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**COST-COMPETTIVE CONSTRUCTION  
MANAGEMENT: A REVIEW  
OF CORPS OF ENGINEERS  
CONSTRUCTION MANAGEMENT COSTS**

Report AR603R3

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## Executive Summary

### **COST-COMPETITIVE CONSTRUCTION MANAGEMENT: A REVIEW OF CORPS OF ENGINEERS CONSTRUCTION MANAGEMENT COSTS**

The U.S. Army Corps of Engineers (USACE) manages nearly \$3 billion of Federal Government construction each year. Its Federal customers include the Office of the Secretary of Defense, the Military Departments, and Federal agencies. The construction management services that USACE provides are paid for through fees based on the value of the construction.

In 1988, we compared the construction management fees charged by USACE to those charged by private-sector construction management firms. At that time, we found that USACE is a full-service construction management organization and the fees it charges compare favorably with what private-sector construction management firms charge for equivalent services. We also found most USACE customers are not aware of all the services they receive from the Corps.

The impact of declining budgets continues to make construction management costs an important issue for USACE customers. We found in this review of construction management costs that the private sector has been experiencing the same cost pressures as the Corps and they have responded by decreasing the services they typically provide. When full-service costs are compared, we find that USACE costs are very competitive with those charged by private-sector firms.

We recommend that the Director of Military Programs communicate these findings to USACE customers. Although USACE costs are currently competitive, we further recommend that the Chief of Construction Division encourage the continued cost competitiveness of Corps construction management by closely monitoring construction management expenditures to ensure that USACE construction management organizations are staffing and reorganizing to reflect changing workloads.

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## CHAPTER 1

### INTRODUCTION

The U.S. Army Corps of Engineers (USACE) provides construction management (CM) services for nearly \$3 billion worth of construction each year. Those services, generally referred to as supervision and administration (S&A), are provided to the Military Departments, Defense agencies, and other Federal agencies. Most USACE customers pay for services through a CM fee applied to the cost of the constructed project. That fee is referred to as the S&A rate. The remaining customers pay on a cost-reimbursable basis.

In 1988, in response to USACE customers who believed that S&A rates were too high, the Chief of the Construction Division tasked the Logistics Management Institute (LMI) to examine S&A services and charges.<sup>1</sup> In that study, we showed that USACE typically provides more services to its customers than do private-sector CM firms, and that USACE CM fees are lower for comparable services.

Since that initial study, USACE has increased its S&A rates because of increases in labor and other costs. Although it believes its rate increases are justifiable and consistent with industry trends, a further review of the issue is appropriate in light of the declining construction budgets being experienced by USACE customers.

This review builds upon our previous study and utilizes the results of the annual private-sector CM cost survey conducted by the Construction Management Association of America (CMAA) for the cost comparisons. Our review covers only USACE's Military Construction (MILCON) Program. It does not cover the Civil Works Program. We used the CMAA *Standards of Practice Manual* to develop the listing of services covered by CM (see Table 1-1) and to define these services. The definitions and the comparison of USACE and private-sector CM services are

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<sup>1</sup>*Corps of Engineers Military Construction: Management Cost, Below the Industry Average.* Moore, William B., Trevor L. Neve, Jeffrey A. Hawkins. August 1988.

presented in Appendix A. The division of services among USACE organizational levels is shown in Appendix B along with the relative cost to provide each service.

**TABLE 1-1**

**CONSTRUCTION MANAGEMENT SERVICES**

<b>Pre-design phase</b>
Project management
Scheduling
Cost management
Contract/project administration
<b>Design-and-bid phase</b>
Project management
Scheduling
Contract/project administration
<b>Construction phase</b>
Project management
Scheduling
Cost management
Contract/project administration
Quality assurance
<b>Additional services</b>
Procurement of materials
Value engineering
Claims analysis
Administration of social programs
Labor rates
Postconstruction activities

*Note:* See Appendix A for definitions of these services.

The relative cost to provide each service was determined in our initial study by applying the analytical-hierarchy process (AHP) with a group of USACE construction managers. In the study, we surveyed private-sector firms to determine what they believed the relative cost of each service was. Our survey confirmed our initial results with the largest construction phase service being nearly identical

(75.7 percent of each CM dollar from the AHP versus 77.8 percent from the survey) and the others differing by only a few percentage points. The relative cost of each service was used to adjust private-sector projects for services not provided and USACE costs for services funded with other than S&A monies.

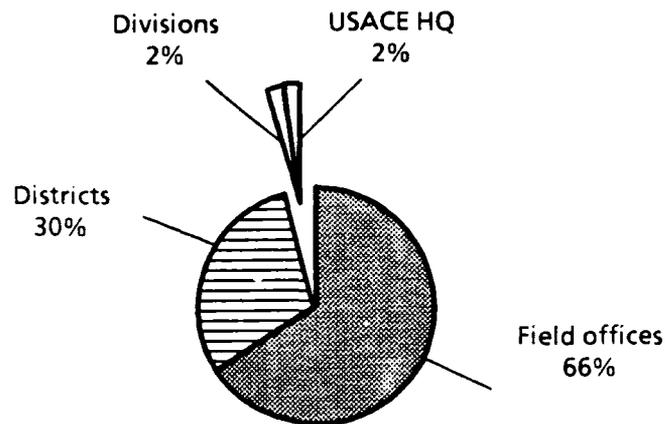
## CHAPTER 2

### FINDINGS

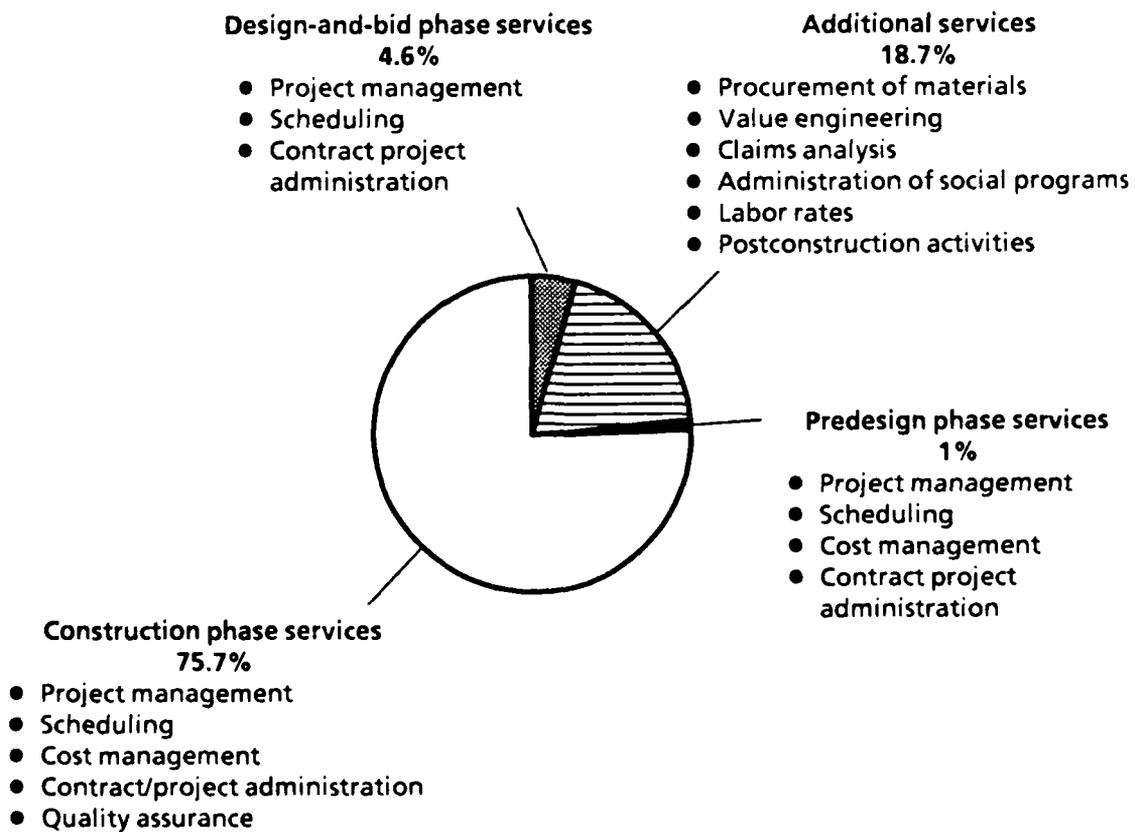
From the first CMAA-sponsored survey, we found that few private-sector CM firms provide all CM services on each job. That survey indicated that private-sector firms provide their customers only 80 percent of the total CM services identified by the CMAA; in the second CMAA-sponsored survey, the number of services typically provided decreased to 60 percent. In this degeneration of services, the private sector starkly contrasts with USACE, which normally provides 100 percent of those services. Consequently, we must adjust costs when comparing USACE to private-sector CM to account for this difference.

Most USACE customers are not aware of all of the services they receive because those services are performed by different organizations in USACE, many of which are never seen by the customer (see Appendix B). In general, customers see only field office staffs and believe their activities represent all the CM for which they are paying. Field office staffs perform less than 70 percent of the CM services, with the other services performed by USACE districts, divisions, and headquarters (see Figure 2-1). Additionally, USACE customers are generally unaware that they are not charged for the services they receive from division offices and the USACE headquarters since those organizations are funded with Operations and Maintenance, Army (OMA) funds. That OMA funding represents a saving to USACE customers of approximately 4 percent of the total CM costs.

The USACE CM fee – S&A rate – is divided among the four major categories of CM services (see Figure 2-2). A discussion of the division is contained in Appendix B. Some CM costs, 5.6 percent of the total, are associated with predesign and design-and-bid phase services. Those phases are primarily concerned with the engineering aspects of the project, with which construction managers have limited involvement. Construction managers become more heavily involved during the construction phase where 75.7 percent of the CM dollar is expended for services provided. Most of that effort is associated with the administration and inspection of the project during construction. The remaining 18.7 percent of cost is associated with



**FIG. 2-1. WHERE USACE CONSTRUCTION MANAGEMENT EFFORT IS EXPENDED**



**FIG. 2-2. WHERE THE CONSTRUCTION MANAGEMENT DOLLAR GOES**

providing additional services such as procurement of materials, postconstruction activities, etc., which are not normally provided by private-sector CM firms.

Considerable misunderstanding exists about how the CM fee or so called "flat rate account" functions. Many customers incorrectly believe that the flat rate should recoup CM costs on a project-by-project basis. The flat rate accounts are intended to recoup CM costs from a class of projects such as MILCON or O&M. The flat rate is used to minimize administrative burden and cost and implicitly recognizes that cross subsidies occur within the class of projects. The classic example is the subsidizing of small projects by large projects. Customers who state that they are being overcharged for the services received on large or simple projects fail to realize that they are also being undercharged on small or complex ones. Over time, with a large number of projects, we believe the flat rate approach is a reasonable alternative to charging actual costs at the project level.

Although the services provided by private CM firms decreased substantially, the fee charged for these services did not. In fact, the typical private-sector fee increased slightly for most categories of projects. When the private-sector CM fees are adjusted to reflect the full provision of services, we can see a significant increase in those fees since the 1988 survey (see Table 2-1).

**TABLE 2-1**  
**PRIVATE-SECTOR FULL SERVICE COSTS**

	1988 median	1990 median
Family housing - Army	5.4%	6.5%
Family housing - Air Force	5.4	6.5
MILCON - Army	7.0	8.8
MILCON - Air Force	7.0	8.7
MILCON - Army Reserves	7.4	8.7
O&M - Army	6.5	9.8
O&M - Air Force	6.5	10.2
Production base support	5.4	8.3

Interviews with construction managers and a review of the survey data showed that no single factor was responsible for the increase in private-sector CM fees. Rather, it appears that the increase is the result of a combination of factors. Construction costs have escalated at a slower rate than have personnel costs over the past 2 years. Since fees are the ratio of CM costs (primarily labor) to construction cost, this trend by itself would cause fees to rise. The effect of this differential escalation can be estimated by comparing construction cost escalation to the escalation of private-sector civil engineer salaries. Using the *Engineering News Record* building construction cost index and the Bureau of Labor salary statistics, we found that during the period 1985 through 1989, construction costs escalated by 9.8 percent and civil engineer salaries by 16.8 percent. This differential escalation causes a 0.3 to 0.6 percent increase in CM fees depending on the type of project. Our survey also indicated that CM firms have experienced a large increase in their indirect costs. While direct labor as a percentage of the CM fee decreased from 39 percent to 27 percent, all four indirect cost categories increased (see Table 2-2). General and Administrative (G&A) expenses increased significantly for both the labor and nonlabor components. Nonlabor indirect expenses also showed a large increase. Although we could not determine a direct cause for these cost increases from the survey or interviews, construction industry professionals believe that automation and personnel benefit increases accounted for most of the increase.

Despite the differences in services available, USACE CM costs and the private-sector fees can be put on a comparable basis. Private-sector fees must be adjusted to reflect the provision of full services before making a comparison – the methodology for making this adjustment is described in Appendix C. The results of this comparison for the 1990 survey are shown in Table 2-3. USACE costs are generally below the average full service private-sector fees for the same type of work.

