pre-concept submittal, studies, etc.

2. Where appropriate and due to scope of project, an ENG Form 150 or the forms described in TM 5-800-2 may be submitted. Most projects do not fall into this category.

3. Relief from utilizing MCACES as it may apply to the exceptions listed in 1 and 2 above shall be requested in writing from the Cost Engineering Branch. The A-E shall provide rationale for the relief requested.

C. Detailed guidance:

1. The MCACES estimate should be setup as a Type "A Crews with Auto Reprice".

2. The A-E shall prepare the cost estimate with current costs, local labor rates and prices. The proper cost escalation and any required electronic databases will be provided by Cost Engineering Branch unless the A-E is directed otherwise.

3. Each detailed item of construction for final cost estimates must show separate labor, material and equipment costs based on current prices. Labor costs may be expressed as dollar amounts or man-hours with applicable labor rates. Detail items must show production information. Current Davis-Bacon wage rates or current prevailing wage rates whichever is greater should be used. This approach is also recommended for preliminary and other estimates. A copy of the current Davis-Bacon wage rates shall be obtained from the Design Team Leader.

4.Quotations: Three (3) manufacturers and/or supplier's quotations, and fabrication/delivery time shall be provided for large cost material and equipment items. Telephone quotes are acceptable if accompanied by date, company, name of contact and phone number. These documents shall accompany the estimate.

5. The detail unit cost items that comprise the MCACES cost estimate shall be obtained using Window's "Drag and Drop" function from the most current Corps of Engineers Unit Price Book (UPB). In a case where the A-E cannot find a specific UPB detail cost item, the closest match shall be utilized. This "closest match" detail item shall then be modified by the cost estimator to best reflect the conditions of that project's scope of work. The cost estimator shall provide wording in the note field as to why the specific cost driving criteria was changed – i.e. crews, labor, material, productivity, etc.

6. A sufficient description (size, capacity, etc.) of each item must be provided in order to evaluate prices.

7. Insurance and taxes on direct labor costs could range from 25% to 40% or higher depending on location of work and discipline of trade.

8. State sales tax for the state in which the project is located shall be applied to the direct material cost.

9. The A-E shall not apply mark-ups for Government contingencies and Supervision, Inspection & Overhead (SIOH) to the cost estimate unless specifically directed by Cost Engineering Branch.

10. Estimates for military projects must have a separate breakdown of site and building costs. For more than one building, a separate cost breakdown for each building must be provided. Estimates for Civil Works and HTRW projects must comply with their respective Work Breakdown Structures.

11. Estimates for military projects involving new work (“L”) and renovation work (“K”) must have a separate cost breakdown for each. This also applies to new and renovation work for one building. This is required due to different types of funding sources.

12. Building costs (renovations and new work) should be noted as a square foot cost based on gross building area.

13. Items that are separately funded such as removable equipment should be separate. A separate cost breakdown should be provided for each pavement section over 5,000 SY.

14. Overall Square foot, linear foot and lump sum costs are acceptable for preliminary submissions when sufficient details are not available due to the current level of design. Beyond 65% design completion, construction cost must be based on a detailed quantity take off.

15. Overhead should conform to TM 5-800-2, Chapter 11. Computations will be part of the estimate similar to pages D-10 through D-14 of the sample estimate.

16. Profit should be calculated through use of the Corps of Engineers Weighted Guideline Method. See Attachment 2.

17. Prime contractor markup on subcontractor work of 5% is an acceptable average.

18. Appropriate design contingency may be applied to cover the risk of uncertainties in the estimate. However this contingency should be reduced as design progresses and eliminated on final estimates.

19. Submittal requirements for construction cost estimates prepared using MCACES shall include the following:

a. Project identification.

b. Project summary pages including Direct Summary.

c. Details for any user added crews, etc.

d. Disk containing MCACES for Windows project file and the labor rate data file.

20. The A-E shall list all assumptions made, to include qualifying factors and any other pertinent information that has been utilized in the generation of the cost estimate. This information shall be provided on the Title Note page of the MCACES estimate.

21. The A-E shall provide documentation to explain what market factors have been considered and/or incorporated into the cost estimate to reflect the current construction market conditions.