**TABLE 2-2**  
**CHANGES IN CONSTRUCTION MANAGEMENT**  
**FEE COMPOSITION**

	1988	1990
Direct labor Percent of fee	39%	27%
Payroll burden Percent of direct labor	36	37
G&A labor Percent of direct labor	26	41
G&A nonlabor Percent of direct labor	26	93
Nonlabor indirect Percent of direct labor	13	30

**TABLE 2-3**  
**CONSTRUCTION MANAGEMENT COST COMPARISON**

Customer	Private-sector fee range			USACE costs
	25th percentile	Median	75th percentile	Fee charged
Family housing - Army	3.4%	6.5%	19.6%	6.0%
Family housing - Air Force	3.4	6.5	19.6	6.0
MILCON - Army	4.9	8.8	13.1	6.0
MILCON - Air Force	4.8	8.7	13.1	6.0
MILCON - Army Reserves	6.9	8.7	10.2	6.0
O&M - Army	4.2	9.8	13.3	8.0
O&M - Air Force	4.2	10.2	14.4	8.0
Production base support	4.6	8.3	17.6	6.0

## CHAPTER 3

### CONCLUSIONS AND RECOMMENDATIONS

#### CONCLUSIONS

Most USACE customers are not aware of all the CM services they are provided. Customers see the work of the field offices but do not normally see the total CM effort that is expended by other USACE organizations. These unseen services, which account for 34 percent of the total, are critical to the management of a construction project. They are not unnecessary "frills" and if the construction manager does not perform them, the customer will have to do so. The USACE must better educate its customers about the services that they receive for their CM dollar.

USACE fees are appropriate for the services they provide. The recent increase in costs experienced by USACE appears to be an industry-wide trend and not an isolated problem. Some private-sector CM firms may appear to be less expensive than USACE because they provide fewer and/or lower cost services. This can be seen from the results of the CMAA survey in Appendix C. A tabulation of these results shows that, on average, private-sector firms only provide 60 percent of the services that USACE provides. When private-sector costs are adjusted to reflect the same level of service, USACE costs are lower, as described in Appendix C.

#### RECOMMENDATIONS

We believe that USACE CM fees are competitive with those charged by private-sector firms. USACE's failure to communicate the complete story about CM services being provided is often at the root of much of the discontent exhibited by its customers. In the face of declining MILCON budgets, the USACE districts, divisions, and headquarters should assign a high priority to communicating an accurate picture of CM. We recommend that the Chief of Construction provide copies of this report along with a simplified brochure to all districts and divisions with a MILCON mission. Additional communications aids such as a briefing package or video tape should also be considered. By taking these steps, we believe that USACE can

improve customer relations by demonstrating that Corps CM services are competitively priced.

**APPENDIX A**

**A COMPARISON OF PRIVATE-SECTOR  
AND USACE CONSTRUCTION MANAGEMENT SERVICES**

## **A COMPARISON OF PRIVATE-SECTOR AND USACE CONSTRUCTION MANAGEMENT SERVICES**

The list of construction management services and responsibilities used in this study was developed by the Construction Management Association of America (CMAA). It is the generally accepted set of definitions used by the industry.

The list is divided into two columns. The first column provides the CMAA list of all possible private-sector construction management services and their descriptions, while the second column describes the comparable service provided by the U.S. Army Corps of Engineers (USACE) together with the source of funds. In most cases, the private-sector and USACE definitions of service are the same, but two differences occur. In the private sector, the owner normally retains contractual authority and the construction manager only makes recommendations. USACE normally has this contractual authority, however, and therefore carries more responsibility than its private-sector counterpart. USACE also provides more of the services listed than does the average private-sector construction manager, and for some USACE-provided services, the private sector has no counterparts.

## CONSTRUCTION MANAGEMENT SERVICES

### CMAA

### Corps of Engineers

#### 1.0 PREDESIGN PHASE

#### 1.1 Project Management

##### **1.1.1 Construction Management Plan (CMP)**

The construction manager prepares the CMP for the project and considers the owner's schedule, cost, and design requirements and develops various alternatives for the sequencing and management of the project. He/she then makes recommendations to the owner. The CMP includes a description of the various bid packages recommended for the project and is presented to the owner for acceptance.

Same [funded mainly from planning and design (P&D)].

##### **1.1.2 Design Professional Selection**

The construction manager assists the owner in the selection of a design professional by developing lists of potential firms, developing criteria for selection, preparing and transmitting the requests for proposals (RFPs), assisting in reviewing written proposals, conducting interviews, evaluating candidates, and making recommendations.

Same (funded mainly from P&D).

##### **1.1.3 Design Professional Contract Preparation**

The construction manager assists the owner in reviewing and preparing the agreement between the owner and the design professional.

Same (funded from P&D).

## CMAA

### **1.1.4 Design Professional Orientation**

The construction manager conducts or assists in conducting a design professional orientation session during which the design professional will receive information regarding project, schedule, cost, and administrative requirements.

## **1.2 Scheduling**

### **1.2.1 Master Schedule**

In accordance with the CMP, the construction manager prepares a master schedule for each component of the project. It specifies the proposed start and finish dates for each contract and the dates by which certain construction activities must be complete. The construction manager submits the master schedule to the owner for acceptance.

### **1.2.2 Design Phase Milestone Schedule**

After the owner's acceptance of the master schedule, the construction manager prepares the milestone schedule for the design phase. That milestone schedule may be used in requests for proposals and the contract for the design professional and is a method for judging progress during the design phase.

## **1.3 Cost Management**

### **1.3.1 Construction Market Survey**

The construction manager conducts a construction market survey to provide current information on the general availability of local construction services, labor and material cost, and the economic

## Corps of Engineers

Same [normally funded from P&D. Some supervision and administration (S&A) for large projects].

Same (funded from P&D).

Same (funded from P&D).

Same (funded from P&D).

## CMAA

factors related to the project. A report of the survey is provided to the owner.

### **1.3.2 Project and Construction Budget**

Based on the CMP and the construction market survey, a project and construction budget is prepared and submitted to the owner for acceptance; the construction manager revises it as the owner directs.

### **1.3.3 Cost Analysis**

The construction manager analyzes and reports to the owner the cost of various design and construction alternatives. As a part of this cost analysis, costs related to efficiency, usable life, maintenance, energy, and operation are considered. Value engineering studies may also be conducted.

## **1.4 Contract/Project Administration**

### **1.4.1 Establishing the Project MIS**

The construction manager develops a management information system (MIS) to establish communications among the owner, construction manager, design professional, contractor, and other parties on the project. In developing the MIS, the owner's key personnel and others are interviewed to determine the type of information for reporting, the reporting format, and the desired frequency for distribution of the various reports.

### **1.4.2 Design Phase Procedures**

As part of the MIS, the construction manager establishes procedures for reporting communications and administration during the design phase.

## Corps of Engineers

Same (funded from P&D).

Same (funded from P&D).

Same: Functions performed via the Automated Military Projects Reporting System (AMPRS) Corps of Engineers Management Information System (COEMIS) (funded from P&D).

Same: Standard Corps of Engineers reports (funded from P&D).

## CMAA

## Corps of Engineers

### 2.0 DESIGN AND BID PHASE

#### 2.1 Project Management

##### *2.1.1 Revisions to the Construction Management Plan*

During the design phase, the construction manager makes recommendations to the owner regarding revisions to the CMP. Revisions approved by the owner are incorporated into the CMP.

Same (funded mainly from P&D).

##### *2.1.2 Project Conference*

At the start of the design phase, the construction manager conducts a project conference attended by the design professional, the owner, and others. During the project conference, the CMP, master schedule, design phase milestone schedule, project and construction budget, and MIS are reviewed.

Same (funded mainly from P&D).

##### *2.1.3 Design Phase Information*

The construction manager monitors the design professional's compliance with the CMP and the MIS and coordinates and expedites the flow of information among the owner, design professional, and others.

Same (funded from P&D).

##### *2.1.4 Project Meetings*

The construction manager conducts periodic project meetings attended by the owner, design professional, and others. Such meetings serve as a forum for the exchange of information about the project and the review of design progress. The construction manager prepares and distributes minutes of these meetings to the owner, design professional, and the owners, and others.

Same (funded mainly from P&D).

## CMAA

## Corps of Engineers

### **2.1.5 Review of Design Documents**

The construction manager reviews the design documents for clarity, consistency, and completeness. The results of the review are provided in writing and as notations on the documents. The construction manager is not responsible for providing, nor does he/she control, the project design and the contents of the design documents. By performing the reviews described herein, the construction manager is not acting in a manner so as to assume responsibility or liability, in whole or in part, for all or any part of the project design and design documents. Actions in reviewing the project design and design documents and in making recommendations are only advisory to the owner.

The Corps is responsible to the owner for the quality of the design (funded from P&D and some S&A).

### **2.1.6 Design Recommendations**

The construction manager makes recommendations to the owner and design professional with respect to constructibility, construction cost, sequence of construction, construction duration, and separation of the project into contracts for various categories of the work.

Same (funded from P&D and some S&A).

### **2.1.7 Owner's Design Reviews**

The construction manager expedites the owner's design reviews by compiling and conveying the owner's comments to the design professional.

Same (funded from P&D).

### **2.1.8 Approvals by Regulatory Agencies**

The construction manager coordinates transmittal of documents to regulatory agencies for review and advises the owner

Same (funded from P&D).

## CMAA

of potential problems in completion of such reviews.

### **2.1.9 General Conditions**

The general conditions to the contract documents for the project are in CMAA Document No. A-3. Separate general conditions for materials and for equipment procurement are prepared to meet the specific requirements of the project.

### **2.1.10 Public Relations**

The construction manager assists the owner in public relations activities and prepares information for and attends public meetings.

### **2.1.11 Project Funding**

The construction manager assists the owner in preparing documents for the Project and Construction Budget for obtaining or reporting on project funding. The documents are prepared in a form approved by the owner.

### **2.1.12 Prequalifying Bidders**

The construction manager assists the owner in developing lists of possible bidders and in prequalifying bidders. This service includes the following: preparation and distribution of questionnaires; receiving and analyzing completed questionnaires; interviewing possible bidders, bonding agents, and financial institutions; and preparing recommendations for the owner. A bidders' list for each bid package is prepared.

### **2.1.13 Notices and Advertisements**

The construction manager assists the owner in preparing and placing notices and

## Corps of Engineers

The Corps uses the Government's standard general conditions (funded from P&D and S&A).

Same (funded from P&D and S&A).

Same: Standard Government forms are used (funded from P&D).

Same, but rarely used except for very large or very unusual jobs (funded from P&D and S&A).

Same (funded from P&D).

## CMAA

advertisements to solicit bids for the project.

### **2.1.14 Delivery of Bid Documents**

The construction manager expedites the delivery of bid documents to the bidders. He obtains the documents from the design professional and arranges for printing, binding, wrapping, and delivery to the bidders. He/she also maintains a list of the bidders receiving bid documents.

### **2.1.15 Bidders' Interest Campaign**

The construction manager conducts a telephonic and correspondence campaign to attempt to increase interest among qualified bidders.

### **2.1.16 Prebid Conference**

In conjunction with the owner and design professional, the construction manager conducts prebid conferences. These conferences are a forum for the owner, construction manager, and design professional to explain the project requirements to the bidders, including the schedule, time and cost control; access requirements; the owner's administrative requirements; and technical information.

### **2.1.17 Information to Bidders**

The construction manager develops and coordinates procedures to provide answers to the bidders' questions.

### **2.1.18 Addenda**

The construction manager receives from the design professional a copy of all addenda. He/she reviews them for clarity, consistency, and completeness and distributes copies to each bidder. The

## Corps of Engineers

Same (funded from P&D).

Same where and when appropriate (funded from P&D).

In addition, the Corps performs site visits with potential contractors on large jobs (funded mainly from S&A with some P&D).

Same (funded from P&D and some S&A).

Same (funded from P&D and some S&A).

## CMAA

construction manager does not assume responsibility or liability for the project design contents or the design documents.

### **2.1.19 Bid Opening and Recommendations**

The construction manager assists the owner in the bid opening and evaluates the bids for responsiveness and price. He/she makes recommendations to the owner concerning the acceptance or rejection of bids.

### **2.1.20 Postbid Conference**

The construction manager conducts a postbid conference to review contract award procedures, schedules, project staffing, and other pertinent issues.

### **2.1.21 Construction Contracts**

The construction manager assists the owner in the preparation, delivery, and execution of the contract documents and issues the notice to proceed on behalf of the owner.

### **2.1.22 Preconstruction Conference**

The construction manager conducts, in conjunction with the owner and design professional, a preconstruction conference during which he/she states the project reporting procedures and other rules.

### **2.1.23 Permits, Insurance, and Labor Affidavits**

The construction manager verifies that the contractor has secured the required building permits, bonds, insurance, labor affidavits and waivers. This action does not relieve the contractor of his responsibility to

## Corps of Engineers

The Corps makes the decision on acceptance or rejection of bids. With negotiated contracting, there is significant Construction Division involvement (funded from P&D and a little S&A).

The Corps does not perform this service.

Same (funded from P&D).

Same (funded from S&A).

Same (funded from S&A and some P&D).

## CMAA

comply with the provisions of the contract documents.

### **2.2 Scheduling**

#### **2.2.1 Revisions to Master Schedule**

While performing the services provided in Paragraphs 2.1.1 and 2.1.2, and as necessary throughout the design phase, the construction manager recommends revisions to the master schedule. The owner will issue, as needed, change orders to the appropriate parties to implement the master schedule revisions.

#### **2.2.2 Monitoring the Design Phase Milestone Schedule**

While performing the services provided in Paragraphs 2.1.3 and 2.1.4, the construction manager monitors compliance with the design phase milestone schedule.

#### **2.2.3 Prebid Construction Schedules**

Prior to transmitting contract documents to bidders, the construction manager prepares a prebid construction schedule for each part of the project and makes it available to the bidders during the bid and award phase.

#### **2.2.4 Contractor's Construction Schedule**

The construction manager provides a copy of the master schedule to the bidders. As a part of the notice of award, he/she informs each contractor of the requirements for the preparation of the contractor's construction schedule. Each contractor prepares its own construction schedule, which provides for completing the work in accordance with the milestone dates in the

## Corps of Engineers

The Corps issues change orders after advising the owner (funded from P&D).

Same (funded from P&D).

Same, but the Corps provides this service only on large, complex projects with phasing (funded by P&D).

Same, but only used for large, complex projects (funded from S&A).

## CMAA

master schedule. The construction manager reviews the contractor's construction schedule and determines whether it establishes completion dates that comply with the requirements of the master schedule and the contract documents.

### **2.3 Contract/Project Administration**

#### **2.3.1 Project and Construction Budget Revision**

The construction manager makes recommendations to the owner on design changes that may result in revisions to the project and construction budget.

#### **2.3.2 Cost Control**

The construction manager prepares an estimate of the construction cost for each submittal of design drawings and specifications from the design professional. The estimate for each submittal is accompanied by a report to the owner and design professional identifying variances from the project and construction budget. He/she coordinates and expedites the activities of the owner and design professional when changes to the design are required to remain within the project and construction budget.

#### **2.3.3 Value Analysis Studies**

The construction manager provides value analysis studies on major construction components. The results of these studies are in report form and are distributed to the owner, design professional, and others.

## Corps of Engineers

Same (funded from S&A with some P&D).

Same. It is used for developing the current working estimate (funded from P&D).

Same (funded from P&D).

## CMAA

## Corps of Engineers

### **2.3.4 Tradeoff Studies**

The construction manager provides tradeoff studies for various minor construction components. The results of the tradeoff studies are in report form and are distributed to the owner, design professional, and others.

Same. This could be part of value analysis (funded from P&D).

### **2.3.5 Management Information Systems**

**2.3.5.1 Schedule Reports.** In conjunction with the services provided by Paragraph 2.1.4, the construction manager prepares and distributes schedule maintenance reports to compare actual progress with scheduled progress for the design phase and the overall projects.

Same. Provided via AMPRS (funded from P&D).

**2.3.5.2 Project Cost Reports.** The construction manager prepares and distributes project cost reports which specify estimated costs compared to the project and construction budget.

Same: Provided via AMPRS and COEMIS (funded from P&D).

**2.3.5.3 Cash Flow Report.** The construction manager periodically prepares and distributes a cash flow report.

Same: COEMIS 3011A and 3011C reports (funded from P&D).

**2.3.5.4 Design-Phase Change Order Report.** The construction manager prepares and distributes design-phase change order reports, which list all owner-approved change orders as of the date of the report, and state the effects of the change orders on the project and construction budget and the master schedule.

Same (funded from P&D).

## CMAA

## Corps of Engineers

### **2.3.6 Estimates for Addenda**

The construction manager prepares an estimate of cost for all addenda and submits the estimates to the owner for approval. After approval by the owner, the addenda are transmitted to bidders.

Same (funded from P&D).

### **2.3.7 Analyzing Bids**

Upon receipt of the bids, the construction manager evaluates them, including alternate prices and unit prices.

Same (funded from P&D and S&A).

## **3.0 CONSTRUCTION PHASE**

### **3.1 Project Management**

#### **3.1.1 On-Site Management and Construction Phase Communication Procedures**

The construction manager provides and maintains a management team on the project site to provide contract administration as an agent of the owner. The construction manager also establishes and implements coordination and communication procedures among the construction managers, owner, design professional, contractors, and others.

Same. Includes claims (funded from S&A).

#### **3.1.2 Construction Administration Procedures**

The construction manager establishes and implements procedures for requests for information, shop drawings and material sample submittals, contract schedule adjustments, change orders, payment requests, and the maintenance of logs. The construction manager maintains daily job reports. As the owner's representative at the construction site, the construction manager receives requests for information,

The Corps also includes the review of shop drawings (funded from S&A).

## CMAA

submittals, contractor schedule, adjustment, change order requests, and payment requests.

### **3.1.3 Project Site Meetings**

Periodically, the construction manager conducts meetings at the project site with each contractor and conducts coordination meetings with all contractors, the owner, and the design professional. He/she records, transcribes, and distributes minutes to all attendees, the owner, design professional, and others.

### **3.1.4 Coordination of Independent Consultants**

Technical inspection and testing provided by the design professional or other parties are coordinated by the construction manager who is provided a copy of all inspection and testing reports on the day of the inspection or test. The construction manager is not responsible for providing, nor does he/she control, the actual performance of technical inspection and testing. The construction manager is performing a coordination function and is not assuming responsibility or liability for such inspection and testing.

### **3.1.5 Substantial Completion**

In conjunction with the design professional, the construction manager determines when the project and the contractor's work is substantially complete. Prior to issuing a certificate of substantial completion, the construction manager, in conjunction with the design professional, prepares a list of incomplete work which does not conform to the contract documents. This list is attached

## Corps of Engineers

Same (funded from S&A).

The Corps takes a more active role. Testing is done by quality assurance, not through a design professional (funded from S&A).

An outside design professional is not involved (funded from S&A).

## CMAA

to the certificate of substantial completion.

### **3.1.6 Final Completion**

In conjunction with the design professional, the construction manager determines when the project and the contractor's work is finally complete, and issues a certificate of final completion.

### **3.1.7 Review of Requests for Changes to the Contract Time and Price**

The construction manager reviews the contents of a request for a change to the contract time or price submitted by a contractor, assembles information concerning the request, endeavors to determine the cause of the request, and makes recommendations to the owner with respect to acceptance of the request.

### **3.1.8 Operation and Maintenance Materials**

The construction manager receives from the contractor operation and maintenance manuals and warranties and guarantees for materials and equipment installed in the project.

## **3.2 Scheduling**

### **3.2.1 Master Schedule**

The construction manager adjusts and updates the master schedule and distributes copies to the owner and design professional. Adjustments to the master schedule are made for the benefit of the project.

## Corps of Engineers

The certification is done on Form DD 1354. The Corps also tracks fiscal completion (funded from S&A).

The Corps normally makes decisions on construction change orders and advises the owner if costs are within the contingency amounts unless the owner has directed different procedures (funded from S&A).

Same (funded from S&A).

Same, but only used for large, complex projects (funded from S&A).

## CMAA

## Corps of Engineers

### **3.2.2 Contractor's Construction Schedule**

The construction manager reviews the contractor's construction schedule and verifies that it complies with the requirements of the contract documents.

Same (funded from S&A).

### **3.2.3 Schedule Compliance Review**

The construction manager reviews the progress of construction of each contractor on a monthly basis, evaluates the percentage complete of each construction activity as indicated in the contractor's construction schedule, and reviews percentages with the contractor. This evaluation serves as data for input to the periodic construction schedule report which is prepared and distributed to the contractor, owner, and design professional. The report indicates the actual progress compared to scheduled progress and serves as the basis for the progress payments to the contractor. The construction manager advises and makes recommendations to the owner concerning the alternative courses of action that the owner may take in its efforts to achieve contract compliance by the contractor.

The Corps usually takes action without owner involvement. Coordination with the owner is needed only for expediting or accelerating the project (funded from S&A).

### **3.2.4 CM Review of Time Extension Requests**

The construction manager advises the owner on the effect on the master schedule of time extensions requested by the contractor prior to the issuance of a change order.

Same (funded from S&A).

## CMAA

## Corps of Engineers

### **3.2.5 Recovery Schedules**

The construction manager may require the contractor to prepare and submit a recovery schedule, as specified in the contract documents.

Same (funded from S&A).

### **3.3 Cost Management**

#### **3.3.1 Allocation of Cost to the Contractor's Construction Schedule**

The contractor's construction schedule allocates the total contract price among the contractor's scheduled activities. The sum of the prices equals the total contractor price. The construction manager reviews the total contract price allocations and verifies that such allocations are made in accordance with the requirements of the contract documents. Progress payments are based on the contractor's percentage of completion of the scheduled activities as set out in the construction schedule report.

Same (funded from S&A).

#### **3.3.2 Change Order Control**

The construction manager establishes and implements a change order control system. All proposed change orders are first described in detail in a request for a proposal to the contractor and are accompanied by technical drawings and specifications prepared by the design professional. In response to the request for a proposal, the contractor submits to the construction manager for evaluation detailed information concerning the costs and time extensions, if any, to perform the proposed change work order. The construction manager discusses the proposed change order with the contractor

Same (funded from S&A).

## CMAA

and endeavors to determine the contractor's basis for the cost to perform the work. The construction manager makes recommendations to the owner prior to execution of change orders being incorporated into the contractor's construction schedule.

### **3.3.3 Project Site Meetings**

Periodically the construction manager conducts meetings at the project site with each contractor and conducts coordination meetings with all contractors, the owner, and design professional. The construction manager records, transcribes, and distributes minutes to all attendees, the owner, design professional, and others.

### **3.3.4 Cost Records**

In instances in which a lump sum or unit price is not determined prior to performing work described in a request for proposal, the construction manager requests from the contractor records of the cost of payroll, materials, and equipment and the amount of payments to subcontractors for performing such work.

## **3.4 Contract/Project Administration**

### **3.4.1 Schedule Maintenance Reports**

The construction manager prepares and distributes schedule maintenance reports during the construction phase. The report compares the actual construction dates with scheduled construction dates of each separate contract and the master schedule for the project.

## Corps of Engineers

Same except for distribution (funded from S&A).

Same (funded from S&A).

Same (funded from S&A).

## CMAA

### **3.4.2 Project Cost Reports**

The construction manager prepares and distributes project cost reports during the construction phase; those reports compare actual project and construction costs with the project and construction budget.

### **3.4.3 Project and Construction Budget Revisions**

The construction manager makes recommendations to the owner on construction changes that may result in revisions to the project and construction budget.

### **3.4.4 Cash Flow Reports**

The construction manager prepares and distributes cash flow reports during the construction phase. The reports compare actual cash flow to projected cash flow.

### **3.4.5 Progress Payment Reports (Each Contract)**

The construction manager prepares and distributes the progress payment reports. These reports state the total construction contract price, payment to date, current payment requested, retention age, and actual amounts owed this period. One portion is a certificate of payment signed by the construction manager and delivered to the owner for use by the owner in making payments to the contractor.

## Corps of Engineers

Reports are produced by COEMIS and AMPRS. The Corps includes financial completion and return of surplus funds, and there are additional Government financing requirements (funded from S&A).

The Corps handles additional Government financing requirements (funded from S&A).

Same: COEMIS, 3011A, and 3011C reports (funded from S&A).

Same (funded from S&A).

## CMAA

### **3.4.6 Change Order Reports**

The construction manager periodically prepares and distributes change order reports during the construction phase. The reports list all owner-approved change orders by number, a brief description of the change order work, the cost established in the change order, and percent of completion of the change order work.

### **3.4.7 Contractor's Safety Program Report**

The construction manager reports to the owner when the contractor notifies him/her that the contractor has prepared a contractor's safety program as required by the contract documents.

## **3.5 Quality Assurance**

The construction manager establishes and implements a program to monitor the quality of the construction to assist in guarding against defects and deficiencies in the work of the contractor. The construction manager rejects work and transmits to the owner and contractor a notice of nonconforming work when the opinion is that the work does not conform to the requirements of the contract documents. The construction manager, in conjunction with the design professional, makes recommendations to the owner for corrective action but is not authorized to change or release any requirements of the contract documents. All changes to the agreement between the owner and contractor are by change orders executed by the owner. Communication between the construction manager and contractor with regard to quality review is not in any

## Corps of Engineers

Same (funded from S&A).

In addition, the Corps enforces accident reporting and investigation procedures, safety inspections, and safety meetings (funded from S&A).

The Corps of Engineers quality assurance is similar to that defined in Section 3.5 except that the Corps assumes the responsibilities and authorities that Section 3.5 assigns to the owner. The contractual relationship is between the contractor and the Corps, not the owner (funded from S&A).

## CMAA

way to be construed as binding the construction manager or owner to release the contractor from the fulfillment of any of the terms of his contract documents. The construction manager is not responsible for, nor does he/she control, the means and methods of construction for the project. It is understood that the construction manager's action in providing quality review is a service to the owner and he/she is not assuming responsibility or liability for the construction work for the project.

### **4.0 ADDITIONAL SERVICES**

#### **4.1 Procurement of Materials**

The construction manager provides procurement services for the owner as designated to include reviewing specifications, using purchase orders, and overseeing the delivery and storage of materials.

#### **4.2 Value Engineering**

The construction manager arranges for and conducts value engineering analyses on aspects of the project where appropriate.

#### **4.3 Claims Analysis and Processing**

Same as 3.1.7.

#### **4.4 Administration of Social Programs**

Not applicable.

## Corps of Engineers

Same (funded from S&A).

Same (funded from S&A although costs are carried in most cases through savings).

The Corps handles the processing, resolution, and negotiation of claims (funded from S&A).

The Corps is involved in the administration of programs legislated to help small, disadvantaged, and minority businesses (funded from S&A).

CMAA

Corps of Engineers

**4.5 Labor Rates**

Not applicable.

The Corps administers the Davis-Bacon legislation, which sets minimum wage rates for Government construction (funded from S&A).

**4.6 Post Construction Actions**

Not applicable.

The Corps is responsible for the administration of warranties and guaranties (funded from S&A).

**APPENDIX B**

**THE COMPOSITION OF CONSTRUCTION  
MANAGEMENT COSTS**

## THE COMPOSITION OF CONSTRUCTION MANAGEMENT COSTS

Construction management (CM) in the U.S. Army Corps of Engineers (USACE) is divided among four organizational levels: field offices, districts, divisions, and the Corps headquarters. Only the field offices and districts charge their efforts directly to the customer. Division and Corps headquarters support is funded from Operations and Maintenance, Army (OMA) appropriations. When comparing the costs to Corps customers with those of the private sector, we must differentiate between the suppliers of the services and which services are provided. Table B-1 shows the percentage of CM effort expended for each category of service, and Table B-2 shows where those construction services are performed. The division and USACE (Corps Headquarters) columns represent free service to the Corps' customers.