22. The A-E shall identify on the cover page of the MCACES estimate for each submission, the name of the individual who performed the Quality Assurance/Quality Control review of the cost estimate.

23. All pages within an estimate must be numbered consecutively (except MCACES) and have the same date which is the effective price level for the estimate. (MCACES computer generated page numbering is acceptable).

24. Complete headings are required on each sheet.

25. The estimate submitted (hard copy and disk), must be legible or it will be returned.

26. Construction Schedule:A-E shall submit a construction schedule(graphical, Timeline, etc.) at each phase of the design submittal) for the project in

sufficient detail that identifies major items/features/activities of work as a minimum to include procurement of long lead items. The rationale for development of the construction schedule shall also be provided

27. All military projects are to have a draft DD Form 1354 completed and submitted at the time of the final estimate. See III below and Attachment 3.

28. Original copy of the final estimate and disk with a completed price schedule must be sent to the Cost Engineering Branch in a double sealed envelope marked "FOR OFFICIAL USE ONLY" and "NOT TO BE OPENED IN THE MAIL ROOM."

MAIL: Baltimore District, U.S. Army Corps of Engineers
ATTN: CENAB-EN-C, Room 10500
P.O. Box 1715
Baltimore, MD 21203-1715

OVERNIGHT: Baltimore District, U.S. Army Corps of Engineers
ATTN: CENAB-EN-C, Room 10500
10 South Howard Street
Baltimore, MD 21201

D. Response to Comments: Written responses to all review comments shall be provided. One word responses, i.e. "Concur" or "Complied" are not to be used. The response shall indicate how the comment will be incorporated, or if not, the reason for not incorporating the comment. In all circumstances, the response to comments, to include a revised cost estimate if requested shall be submitted to the Cost Engineering Branch within 2-weeks of the date of receipt of the comments from the Baltimore District Point of Contact.

E. Architect-Engineer Performance Evaluation: The A/E's performance in the complete development and preparation of the cost estimate will be evaluated by the Government as part of the Architect-Engineer overall performance evaluation.

II. PROFIT DETERMINATION:

A. In preparing government estimates and/or where profit is negotiated as an element of price, either prime or subcontractor, a reasonable profit shall be negotiated or determined for each procurement action by using the procedure on the reverse side as guide. Profit shall be calculated separately for the prime and for each subcontractor.

B. Based on the circumstances of each procurement action, each of the factors on the proceeding page shall he weighted from 0.03 to 0.12 as indicated below. The value shall be obtained by multiplying the rate by the weight. The value column when totaled indicates the fair aid reasonable profit percentage under the circumstances of the particular procurement.

1. Degree of Risk: Where the work involves no risk or the degree of risk is very small, the weighing should be 0.03; as the degree of risk increases, the weighing should be increased up to a maximum of 0.12. Lump sum items will have, generally, a higher weighted value than unit price items for which quantities are provided. Other things to consider: the portion of the work to be done by subcontractors, nature of work, where work is to be performed, reasonableness of negotiated costs, amount of labor included in costs, whether the negotiation is before or after performance of work, etc.

2. Relativity Difficulty of Work: If the work is most difficult and complex the weighing should be 0.12 and should be proportionately reduced to 0.03 on the simplest of jobs. This factor is tied in to some extent with the degree of risk. Some things to consider: the nature of the work, by whom it is to be done, where, what is the time schedule, etc.

3. Size of Job: All work not in excess of $100,000 shall be weighted at .12. Work estimated between $100,000 and $5,000,000 shall be proportionately weighted from 0.12 to 0.05. Work from $5,000,000 to $10,000,000 shall be weighted at 0.04 and work in excess of $10,000,000 at 0.03.

4. Periods of Performance: Jobs in excess of 24 months are to be weighted at 0.12. Jobs of lesser duration are to be proportionately weighted to a minimum of 0.03 for jobs not to exceed 30 days. No weight where additional time not required.

5. Contractor's Investment: To be weighted from 0.03 to 0.12 on the basis of below average, average and above average. Things to consider: amount of subcontracting, mobilization payment item, Government-furnished property, method of making progress payments, etc.

6. Assistance by Government: To be weighted from 0.12 to 0.03 on the basis of average to above average. Things to consider: use of Government-owned property, equipment and facilities, expediting assistance, etc.