The data in this appendix describe the expenditure of CM effort and show where CM services are performed. Results were derived by an experienced panel of experts drawn from a variety of organizational levels within USACE. Two techniques were used to derive the results. We identified where CM services are performed by developing a consensus of the panel on the services provided by each organization (see Table B-2). For the expenditure of CM effort, the panel used a computer software package called Expert Choice to aid the decision making. Expert Choice is a systematic approach that supports the decision makers in comparing alternatives when many criteria are involved. In Table B-2, the four organizational levels involved in CM are shown as well as the effort expended at each level for each of the categories of service. In Table B-1, the alternatives were the categories of service, and the decision was how much CM effort is expended for each service. Through a series of comparisons, the panel of experts assigned relative weights to the alternatives while monitoring the consistency of the panel's judgments.

TABLE B-1

EXPENDITURE OF CONSTRUCTION MANAGEMENT EFFORT

Service phase	Percent of construction management costs
<b>1.0</b> Predesign phase	<b>1.0</b>
1.1 Project management	0.7
1.2 Scheduling	0.1
1.3 Cost management	0.1
1.4 Contract/project administration	0.1
<b>2.0</b> Design-and-bid phase	<b>4.7</b>
2.1 Project management	3.3
2.2 Scheduling	0.7
2.3 Contract/project administration	0.7
<b>3.0</b> Construction phase	<b>75.6</b>
3.1 Project management	20.3
3.2 Scheduling	4.9
3.3 Cost management	4.1
3.4 Contract/project administration	7.0
3.5 Quality assurance	39.3
<b>4.0</b> Additional	<b>18.7</b>
4.1 Procurement of materials	0.5
4.2 Value engineering	0.9
4.3 Claims analysis	7.2
4.4 Administration of social programs	1.9
4.5 Labor rates	2.0
4.6 Postconstruction activities	6.2
<b>Total</b>	<b>100.0</b>

**TABLE B-2**

**WHERE CONSTRUCTION MANAGEMENT SERVICES ARE PERFORMED**

<b>Service phase</b>	<b>Field office</b>	<b>District</b>	<b>Division</b>	<b>USACE</b>
<b>1.0 Predesign phase</b>	<b>1.0%</b>	<b>95.0%</b>	<b>2.5%</b>	<b>1.5%</b>
1.1 Project management	2.0	93.0	3.0	2.0
1.2 Scheduling	0.0	96.0	3.0	1.0
1.3 Cost management	0.0	97.0	2.0	1.0
1.4 Contract/project administration	0.0	98.0	2.0	0.0
<b>2.0 Design-and-bid phase</b>	<b>4.0</b>	<b>92.0</b>	<b>3.0</b>	<b>1.0</b>
2.1 Project management	10.0	84.0	5.0	1.0
2.2 Scheduling	0.0	98.0	2.0	0.0
2.3 Contract/project administration	0.0	98.0	2.0	0.0
<b>3.0 Construction phase</b>	<b>76.0</b>	<b>20.0</b>	<b>2.0</b>	<b>2.0</b>
3.1 Project management	84.0	15.0	1.0	0.0
3.2 Scheduling	92.0	7.0	0.5	0.5
3.3 Cost management	90.0	8.0	1.0	1.0
3.4 Contract/project administration	48.0	48.0	2.0	2.0
3.5 Quality assurance	84.0	10.0	2.0	4.0
<b>4.0 Additional</b>	<b>48.0</b>	<b>49.0</b>	<b>2.0</b>	<b>1.0</b>
4.1 Procurement of materials	25.0	75.0	0.0	0.0
4.2 Value engineering	35.0	63.0	2.0	0.0
4.3 Claims analysis	58.0	40.0	1.0	1.0
4.4 Administration of social programs	10.0	87.0	2.0	1.0
4.5 Labor rates	90.0	10.0	0.0	0.0
4.6 Postconstruction activities	90.0	8.0	1.0	1.0

**APPENDIX C**

**PRIVATE-SECTOR CONSTRUCTION MANAGEMENT COSTS**

## PRIVATE-SECTOR CONSTRUCTION MANAGEMENT COSTS

Construction management (CM) has recently begun to gain recognition as a separate industry. As a result, little information describing costs and fees charged for providing CM services is readily obtainable. The Construction Management Association of America (CMAA) is the professional organization charged with the responsibility of marketing the CM industry. It has recently completed a *Standards of Practice Manual*, which defines the services that constitute construction management, and last year, it launched an initiative to promote the CM project delivery method by collecting and analyzing CM costs and fee structure data through surveys of participating members. In a continual effort to collect this information, the CMAA has recently surveyed its membership again.

The results of this second survey show that the services provided by private-sector CM firms vary widely, and on average, these firms provide only 80 percent of the services that a full-service organization, such as the U.S. Army Corps of Engineers (USACE), would provide. Therefore, before they can be compared, the fees for any given private-sector CM project must be adjusted to reflect the same level of service provided during typical USACE CM projects. The basis for such adjustments was the quantification of the relative costs for providing CM services, as identified in CMAA's *Standards of Practice Manual*. Each private-sector project was then adjusted to its "full-service" cost by adding the cost of omitted services normally provided by USACE. This distribution of adjusted CM fees was then compared to USACE's CM fees for similar types of work.

### SURVEY RESPONSES

This year's survey was sent to 179 CMAA member companies that perform CM functions. Table C-1 summarizes the response information. Although this year's response rate was lower than that of the preceding year, each company that participated provided more project data; this year, even though we had fewer responses, those responses included 196 valid projects compared with 162 in the previous survey.

**TABLE C-1**  
**SUMMARY OF VALID SURVEY RESPONSES**

	Number	Percentage
Companies mailed surveys	179	N/A
Valid company responses	29	16
Valid project responses	196	18 <sup>a</sup>

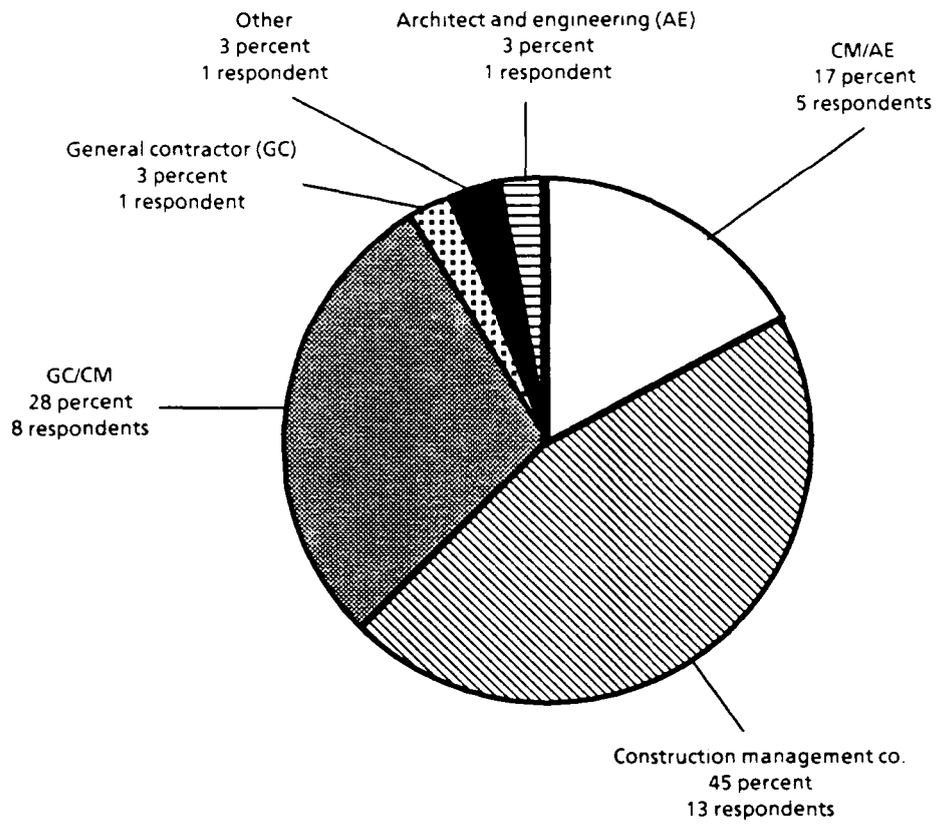
*Note:* N/A = not applicable.

<sup>a</sup> Assumes each company provided eight valid project responses.

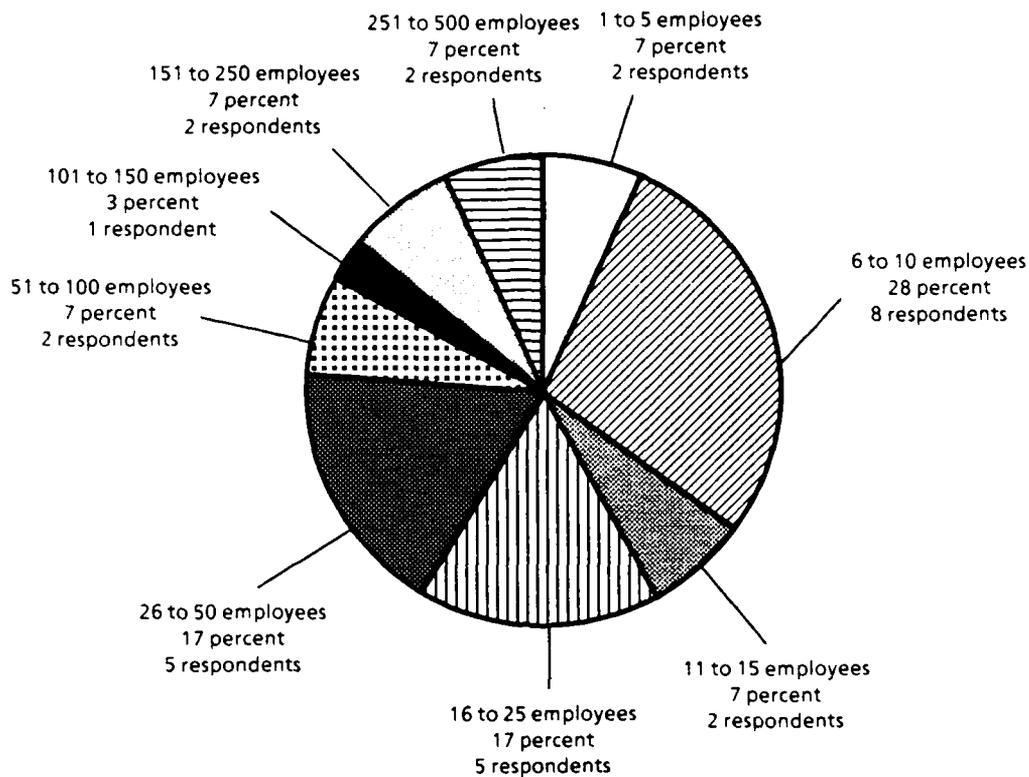
### GENERAL COMPANY DATA

Figure C-1 shows the distribution of valid company responses classified by the company's predominant type of work. Participants were asked to mark the category that best represents their predominant type of work. As with the first survey, most of the respondents, 45 percent, classified themselves as pure construction management companies. Others classified themselves as a combination of CM and general contractor (GC) (28 percent) and CM and architect and engineering (AE) (17 percent). Also, some participants are actually separate CM business units of larger companies and they were treated as separate organizations.

Figure C-2 shows the distribution of the valid responses by total staff size. The companies were asked to give a full-time equivalent of the part-time and consultant staff. Most of the responses were from smaller CM companies with 76 percent of those companies reporting 50 or fewer employees. This distribution is similar to the first survey except that fewer companies in the smallest classification (1 to 5) participated this year.



**FIG. C-1. DISTRIBUTION BY TYPE OF COMPANY**



**FIG. C-2. DISTRIBUTION BY COMPANY SIZE**

The distribution by clientele is shown in Figure C-3. Companies were classified as having either private-sector or Government clientele if they indicated that at least 75 percent of their contracts came from those sources. Otherwise, they were said to be mixed. Participants who reported contracting most of their work to Government clients grew significantly (from 12 percent to 38 percent). However, again this year most participants had predominately private-sector clientele.

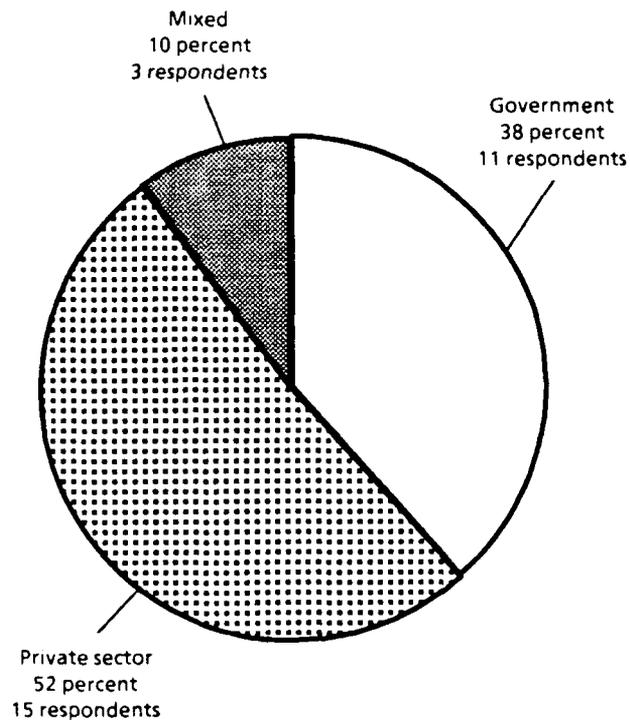


FIG. C-3. DISTRIBUTION BY CLIENTELE

Table C-2 summarizes general company data for fees charged by CM companies, CM companies' customers, and the percentage of Government and private-sector contracts. This table also shows the change from last year's responses. This year's results indicate that the popularity of "lump-sum, fixed-fee" contracts declined significantly while contracts employing "time spent" fee structures increased. The "cost-plus, fixed-fee" structure remained the second most popular type of fee structure. This table also shows that construction management work within the private sector is dominated by corporate/industrial, housing, commercial development, health care providers, and educational/institutional customers. The relative number of health care providers who obtained CM services increased significantly, while the relative number of corporate/administrative/commercial customers declined. Public-sector projects grew most rapidly in the state and local Government and transportation departments.

**TABLE C-2**  
**GENERAL COMPANY DATA**

Characteristic	Mean <sup>a</sup>	Percentage change <sup>b</sup>
<b>Types of fees charged by participants</b>		
Lump-sum, fixed-fee	32%	- 33
Cost-plus, fixed-fee	27	- 7
Time spent (with maximum or time and materials)	26	+ 125
Percentage of construction contract	15	+ 25
Other	1	- 50
<b>Types of customers</b>		
Health care providers	12%	+ 240
Corporate/industrial	15	- 17
Housing/lodging	13	- 7
Commercial developers	10	- 23
Corporate/administrative/commercial	6	- 70
Educational/institutional	12	- 20
Private religious/cultural	3	0
State and local government	15	+ 114
Environmental Protection Agency	2	0
Transportation Departments	12	+ 300
Department of Defense	<1	0
<b>Types of clientele</b>		
Government clients	41%	+ 78
Private-sector clients	59	- 23

**Note:** Percentages may not add to 100 percent because of rounding.

<sup>a</sup> Represents the average (mean) of all responses that were presented as percentages.

<sup>b</sup> The percentage change reflects the difference in this year's responses and those in the original survey.

A thorough breakdown of revenues (for "fee only" and "at risk") by size of company and type of company are included in Table C-3. Overall, the CM companies surveyed averaged \$2.5 million in annual revenues, completed six projects per year for fee only, averaged \$1.5 million, and completed two projects per year "at risk." General contractor (GC) and CM companies were the largest revenue generators and AE firms generally manage significantly smaller projects. This is probably because AE firms tend to provide fewer services than the other classifications. The average revenues for participants that provide CM services were down significantly from the previous year.

**TABLE C-3**  
**SUMMARY OF ANNUAL REVENUES FROM CM PROJECTS**

Characteristic	Average annual CM revenues (\$)	Average number of projects
<b>Overall</b>	\$4,041,941	7.4
<b>Size of company</b>		
1 - 5 employees	\$1,259,075	3.0
6 - 10 employees	1,825,000	6.6
11 - 15 employees	2,519,400	8.0
16 - 25 employees	4,272,000	13.2
26 - 50 employees	5,883,800	5.4
51 - 100 employees	2,133,500	4.0
Over 100 employees	7,559,200	7.8
<b>Type of company</b>		
GC	10,000,000	3.0
CM company	2,840,063	6.9
AE firm	80,000	4.0
GC/CM	7,289,900	10.9
CM/AE	1,785,000	6.0
Other	1,767,000	4.0

## DIRECT AND INDIRECT COSTS

The summary of direct and indirect costs as a percentage of total CM revenues is presented in Table C-4. The median, 25<sup>th</sup> percentile, and 75<sup>th</sup> percentile are shown for all valid responses. The data are also analyzed by size and type of company. After screening the original data, we found that only 24 of the 29 responses provided valid data.

**TABLE C-4**  
**SUMMARY OF DIRECT AND INDIRECT CM COSTS**  
(As a percent of CM revenues)

Characteristic	Number of participants	Direct labor expenses			Payroll burden			G&A Labor expenses		
		25 <sup>th</sup>	Median	75 <sup>th</sup>	25 <sup>th</sup>	Median	75 <sup>th</sup>	25 <sup>th</sup>	Median	75 <sup>th</sup>
<b>Overall</b>	24	23	27	32	7	10	13	4	11	20
<b>Size of company</b>										
1 - 15	7	15	24	26	3	5	13	3	5	12
Over 15	17	25	30	33	9	11	14	5	14	23
<b>Type of company</b>										
GC	1	N/A	17	N/A	N/A	6	N/A	N/A	25	N/A
CM company	11	27	30	37	9	11	13	5	10	19
All other	12	17	25	31	6	9	14	3	11	19

Characteristic	Number of participants	G&A Nonlabor expenses			Nonlabor indirect expenses			Annual operating income		
		25 <sup>th</sup>	Median	75 <sup>th</sup>	25 <sup>th</sup>	Median	75 <sup>th</sup>	25 <sup>th</sup>	Median	75 <sup>th</sup>
<b>Overall</b>	24	8	25	32	2	8	21	4	10	17
<b>Size of company</b>										
1 - 15	7	6	18	32	1	22	39	3	10	20
Over 15	17	9	26	32	2	5	10	6	10	15
<b>Type of company</b>										
GC	1	N/A	35	N/A	N/A	7	N/A	N/A	10	N/A
CM company	11	9	26	32	2	3	22	4	10	15
All other	12	8	14	31	3	9	26	4	8	24

Note: G&A = general and administrative, N/A = not available.

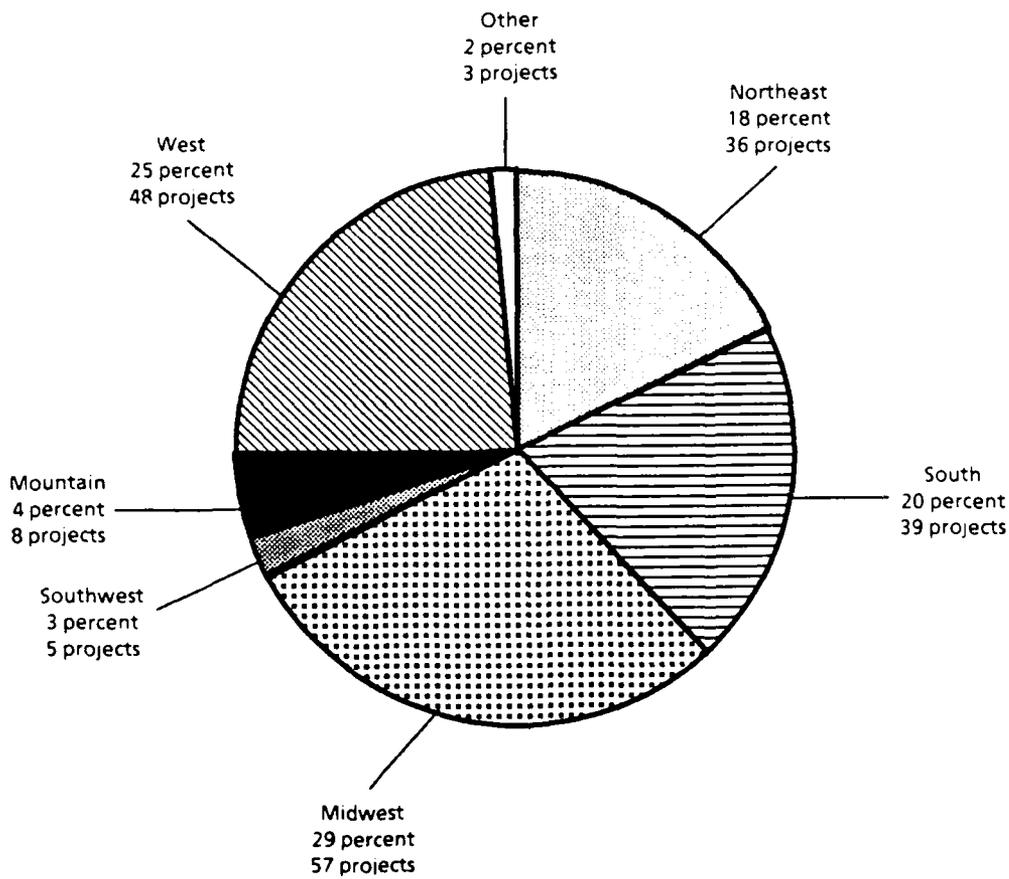
The results in Table C-4 are intended to provide an indication of industry trends for allocating direct and indirect CM costs. They are by no means intended as guidance for this purpose. As expected, the way each company allocated its costs varied widely. However, the median responses from this year's participants indicate that most are allocating about 27 percent of their costs to direct labor, about 36 percent to general and administrative (G&A) expenses and labor, about 10 percent to payroll burden, and about 8 percent to nonlabor indirect expenses. A significant shift toward charging indirect accounts rather than direct accounts occurred this year. Since accounting practices are so varied among the participants, it is difficult to draw conclusions from these results. However, if these results are compared with the project cost data and level of services provided on those projects, it appears that CM costs increased slightly while the amount of services provided decreased. The growth in the G&A nonlabor expense category would suggest that new automation may have had an impact. Payroll burden as a percentage of direct labor shows a 5 percent increase over last year. That change is believed to be due in part to salary and benefits, which have increased more rapidly than construction and other costs. This is the first year we asked for annual operating income as a percentage of CM revenues. The median value for this ratio is 10 percent with little variation by the size or type of company.

## **PROJECT DATA**

In the last part of the survey, the participants were asked to submit information for as many as 12 individual projects that their company had performed CM services. The survey asked for type of construction project, geographic location of the construction project, the scope of the construction project (new construction or renovation), type of contract (CM as owner's agent or CM provides guaranteed maximum price), basis for internally estimating the CM contract value, and value of the CM and construction contracts.

Figure C-4 shows the distribution of the 179 projects for which the geographic location of the construction site was reported. The information from this survey indicates that CMAA members are performing most of their CM work in the West and Midwest and to a lesser degree in the Northeast and South. This shows a shift of CM projects from the Northeast and South to the West and Midwest compared to last year's survey. Once again, these results depend upon the CM companies that participated in the survey and should not be interpreted as an industry trend.

However, it is important to note where the projects were managed since geographic location impacts the cost of services provided.



BREAKDOWN OF GEOGRAPHIC REGIONS BY STATES

Region	States
Northeast	CT, DE, ME, MD, MA, NH, NJ, NY, PA, RI, VT
South	AR, AL, DC, FL, GA, KY, LA, MS, NC, SC, TN, VA, WV
Midwest	IL, IN, IA, KS, MI, MN, MO, NE, ND, OH, SD, WI
Southwest	AZ, NM, OK, TX
Mountain	CO, ID, MT, NV, WY, UT
West	AK, CA, HI, OR, WA
Other	Canada, Mexico, and Overseas

FIG. C-4. DISTRIBUTION OF PROJECTS BY GEOGRAPHIC REGION

Table C-5 shows the distribution of the project responses by type. It indicates the specific types of construction projects that the participants provided in the survey and shows the sources of data used in the project data summaries.

TABLE C-5

## DISTRIBUTION OF VALID RESPONSES BY PROJECT TYPE

Category and type	Number of projects	Percentage of total
<b>Health care providers</b>	<b>17</b>	<b>8.8</b>
(01) Hospitals	7	3.6
(03) Clinics/outpatient facilities	5	2.6
(04) Medical offices	2	1.0
(05) Extended care/nursing homes	3	1.6
<b>Corporate/industrial</b>	<b>19</b>	<b>9.9</b>
(06) Warehouse/distribution centers	7	3.6
(07) Light industrial	4	2.1
(08) Process plants/heavy industrial	8	4.2
<b>Housing/lodging</b>	<b>30</b>	<b>15.7</b>
(09) Hotels (high-rise)	3	1.6
(10) Motels (low-rise)	5	2.6
(11) Apartments/condominiums (high-rise)	5	2.6
(12) Apartments/condominiums (low-rise)	9	4.7
(13) Single-family housing	8	4.2
<b>Commercial developers</b>	<b>27</b>	<b>14.0</b>
(14) High-rise office buildings	3	1.6
(15) Mid-rise office buildings	7	3.6
(16) Low-rise office buildings	6	3.1
(17) Shopping malls (enclosed)	5	2.6
(18) Strip shopping centers	6	3.1
<b>Corporate/administrative/commercial</b>	<b>14</b>	<b>7.3</b>
(19) General offices	9	4.7
(20) Retail stores	3	1.6
(21) Restaurants	2	1.0

**Notes:** Percentages may not total 100 percent because of rounding. Two-digit code refers to CMAA survey project type.

**TABLE C-5**

**DISTRIBUTION OF VALID RESPONSES BY PROJECT TYPE (Continued)**

Category and type	Number of projects	Percentage of total
<b>Educational/institutional</b>	<b>34</b>	<b>17.8</b>
(22) Classrooms	19	9.9
(23) Science/research labs	3	1.6
(24) Dormitories/housing	3	1.6
(25) Sports/athletic facilities	9	4.7
<b>Private religious/cultural</b>	<b>6</b>	<b>3.1</b>
(26) Churches	2	1.0
(27) Theaters/auditoriums	4	2.1
<b>State and local Government</b>	<b>12</b>	<b>6.2</b>
(28) Office buildings	3	1.6
(29) Museums/galleries	2	1.0
(30) Correctional facilities	7	3.6
<b>Environmental Protection Agency</b>	<b>6</b>	<b>3.2</b>
(31) Water-treatment plants	0	0
(32) Wastewater treatment	3	1.6
(33) Hazardous waste facilities	0	0
(34) Water/sewer lines	3	1.6
<b>Transportation Departments</b>	<b>20</b>	<b>10.3</b>
(35) Bridges	5	2.6
(36) Roads	12	6.2
(37) Tunnels	1	0.5
(38) Airports	2	1.0

**Notes:** Percentages may not total 100 percent because of rounding. Two-digit code refers to CMAA survey project type.

TABLE C-5

DISTRIBUTION OF VALID RESPONSES BY PROJECT TYPE (Continued)

Category and type	Number of projects	Percentage of total
<b>Department of Defense</b>	<b>5</b>	<b>2.6</b>
(39) Military housing	0	0
(40) Military offices	0	0
(41) Military training facilities	0	0
(42) Military medical facilities	0	0
(43) Piers/wharves	5	2.6
(44) Dredging	0	0
(45) Locks and dams	0	0
(46) Reservoirs	0	0
(47) Channel protection	0	0
(48) Beach stabilization	0	0
<b>Other Federal</b>	<b>2</b>	<b>1.0</b>
(49) Office buildings	0	0
(50) Postal facilities	2	1.0

**Notes:** Percentages may not total 100 percent because of rounding. Two-digit code refers to CMAA survey project type.

For the purpose of this study, USACE CM costs were categorized by type of work or fund type – source of appropriations and customers. Private-sector CM projects were aggregated into military construction fund-type categories. These aggregations were used as the basis for USACE versus private-sector comparisons. Table C-6 contains the criteria for grouping private-sector projects. Independent project statistics for each fund type are summarized in Tables C-9 through C-21.