7. Subcontracting: To be weighted inversely proportional to the amount of subcontracting. where 80% or more of the work is to be subcontracted the weighing is to be 0.03 and such weighing proportionately increased to 0.12 where all the work is performed by the contractor's own forces.

C. Statements in sufficient detail to explain the reasons for assigning the specific weights used shall be set forth on the preceding page. For example, if degree of risk for the contractor is weighted at 0.10 because the change is not yet directed, the work is difficult or complex, little or none of it will be subcontracted, and a large part of the direct cost will be for labor, briefly write down all of these reasons as the rationale for assigning the 0.10 weight.

III. DIRECTIONS FOR DD FORM 1354 PREPARATIONS

1. The purpose of these instructions is to provide single step-by-step procedures to designers responsible for preparing draft DD Form 1354’s.

2. The following are item-by-item steps stating who is responsible for the item, the type of information required, and from where the information can be obtained:

a. ITEMS 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14 - Not Applicable. These items will be filled in by Construction Division.

b. ITEM 15 – Insert an “X” in the appropriate box of Block “A” to show whether the form involves new construction, existing facilities, or capital improvements to existing facilities. If other box is used, it must be clarified in ITEM 31, Remarks. Construction Division will fill in Block “B”. The information for this block is self-evident.

c. ITEM 16 – The project number is entered in this block and is obtained from the project manager.

d. ITEM 17 – Identify each entry with a number beginning with “1” and continuing.

e. ITEM 18 – Category codes are the Department of Army’s facilities classifications and construction categories. Each type facility, whether it be sidewalk, lighting systems, water lines, parking, roads, etc., have a code. Additionally, each type of building or structure has a category code. Category codes are used to catalog the type of facility and structure the facility has as real property. They are normally tied to the function of an item. Category codes are obtained from Army Regulation AR 415-28, which is obtainable through the US Government Printing Office. The project must be broken down into the maximum number of categories.

f. ITEM 19 – The “facility” is the description given with the appropriate category code in AR 415-28.

g. ITEMS 20, 22, 23, 24 – These items are obtained from the design estimate. The quantities, unit measure, total quantity and cost are to reflect the drawings and specifications as issued to the construction contractor. A “P” will be placed in front of all costs to indicate that they are preliminary and that final costs will be established by the Government upon completion of the construction contract.

ITEM 21 – The “type” means the facility line item is permanent “P”, semi-permanent “S”, or temporary “T”. Either P, S, or T should be entered in this block for the particular line item.

ITEM 25 – The basic number assigned the standard drawing is entered here.

ITEM 26 – Remarks should include a brief description of the item, particularly if an establishment of the general category short title is beneficial.

ITEMS 27, 28, 29, 30 – These will be completed by Baltimore District Construction Division.

3. A cover sheet is to be attached to the DD Form 1354 giving the project location, the designer, the designer's address, phone number, and the person responsible for the preparation of the form. The form is to be submitted with the 95% submission.

4. It is helpful to understand that this document is used by the installation to maintain an inventory of all real property facilities, their quantities, and costs. It is imperative that the information be as detailed as possible.

5. If there is the need for additional information or the A/E has questions regarding any of the information contained herein, please contact Cost Engineering Branch at (410) 962-6723 or 3995.

## MCACES SOFTWARE REQUEST FORM

MCACES for WINDOWS
Version 1.2
Cost Estimating Software

Date: _____ Contract No. _____

Project: _____

Receipt of the MCACES for WINDOWS software (Version 1.2) and the users manual is acknowledged by:

(Sign Name)
_____

(Title):
_____

and is to be used for the processing of construction cost estimates for projects under contract with the U.S. Army Corps of Engineers, Baltimore District. The installed software and databases will be deleted upon closeout of the above stated contract work or the continuation of another contract with the Baltimore District.

Note: All disks have been scanned for virus with Norman Anti-Virus for Windows NT.