TABLE C-6

MAPPING OF PRIVATE-SECTOR PROJECT TYPES TO CORPS OF ENGINEERS FUND TYPES

USACE fund types	Project types
<b>Family Housing – Army</b>	(11) Apartment/condominiums (high-rise) (12) Apartments/condominiums (low-rise) (13) Single-family housing
<b>Family Housing – Air Force</b>	(11) Apartments/condominiums (high-rise) (12) Apartments/condominiums (low-rise) (13) Single-family housing
<b>Foreign Military Sales</b>	(07) Light industrial (28) Office buildings (38) Airports (40) Military offices (41) Military training facilities (42) Military medical facilities
<b>Host Nation</b>	(01) Hospitals (07) Light industrial (24) Dormitories/housing (25) Sports/athletic facilities (28) Office buildings (31) Water-treatment plants (36) Roads (39) Military housing (40) Military offices (41) Military training facilities (42) Military medical facilities (49) Federal office buildings
<b>MILCON – Army</b>	(01) Hospitals (03) Clinics/outpatient facilities (04) Medical offices (06) Warehouse/distribution centers (07) Light industrial (10) Motels (low-rise) (16) Low-rise office buildings (19) General offices

**Note:** The two-digit number in parentheses refers to the CMAA survey project category code

TABLE C-6

MAPPING OF PRIVATE-SECTOR PROJECT TYPES TO CORPS OF ENGINEERS  
FUND TYPES (Continued)

USACE fund types	Project types
<b>MILCON – Army (Continued)</b>	(24) Dormitories/housing (25) Sports/athletic facilities (26) Churches (28) Office buildings (31) Water-treatment plants (32) Wastewater treatment (34) Water/sewer lines (39) Military housing (40) Military offices (41) Military training facilities (42) Military medical facilities
<b>MILCON – Air Force</b>	(01) Hospitals (03) Clinics/outpatient facilities (04) Medical offices (06) Warehouse/distribution centers (07) Light industrial (10) Motels (low-rise) (16) Low-rise office buildings (19) General offices (24) Dormitories/housing (25) Sports/athletic facilities (26) Churches (28) Office buildings (31) Water-treatment plants (32) Wastewater treatment (34) Water/sewer lines (38) Airports (39) Military housing (41) Military training facilities (42) Military medical facilities
<b>MILCON – Army Reserves</b>	(16) Low-rise office buildings (22) Classrooms (49) Federal office buildings

**Note:** The two-digit number in parentheses refers to the CMAA survey project category code.

**TABLE 6**  
**MAPPING OF PRIVATE-SECTOR PROJECT TYPES TO CORPS OF ENGINEERS**  
**FUND TYPES (Continued)**

USACE fund types	Project types
<b>MILCON – Other</b>	(04) Medical offices (06) Warehouse/distribution centers (07) Light industrial (08) Process plants/heavy industrial (11) Apartments/condominiums (high-rise) (12) Apartments/condominiums (low-rise) (13) Single-family housing (14) High-rise office buildings (15) Mid-rise office buildings (20) Retail stores (22) Classrooms (23) Science research labs (24) Dormitories/housing (25) Sports/athletic facilities (26) Churches (27) Theaters/auditoriums (28) Office buildings (29) Museums/galleries (30) Correctional facilities (31) Water-treatment plants (32) Wastewater treatment (33) Hazardous waste facilities (34) Water/sewer lines (35) Bridges (36) Roads (37) Tunnels (38) Airports (39) Military housing (40) Military offices (41) Military training facilities (42) Military medical facilities (49) Federal office buildings (50) Postal facilities

**Note:** The two-digit number in parentheses refers to the CMAA survey project category code.

TABLE 6

MAPPING OF PRIVATE-SECTOR PROJECT TYPES TO CORPS OF ENGINEERS  
FUND TYPES (Continued)

USACE fund types	Project types
<p><b>Operations &amp; Maintenance – Army</b></p>	<p>All renovation projects for the following:</p> <ul style="list-style-type: none"> <li>(01) Hospitals</li> <li>(03) Clinics/outpatient facilities</li> <li>(04) Medical offices</li> <li>(06) Warehouse/distribution centers</li> <li>(07) Light industrial</li> <li>(08) Process plants/heavy industrial</li> <li>(10) Motels (low-rise)</li> <li>(16) Low-rise office buildings</li> <li>(19) General offices</li> <li>(24) Dormitories/housing</li> <li>(25) Sports/athletic facilities</li> <li>(26) Churches</li> <li>(28) Office buildings</li> <li>(31) Water-treatment plants</li> <li>(32) Wastewater treatment</li> <li>(34) Water/sewer lines</li> <li>(36) Roads</li> <li>(39) Military housing</li> <li>(40) Military offices</li> <li>(41) Military training facilities</li> <li>(42) Military medical facilities</li> <li>(49) Federal office buildings</li> </ul>
<p><b>Operations &amp; Maintenance – Air Force</b></p>	<p>All renovation projects for the following:</p> <ul style="list-style-type: none"> <li>(01) Hospitals</li> <li>(03) Clinics/outpatient facilities</li> <li>(04) Medical offices</li> <li>(06) Warehouse/distribution centers</li> <li>(07) Light industrial</li> <li>(08) Process plants/heavy industrial</li> <li>(10) Motels (low-rise)</li> <li>(16) Low-rise office buildings</li> <li>(19) General offices</li> <li>(24) Dormitories/housing</li> </ul>

**Note:** The two-digit number in parentheses refers to the CMAA survey project category code.

**TABLE 6**  
**MAPPING OF PRIVATE-SECTOR PROJECT TYPES TO CORPS OF ENGINEERS**  
**FUND TYPES (Continued)**

USACE fund types	Project types
<b>Operations &amp; Maintenance – Air Force (Continued)</b>	(25) Sports/athletic facilities (26) Churches (28) Office buildings (31) Water-treatment plants (32) Wastewater treatment (33) Hazardous waste facilities (34) Water/sewer lines (36) Roads (38) Airports (39) Military housing (40) Military offices (41) Military training facilities (42) Military medical facilities (49) Federal office buildings
<b>Production Base Support</b>	(06) Warehouse/distribution centers (08) Process plants/heavy industrial (33) Hazardous waste facilities (34) Water/sewer lines (36) Roads (49) Federal office buildings
<b>Defense Environmental Restoration Program</b>	(31) Water-treatment plants (32) Wastewater treatment (33) Hazardous waste facilities (34) Water/sewer lines
<b>Other</b>	(04) Medical offices (14) High-rise office buildings (20) Retail stores (26) Churches (50) Postal facilities

**Note:** The two-digit number in parentheses refers to the CMAA survey project category code.

Table C-7 is a summary of the CM fees for all projects, by size of company, by type of company, and by client base. This table indicates that the absolute value of CM fees has not changed significantly from the previous survey even though the services provided declined significantly. In general, CM fees decreased (about 6 percent) from last year, and that decrease is directly related to the level of CM services provided. Table C-8 is a summary of the CM services provided by this year's participants compared to last year's responses. It shows that the level of services provided on the projects presented in this survey declined substantially from those of the previous survey. Since the level of service is a major determinant of the total CM cost, these lower levels of services account for the slightly lower overall CM fee from this year's survey compared to the first survey. However, given the significant decline in services shown in Table C-8, the decline in the CM fee is not as great as would be expected, particularly considering the decrease in those services that have the highest impact on CM costs (e.g., construction phase services).

#### **PROJECT STATISTICS SUMMARIES**

The following information is provided for each of the fund types defined in Table C-6 and shown in Tables C-9 through C-21.

- *The construction management fee as a percentage of construction contract.* The construction management fee is presented as a percentage of the value of the construction contract to provide a basis for comparing the fees over varying types of construction and conditions. The CM fee is given for the following elements for each construction type category:
  - ▶ All projects
  - ▶ CM as owner's agent contracts
  - ▶ CM provides guaranteed maximum price contracts.

For each of these conditions, the 25<sup>th</sup> percentile, median, 75<sup>th</sup> percentile, and the number of individual projects reported are given. The number of different companies providing the project information are also given so that the reader can see whether the information provided is unique to a single company or whether the data represent several different companies. Where an N/A is given, too few data points were available to calculate the 25<sup>th</sup> and 75<sup>th</sup> percentile statistics.

- *Construction and CM contract value.* Following each table, the average values of the construction and CM contracts that comprise the CM fee analysis are shown.

**TABLE C-7**  
**SUMMARY OF CONSTRUCTION MANAGEMENT FEE**  
(As percent of construction contract)

Characteristic	Construction management fee			Number of projects	Number of companies
	25th	Median	75th		
<b>Overall</b>	2.9%	4.7%	7.6%	196	29
<b>Size of company</b>					
1 - 5	4.6	5.3	11.9	9	2
6 - 10	3.5	5.2	7.1	43	8
11 - 15	3.6	4.0	5.0	8	2
16 - 25	0.7	3.2	9.7	48	5
26 - 50	3.8	4.9	7.3	40	5
51 - 100	3.8	6.4	11.0	13	2
Over 100	2.0	4.5	6.7	35	5
<b>Type of company</b>					
General contractor (GC)	2.9	2.9	2.9	1	1
CM firm	2.2	4.6	8.0	113	13
Architect engineering firm (AE)	2.0	2.3	3.3	9	1
GC/CM	3.3	4.4	6.4	47	8
CM/AE	4.4	7.0	8.4	19	5
Other	3.2	4.8	11.7	7	1
<b>Client base</b>					
Government	2.3	4.8	7.4	71	11
Private sector	2.8	4.5	8.0	106	15
Mixed	3.6	5.0	6.7	19	3

**TABLE C-8**  
**CM SERVICES PROVIDED**

CM services	Percent of projects where service was provided (1988)	Percent of projects where service was provided (1990)
<b>Predesign phase</b>		
Project management	74	46
Scheduling	71	43
Cost management	74	42
Contract/project administration	72	40
<b>Design-and-bid phase</b>		
Project management	84	64
Scheduling	86	64
Contract/project administration	84	69
<b>Construction phase</b>		
Project management	94	88
Scheduling	92	85
Cost management	97	86
Contract/project administration	94	93
Quality assurance	85	70
<b>Additional services</b>		
Procurement of materials	55	27
Value engineering	64	31
Cost estimating	83	42
Constructibility review	77	29
Materials testing	33	17
Claims analysis	30	17
Other	9	10

- *Basis for estimating CM contract value.* This section of each table shows what methods are used by the survey participants to determine the fee that will be charged: percent of construction contract value, direct and indirect cost calculation, or other.
- *Summary of CM services.* Each table also shows which CM services are provided for reported projects. The services are defined in the CMAA *Standards of Practice Manual*.

TABLE C-9

FAMILY HOUSING – ARMY

CONSTRUCTION MANAGEMENT FEE AS PERCENT OF CONSTRUCTION COST

	CM fee			Number of projects	Number of companies
	25%	Median	75%		
Overall fee	3.4	6.5	19.6	13	7
CM as owner's agent	3.4	6.2	19.6	12	6
CM provides guaranteed maximum price	N/A	6.6	N/A	1	1

Average Value of Construction Contract \$ 25,653,846  
 Average Value of CM Contract \$ 676,192

**Basis for Estimating CM Contract Value**

Percent of Construction Contract Value 77%  
 Direct and Indirect Cost Calculation 23%  
 Other 0%

**Summary of Construction Management Services**

Services provided	Service frequency
<b>Pre-design Phase</b>	
Project management	38%
Scheduling	38%
Cost management	23%
Contract/project administration	38%
<b>Design-and-Bid Phase</b>	
Project management	38%
Scheduling	38%
Contract/project administration	38%
<b>Construction Phase</b>	
Project management	92%
Scheduling	92%
Cost management	85%
Contract/project administration	92%
Quality assurance	77%
<b>Additional Services</b>	
Procurement of materials	31%
Value engineering	15%
Cost estimating	23%
Constructibility review	38%
Materials testing	8%
Claims analysis	8%
Other	15%

TABLE C-10

FAMILY HOUSING – AIR FORCE  
CONSTRUCTION MANAGEMENT FEE AS PERCENT OF CONSTRUCTION COST

	CM fee			Number of projects	Number of companies
	25%	Median	75%		
Overall fee	3.4	6.5	19.6	13	7
CM as owner's agent	3.4	6.2	19.6	12	6
CM provides guaranteed maximum price	N/A	6.6	N/A	1	1

Average Value of Construction Contract \$ 25,653,846  
Average Value of CM Contract \$ 676,192

**Basis for Estimating CM Contract Value**

Percent of Construction Contract Value 77%  
Direct and Indirect Cost Calculation 23%  
Other 0%

**Summary of Construction Management Services**

Services provided	Service frequency
<b>Pre-design Phase</b>	
Project management	38%
Scheduling	38%
Cost management	23%
Contract/project administration	38%
<b>Design-and-Bid Phase</b>	
Project management	38%
Scheduling	38%
Contract/project administration	38%
<b>Construction Phase</b>	
Project management	92%
Scheduling	92%
Cost management	85%
Contract/project administration	92%
Quality assurance	77%
<b>Additional Services</b>	
Procurement of materials	31%
Value engineering	15%
Cost estimating	23%
Constructibility review	38%
Materials testing	8%
Claims analysis	8%
Other	15%

TABLE C-11

FOREIGN MILITARY SALES

CONSTRUCTION MANAGEMENT FEE AS PERCENT OF CONSTRUCTION COST

	CM fee			Number of projects	Number of companies
	25%	Median	75%		
Overall fee	3.9	5.3	10.1	7	6
CM as owner's agent	N/A	9.5	N/A	4	4
CM provides guaranteed maximum price	N/A	3.9	N/A	3	2

Average Value of Construction Contract

\$ 14,257,143

Average Value of CM Contract

\$ 578,000

**Basis for Estimating CM Contract Value**

Percent of Construction Contract Value

29%

Direct and Indirect Cost Calculation

43%

Other

29%

Summary of Construction Management Services

Services provided	Service frequency
<b>Pre-design Phase</b>	
Project management	71%
Scheduling	71%
Cost management	71%
Contract/project administration	71%
<b>Design-and-Bid Phase</b>	
Project management	86%
Scheduling	86%
Contract/project administration	86%
<b>Construction Phase</b>	
Project management	100%
Scheduling	86%
Cost management	86%
Contract/project administration	86%
Quality assurance	57%
<b>Additional Services</b>	
Procurement of materials	43%
Value engineering	71%
Cost estimating	57%
Constructibility review	29%
Materials testing	14%
Claims analysis	14%
Other	0%

**TABLE C-12**  
**HOST NATION**  
**CONSTRUCTION MANAGEMENT FEE AS PERCENT OF CONSTRUCTION COST**

	CM fee			Number of projects	Number of companies
	25%	Median	75%		
Overall fee	4.7	7.0	9.4	26	13
CM as owner's agent	4.8	8.5	10.6	18	11
CM provides guaranteed maximum price	4.2	5.1	6.2	8	2

Average Value of Construction Contract \$ 10,036,808  
Average Value of CM Contract \$ 335,902

**Basis for Estimating CM Contract Value**

Percent of Construction Contract Value 35%  
Direct and Indirect Cost Calculation 62%  
Other 4%

**Summary of Construction Management Services**

Services provided	Service frequency
<b>Pre-design Phase</b>	
Project management	50%
Scheduling	50%
Cost management	38%
Contract/project administration	38%
<b>Design-and-Bid Phase</b>	
Project management	62%
Scheduling	62%
Contract/project administration	77%
<b>Construction Phase</b>	
Project management	77%
Scheduling	73%
Cost management	73%
Contract/project administration	92%
Quality assurance	62%
<b>Additional Services</b>	
Procurement of materials	15%
Value engineering	23%
Cost estimating	23%
Constructibility review	15%
Materials testing	27%
Claims analysis	15%
Other	0%

TABLE C-13

MILCON - ARMY

CONSTRUCTION MANAGEMENT FEE AS PERCENT OF CONSTRUCTION COST

	CM fee			Number of projects	Number of companies
	25%	Median	75%		
Overall fee	4.9	8.8	13.1	49	18
CM as owner's agent	6.6	9.4	14.1	37	15
CM provides guaranteed maximum price	4.1	5.1	7.8	12	5

Average Value of Construction Contract \$ 9,482,746  
 Average Value of CM Contract \$ 330,472

**Basis for Estimating CM Contract Value**

Percent of Construction Contract Value 47%  
 Direct and Indirect Cost Calculation 47%  
 Other 6%

Summary of Construction Management Services

Services provided	Service frequency
<b>Pre-design Phase</b>	
Project management	45%
Scheduling	41%
Cost management	43%
Contract/project administration	35%
<b>Design-and-Bid Phase</b>	
Project management	65%
Scheduling	61%
Contract/project administration	71%
<b>Construction Phase</b>	
Project management	86%
Scheduling	86%
Cost management	90%
Contract/project administration	92%
Quality assurance	59%
<b>Additional Services</b>	
Procurement of materials	16%
Value engineering	24%
Cost estimating	37%
Constructibility review	16%
Materials testing	12%
Claims analysis	12%
Other	0%

TABLE C-14

MILCON - AIR FORCE

CONSTRUCTION MANAGEMENT FEE AS PERCENT OF CONSTRUCTION COST

	CM fee			Number of projects	Number of companies
	25%	Median	75%		
Overall fee	4.8	8.7	13.1	51	19
CM as owner's agent	5.9	9.4	14.1	38	15
CM provides guaranteed maximum price	3.9	4.9	7.0	13	6

Average Value of Construction Contract

\$ 10,150,089

Average Value of CM Contract

\$ 358,199

**Basis for Estimating CM Contract Value**

Percent of Construction Contract Value

45%

Direct and Indirect Cost Calculation

47%

Other

8%

Summary of Construction Management Services

Services provided	Service frequency
<b>Pre-design Phase</b>	
Project management	45%
Scheduling	41%
Cost management	43%
Contract/project administration	35%
<b>Design-and-Bid Phase</b>	
Project management	65%
Scheduling	61%
Contract/project administration	71%
<b>Construction Phase</b>	
Project management	86%
Scheduling	84%
Cost management	88%
Contract/project administration	92%
Quality assurance	61%
<b>Additional Services</b>	
Procurement of materials	18%
Value engineering	25%
Cost estimating	37%
Constructibility review	18%
Materials testing	14%
Claims analysis	14%
Other	0%

TABLE C-15

MILCON – ARMY RESERVES

CONSTRUCTION MANAGEMENT FEE AS PERCENT OF CONSTRUCTION COST

	CM fee			Number of projects	Number of companies
	25%	Median	75%		
Overall fee	6.9	8.7	10.2	14	6
CM as owner's agent	7.2	9.1	10.2	11	4
CM provides guaranteed maximum price	N/A	2.1	N/A	3	2

Average Value of Construction Contract

\$ 5,797,225

Average Value of CM Contract

\$ 359,944

**Basis for Estimating CM Contract Value**

Percent of Construction Contract Value

43%

Direct and Indirect Cost Calculation

57%

Other

0%

Summary of Construction Management Services

Services provided	Service frequency
<b>Pre-design Phase</b>	
Project management	36%
Scheduling	36%
Cost management	36%
Contract/project administration	36%
<b>Design-and-Bid Phase</b>	
Project management	71%
Scheduling	71%
Contract/project administration	93%
<b>Construction Phase</b>	
Project management	100%
Scheduling	100%
Cost management	100%
Contract/project administration	100%
Quality assurance	100%
<b>Additional Services</b>	
Procurement of materials	14%
Value engineering	7%
Cost estimating	14%
Constructability review	0%
Materials testing	0%
Claims analysis	0%
Other	57%

TABLE C-16

MILCON – OTHER

CONSTRUCTION MANAGEMENT FEE AS PERCENT OF CONSTRUCTION COST

	CM fee			Number of projects	Number of companies
	25%	Median	75%		
Overall fee	3.7	6.4	10.0	103	257
CM as owner's agent	4.1	6.6	10.2	79	21
CM provides guaranteed maximum price	3.7	4.9	7.0	24	8

Average Value of Construction Contract

\$ 28,396,743

Average Value of CM Contract

\$ 959,257

**Basis for Estimating CM Contract Value**

Percent of Construction Contract Value

33%

Direct and Indirect Cost Calculation

60%

Other

7%

Summary of Construction Management Services

Services provided	Service frequency
<b>Pre-design Phase</b>	
Project management	42%
Scheduling	39%
Cost management	36%
Contract/project administration	36%
<b>Design-and-Bid Phase</b>	
Project management	64%
Scheduling	63%
Contract/project administration	71%
<b>Construction Phase</b>	
Project management	90%
Scheduling	87%
Cost management	87%
Contract/project administration	93%
Quality assurance	77%
<b>Additional Services</b>	
Procurement of materials	30%
Value engineering	32%
Cost estimating	44%
Constructibility review	29%
Materials testing	24%
Claims analysis	20%
Other	12%

TABLE C-17

**OPERATIONS & MAINTENANCE – ARMY  
CONSTRUCTION MANAGEMENT FEE AS PERCENT OF CONSTRUCTION COST**

	CM fee			Number of projects	Number of companies
	25%	Median	75%		
Overall fee	4.2	9.8	13.3	25	15
CM as owner's agent	3.4	9.4	13.8	20	12
CM provides guaranteed maximum price	6.5	13.2	13.3	5	4

Average Value of Construction Contract \$ 27,599,568  
 Average Value of CM Contract \$ 1,182,413

**Basis for Estimating CM Contract Value**

Percent of Construction Contract Value 12%  
 Direct and Indirect Cost Calculation 76%  
 Other 12%

**Summary of Construction Management Services**

Services provided	Service frequency
<b>Pre-design Phase</b>	
Project management	40%
Scheduling	40%
Cost management	40%
Contract/project administration	36%
<b>Design-and-Bid Phase</b>	
Project management	52%
Scheduling	60%
Contract/project administration	48%
<b>Construction Phase</b>	
Project management	92%
Scheduling	88%
Cost management	96%
Contract/project administration	92%
Quality assurance	76%
<b>Additional Services</b>	
Procurement of materials	24%
Value engineering	28%
Cost estimating	40%
Constructibility review	28%
Materials testing	16%
Claims analysis	20%
Other	12%

TABLE C-18

OPERATIONS & MAINTENANCE – AIR FORCE  
CONSTRUCTION MANAGEMENT FEE AS PERCENT OF CONSTRUCTION COST

	CM fee			Number of projects	Number of companies
	25%	Median	75%		
Overall fee	4.2	10.2	14.4	26	15
CM as owner's agent	4.2	9.8	14.4	21	12
CM provides guaranteed maximum price	6.5	13.2	13.3	5	4

Average Value of Construction Contract

\$ 26,576,508

Average Value of CM Contract

\$ 1,142,371

**Basis for Estimating CM Contract Value**

Percent of Construction Contract Value

12%

Direct and Indirect Cost Calculation

77%

Other

12%

Summary of Construction Management Services

Services provided	Service frequency
<b>Predesign Phase</b>	
Project management	38%
Scheduling	38%
Cost management	38%
Contract/project administration	35%
<b>Design-and-Bid Phase</b>	
Project management	50%
Scheduling	58%
Contract/project administration	46%
<b>Construction Phase</b>	
Project management	92%
Scheduling	88%
Cost management	96%
Contract/project administration	92%
Quality assurance	77%
<b>Additional Services</b>	
Procurement of materials	23%
Value engineering	27%
Cost estimating	38%
Constructibility review	27%
Materials testing	15%
Claims analysis	19%
Other	12%

TABLE C-19

PRODUCTION BASE SUPPORT  
CONSTRUCTION MANAGEMENT FEE AS PERCENT OF CONSTRUCTION COST

	CM fee			Number of projects	Number of companies
	25%	Median	75%		
Overall fee	4.6	8.3	17.6	19	11
CM as owner's agent	4.7	9.4	17.6	13	8
CM provides guaranteed maximum price	4.2	5.9	8.3	6	5

Average Value of Construction Contract

\$ 45,983,513

Average Value of CM Contract

\$ 1,191,624

**Basis for Estimating CM Contract Value**

Percent of Construction Contract Value

11%

Direct and Indirect Cost Calculation

74%

Other

16%

Summary of Construction Management Services

Services provided	Service frequency
<b>Predesign Phase</b>	
Project management	42%
Scheduling	37%
Cost management	32%
Contract/project administration	32%
<b>Design-and-Bid Phase</b>	
Project management	74%
Scheduling	68%
Contract/project administration	84%
<b>Construction Phase</b>	
Project management	89%
Scheduling	89%
Cost management	84%
Contract/project administration	100%
Quality assurance	63%
<b>Additional Services</b>	
Procurement of materials	26%
Value engineering	26%
Cost estimating	47%
Constructibility review	32%
Materials testing	37%
Claims analysis	26%
Other	0%

TABLE C-20

**DEFENSE ENVIRONMENT RESTORATION PROGRAM  
CONSTRUCTION MANAGEMENT FEE AS PERCENT OF CONSTRUCTION COST**

	CM fee			Number of projects	Number of companies
	25%	Median	75%		
Overall fee	7.7	10.0	15.3	5	3
CM as owner's agent	7.7	10.0	15.3	5	3
CM provides guaranteed maximum price	N/A	N/A	N/A	N/A	N/A

Average Value of Construction Contract

\$ 13,280,000

Average Value of CM Contract

\$ 643,920

**Basis for Estimating CM Contract Value**

Percent of Construction Contract Value

20%

Direct and Indirect Cost Calculation

80%

Other

0%

**Summary of Construction Management Services**

Services provided	Service frequency
<b>Pre-design Phase</b>	
Project management	0%
Scheduling	0%
Cost management	0%
Contract/project administration	0%
<b>Design-and-Bid Phase</b>	
Project management	20%
Scheduling	0%
Contract/project administration	0%
<b>Construction Phase</b>	
Project management	80%
Scheduling	100%
Cost management	100%
Contract/project administration	80%
Quality assurance	80%
<b>Additional Services</b>	
Procurement of materials	0%
Value engineering	20%
Cost estimating	20%
Constructibility review	20%
Materials testing	0%
Claims analysis	20%
Other	0%

TABLE C-21

OTHER

CONSTRUCTION MANAGEMENT FEE AS PERCENT OF CONSTRUCTION COST

	CM fee			Number of projects	Number of companies
	25%	Median	75%		
Overall fee	3.7	4.6	7.6	16	9
CM as owner's agent	3.7	5.1	6.6	13	7
CM provides guaranteed maximum price	N/A	3.7	N/A	3	2

Average Value of Construction Contract \$ 11,860,978  
 Average Value of CM Contract \$ 349,392

**Basis for Estimating CM Contract Value**

Percent of Construction Contract Value 63%  
 Direct and Indirect Cost Calculation 25%  
 Other 13%

Summary of Construction Management Services

Services provided	Service frequency
<b>Pre-design Phase</b>	
Project management	38%
Scheduling	38%
Cost management	38%
Contract/project administration	44%
<b>Design-and-Bid Phase</b>	
Project management	56%
Scheduling	56%
Contract/project administration	75%
<b>Construction Phase</b>	
Project management	75%
Scheduling	69%
Cost management	69%
Contract/project administration	94%
Quality assurance	88%
<b>Additional Services</b>	
Procurement of materials	44%
Value engineering	50%
Cost estimating	38%
Constructibility review	50%
Materials testing	19%
Claims analysis	25%
Other	6%

**APPENDIX D**

**SURVEY DOCUMENTS**



**SURVEY OF CONSTRUCTION MANAGEMENT COST STRUCTURES**

**TO: CMAA CORPORATE MEMBER FIRMS**

This 1989 survey of construction management (CM) cost data is again being conducted by CMAA in cooperation with the Logistics Management Institute (LMI), an independent research agency. The principal purpose of the survey is to gather and analyze cost information that will assist us in explaining the cost benefits of the CM project delivery method. Every CM firm has its own method of setting price and every project is different. But it is important for the Association to be able to respond to inquiries from potential clients with aggregate data that generally relate costs to services. The results of the first survey, published in 1988, stimulated much interest among both public and private owners looking for hard information on CM. The responses from this second survey will significantly expand the database of project information, thereby increasing the usefulness of the aggregated results.