A-E Firm: _____

P.O.C. (Print Name): _____

Address: _____

Telephone: (_____)_____

FAX: (_____) _____

E-mail: _____

Type of computer or system installed on: _____

_____

Corps of Engineers employee who helped load software: _____

Any inquiries contact:
U.S. Army Corps of Engineers
Cost Engineering Branch (CENAB-EN-C)
P.O. Box 1715
Baltimore, MD 21203-1715
Tel: (410)962-6723
FAX: (410)962-1850

FOR CENAB-EN-C use:
Design Team
Leader: _____
Cost Eng. File No. _____
Labor Code Used: _____

ATTACHMENT 1

## PROFIT FACTOR

PROJECT: _____

ESTIMATED BY: _____ CHECKED BY: _____

DATE: _____ DATE: _____

| | FACTOR | RATE% | | 0.03 - 0.12 WEIGHT | VALUE |
|---|---|---|---|---|---|
| 1. | Degree of Risk | 20 | X | _____ | _____ |
| 2. | Relative Difficulty of Work | 15 | X | _____ | _____ |
| 3. | Size of Job | 15 | X | _____ | _____ |
| 4. | Period of Performance | 15 | X | _____ | _____ |
| 5. | Contractor's Investment | 5 | X | _____ | _____ |
| 6. | Assistance by Government | 5 | X | _____ | _____ |
| 7. | Subcontracting | 25 | X | _____ | _____ |
| | | 100 | | | |

PROFIT FACTOR = _____%

## REASONS FOR WEIGHTS ASSIGNED

1._____

2._____

3._____

4._____

5._____

6._____

7._____

ATTACHMENT 2

Factor (1) (2) & (5):

High - 0.120
- 0.098
Avg - 0.075
- 0.052
Low - 0.030

Factor (6):

Avg - 0.12
Above Avg - 0.03

Factor (3):

| | | | |
|---|---|---|---|
| 0 | to | $ 100,000 | - 0.12 |
| 100,000 | to | 250,000 | - 0.118 |
| 250,000 | to | 500,000 | - 0.114 |
| 500,000 | to | 750,000 | - 0.111 |
| 750,000 | to | 1,000,000 | - 0.107 |
| 1,000,000 | to | 1,250,000 | - 0.104 |
| 1,250,000 | to | 1,500,000 | - 0.100 |
| 1,500,000 | to | 1,750,000 | - 0.096 |
| 1,750,000 | to | 2,000,000 | - 0.093 |
| 2,000,000 | to | 2,250,000 | - 0.089 |
| 2,250,000 | to | 2,500,000 | - 0.086 |
| 2,500,000 | to | 2,750,000 | - 0.082 |
| 2,750,000 | to | 3,000,000 | - 0.079 |
| 3,000,000 | to | 3,250,000 | - 0.075 |
| 3,250,000 | to | 3,500,000 | - 0.071 |
| 3,500,000 | to | 3,750,000 | - 0.068 |
| 3,750,000 | to | 4,000,000 | - 0.064 |
| 4,000,000 | to | 4,250,000 | - 0.061 |
| 4,250,000 | to | 4,500,000 | - 0.057 |
| 4,500,000 | to | 4,750,000 | - 0.054 |
| 4,750,000 | to | 5,000,000 | - 0.050 |
| 5,000,000 | to | 10,000,000 | - 0.040 |
| | Over | 10,000,000 | - 0.030 |

Factor (4):

Over 24 mos - 0.120
23 to 24 mos - 0.116
22 to 23 mos - 0.112
21 to 22 mos - 0.109
20 to 21 mos - 0.105
19 to 20 mos - 0.101
18 to 19 mos - 0.098
17 to 18 mos - 0.094
16 to 17 mos - 0.090
15 to 16 mos - 0.086
14 to 15 mos - 0.082
13 to 14 mos - 0.079
12 to 13 mos - 0.075
11 to 12 mos - 0.071
10 to 11 mos - 0.068
9 to 10 mos - 0.064
8 to 9 mos - 0.060
7 to 8 mos - 0.056
6 to 7 mos - 0.052
5 to 6 mos - 0.049
4 to 5 mos - 0.045
3 to 4 mos - 0.041
2 to 3 mos - 0.038
1 to 2 mos - 0.034
Under 1 mo - 0.03

Factor (7):

80% or more - 0.030
70% - 79% - 0.042
60% - 69% - 0.055
50% - 59% - 0.068
40% - 49% - 0.080
30% - 39% - 0.092
20% - 29% - 0.105
10% - 19% - 0.118
0% - 09% - 0.120