Each participating firm will receive a copy of the results upon request; this will allow each firm to analyze its own business and pricing strategies in comparison with other firms. Please retain a copy of your response for this purpose and return the separate enclosed participation form addressed to LMI to receive the results of the survey.

It is important that each company receiving this questionnaire complete and return it in the enclosed stamped envelope to insure that we obtain enough responses for statistically meaningful results.

This is a confidential survey; no identification by name of respondent is required on the survey form. All completed surveys should be returned to LMI in the addressed, stamped envelopes provided.

It is important that the data you submit be accurate. Please spend the time - approximately 20 minutes - to carefully complete the survey. Here are some guidelines:

- Read the "special instructions" following this letter before starting the survey.
- Do not guess. A close approximation or actual data are necessary.
- Submit the information in the format requested on the survey to facilitate processing and analysis.
- If you responded to the first cost survey, submit data only for projects not previously reported.
- Limit your responses to construction types falling within the categories listed in the instructions.
- Read through the entire questionnaire before beginning to respond.

Please return your completed questionnaire by November 20, 1989. If you have any questions pertaining to its content or format, feel free to contact Jeffrey Hawkins at (301)320-2000, Extension 274.

Thank you for your cooperation.

Yours sincerely,

**CONSTRUCTION MANAGEMENT ASSOCIATION OF AMERICA**

Karl F. Borgstrom  
Executive Director

12355 SUNRISE VALLEY DRIVE • SUITE 640 • RESTON, VA 22091 • (703) 391-1200



## SURVEY INSTRUCTIONS

- 1.-5. Self-explanatory.
6. Indicate the types of fees, as a percentage, your company charges for the types listed. Must add to 100%.
  - A. **Lump Sum** – predetermined amount (fixed fee) for the CM work
  - B. **Cost-plus fixed fee** – owner pays for all costs and overhead incurred on the project plus a fixed fee (profit)
  - C. **Time Spent** – fee is based on an established hourly rate. Owner is billed for (hours) x (rate).
  - D. **Percentage of Construction Contract** – fee is determined as a percentage of the actual construction contract amount.  $Fee = \% \times \text{Construction } (\$)$ .
7. Here we would like to determine your company's areas of expertise. Indicate, as a percentage of all CM projects, the areas of construction that your company provides CM services for. Indicate 0% where appropriate. Must add to 100%.

All information for items 8.-12. should be obtained from your most recent financial year records. Please indicate these numbers as a percentage of total construction management revenues where indicated.

8. **Direct Labor** – All unburdened labor charged to projects including the portions charged by principals and nontechnical employees.
9. **Payroll Burden** – All fringe expenses paid by the company for mandatory payroll taxes, vacation leave, sick leave, holiday leave, personnel leave, group insurance, pension plans, etc., for both direct and indirect labor.
10. **G&A Labor** – All non-project labor expenses for the technical staff, principals, and administrative staff.
11. **G&A Expenses** – All indirect expenses for rents, utilities, maintenance, depreciation, interest, basic service telephone, insurance, loan interest, uncollectable debt, training and education expenses, legal and account expenses, general supplies (nonproject), and administrative labor.
12. **Non-labor Direct** – All project-related expenses including travel, printing, telephone, outside consulting fees, and project related supplies.

## SURVEY INSTRUCTIONS

14. The following table provides code numbers representing construction types (grouped by most common owner). Select the code best depicting the type of construction you are providing CM project data for. Insert the code in line 13 of the survey form. Please limit your responses to construction types that you have had experience with.

<b>Health Care Providers</b>	<b>Private Religious/Cultural</b>
01 Hospitals	26 Churches
03 Clinics/Outpatient Facilities	27 Theaters/Auditoriums
04 Medical Office	
05 Extended Care/Nursing Homes	<b>State and Local Govt.</b>
	28 Office Buildings
<b>Corporate/Industrial</b>	29 Museums/Galleries
06 Warehouse/Dist. Centers	30 Correctional Facilities
07 Light Industrial	
08 Process Plants/Heavy Industrial	<b>Environmental Protection Agency</b>
	31 Water Treatment Plants
<b>Housing/Lodging</b>	32 Wastewater Treatment
09 Hotels (High Rise)	33 Hazardous Waste Facilities
10 Motels (Low Rise)	34 Water/Sewer Lines
11 Apts./Condos (High Rise)	
12 Apts./Condos (Low Rise)	<b>Transportation Departments</b>
13 Single Family Housing	35 Bridges
	36 Roads
<b>Commercial Developers</b>	37 Tunnels
14 High Rise Office Building	38 Airports
15 Mid Rise Office Building	
16 Low Rise Office Building	<b>Department of Defense</b>
17 Shopping Malls (Enclosed)	39 Military Housing
18 Strip Shopping Centers	40 Military Offices
	41 Military Training Facilities
<b>Corporate/Administrative/Commercial</b>	42 Military Medical Facilities
19 General Offices	43 Piers/Wharfs
20 Retail Stores	44 Dredging
21 Restaurants	45 Locks and Dams
	46 Reservoirs
<b>Educational/Institutional</b>	47 Channel Protection
22 Classrooms	48 Beach Stabilization
23 Science/Research Labs	
24 Dormitories/Housing	<b>Other Federal</b>
25 Sports/Athletic Facilities	49 Office Buildings
	50 Postal Facilities

15. – 18. Self-explanatory.

19. On lines I, II, III, and IV, estimate the percentage of the total CM contract value (line 20), represented by that "service phase." Lines I–IV should add to 100%. For the individual CM project services, make sure you are selecting those that were actually provided.

20. – 21. Self-explanatory.

## CONSTRUCTION MANAGEMENT ASSOCIATION OF AMERICA SURVEY OF CONSTRUCTION MANAGEMENT COSTS

1. Size of company (total staff + full-time equivalent of part-time staff)
 

A. 1-5	F. 51-100	
B. 6-10	G. 101-150	
C. 11-15	H. 151-250	
D. 16-25	I. 251-500	
E. 26-50	J. Over 500	
  
2. Type of company
 

A. General contractor (GC)	D. GC/CM
B. Construction management (CM)	E. GC/AE
C. Architectural and engineering (AE)	F. CM/AE
	G. Other _____
  
3. Total annual revenues from construction management projects including subcontract costs. (For most recent fiscal year.)
 

	fee only	\$ _____
	at risk	\$ _____
  
4. Average number of CM projects completed by your company per year for last 3 years
 

	fee only	_____
	at risk	_____
  
5. Client base (must add to 100 percent)
 

A. Government clients	_____ %
B. Private-sector clients	_____ %
  
6. Indicate, as a percentage of all CM projects, the types of fees your company charges the customer (must add to 100% - see "instructions")
 

A. Lump sum - fixed fee	_____ %
B. Cost plus fixed fee	_____ %
C. Time spent (with max. or T&M)	_____ %
D. Percentage of construction contract	_____ %
E. Other _____	_____ %
  
7. Indicate as a percentage of all CM projects the types of customers your company provides services for (must add to 100% - see "instructions")
 

A. Health Care Providers	_____ %
B. Corporate/Industrial	_____ %
C. Housing/Lodging	_____ %
D. Commercial Developers	_____ %
E. Corporate/Administrative/Commercial	_____ %
F. Educational/Institutional	_____ %
G. Private Religious/Cultural	_____ %
H. State and Local Government	_____ %
I. Environmental Protection Agency	_____ %
J. Transportation Departments	_____ %
K. Department of Defense	_____ %

**Note: See "instructions" for definitions of expenses and costs.**

- |     |   |         |
|-----|---|---------|
| 8.  | CM direct labor costs (as a percentage of total CM revenues)        | _____ % |
| 9.  | Payroll burden or fringes (as a percentage of total CM revenues)    | _____ % |
| 10. | CM G&A labor (as a percentage of total CM revenues)                 | _____ % |
| 11. | CM G&A expenses (as a percentage of total CM revenues)              | _____ % |
| 12. | CM non-labor direct expenses (as a percentage of total CM revenues) | _____ % |
| 13. | Annual operating income from CM (as a percentage of CM revenue)     | _____ % |

**CONSTRUCTION MANAGEMENT PROJECT DATA**

NOTE: Provide data for individual CM projects your company is currently managing or has completed within the last 3 years. Complete survey for at least 6 projects. However, we are requesting that you complete an additional 6 so that the results of the survey will yield better statistics. Indicate "yes" answers by marking the appropriate space with an "x". "No" answers should be left blank.

	Example	Project #1	Project #2	Project #3	Project #4	Project #5	Project #6
14. Type of construction project (select code from list on special instruction page).	30						
15. City and state where construction project occurred	Beth., Md.						
16. Value of construction contract	\$1,000,000						
17. Scope of construction project (mark only one)							
A. Renovation							
B. New construction	x						
18. Type of Contract (mark only one)							
A. CM as agent	x						
B. CM provides guaranteed maximum price							
19. CM services provided for the customer (mark as many services as would apply to CM project)							
I. Pre-design Phase (% cost of total contract)	2%	%	%	%	%	%	%
A. Project Management	x						
B. Scheduling	x						
C. Cost Management	x						
D. Contract/Project Administration	x						
II. Design and Bid Phase (% cost of total contract)	5%	%	%	%	%	%	%
A. Project Management	x						
B. Scheduling	x						
C. Contract/Project Administration	x						
III. Construction Phase (% cost of total contract)	80%	%	%	%	%	%	%
A. Project Management	x						
B. Scheduling	x						
C. Cost Management	x						
D. Contract/Project Administration							
E. Quality Assurance							
IV. Additional (% cost of total contract)	13%	%	%	%	%	%	%
A. Procurement of materials	x						
B. Value Engineering							
C. Cost estimating	x						
D. Constructability review	x						
E. Materials Testing	x						
F. Claims Analysis							
G. Other _____							
20. Basis for estimating CM contract value (mark only one)							
A. Percent of construction contract value	x						
B. Direct and indirect cost calculation							
C. Other _____							
21. Value of CM contract (\$)	\$50,000						

**CONSTRUCTION MANAGEMENT PROJECT DATA (CONTINUED)**

	Project #7	Project #8	Project #9	Project #10	Project #11	Project #12
14. Type of construction project (select code from list on special instruction page).						
15. City and state where construction project occurred						
16. Value of construction contract						
17. Scope of construction project (mark only one)						
A. Renovation						
B. New construction						
18. Type of Contract (mark only one)						
A. CM as agent						
B. CM provides guaranteed maximum price						
19. CM services provided for the customer (mark as many services as would apply to CM project)						
I. Predesign Phase (% cost of total contract)	%	%	%	%	%	%
A. Project Management						
B. Scheduling						
C. Cost Management						
D. Contract/Project Administration						
II. Design and Bid Phase (% cost of total contract)	%	%	%	%	%	%
A. Project Management						
B. Scheduling						
C. Contract/Project Administration						
III. Construction Phase (% cost of total contract)	%	%	%	%	%	%
A. Project Management						
B. Scheduling						
C. Cost Management						
D. Contract/Project Administration						
E. Quality Assurance						
IV. Additional (% cost of total contract)	%	%	%	%	%	%
A. Procurement of materials						
B. Value Engineering						
C. Cost estimating						
D. Constructability review						
E. Materials Testing						
F. Claims Analysis						
G. Other _____						
20. Basis for estimating CM contract value (mark only one)						
A. Percent of construction contract value						
B. Direct and indirect cost calculation						
C. Other _____						
21. Value of CM contract (\$)						

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13. ABSTRACT (Maximum 200 words) The U.S. Army Corps of Engineers (USACE) manages nearly \$3 billion of Federal Government construction each year. Its Federal customers include the Office of the Secretary of Defense, the Military Departments, and Federal agencies. The construction management services that USACE provides are paid for through fees based on the value of the construction. In 1988, we compared the construction management fees charged by USACE to those charged by private-sector construction management firms. At that time, we found that USACE is a full-service construction management organization and the fees it charges compare favorably with what private-sector construction management firms charge for equivalent services. We also found most USACE customers are not aware of all the services they receive from the Corps. The impact of declining budgets continues to make construction management costs an important issue for USACE customers. We found in this review of construction management costs that the private sector has been experiencing the same cost pressures as the Corps and they have responded by decreasing the services they typically provide. When full-service costs are compared, we find that USACE costs are very competitive with those charged by private-sector firms. We recommend that the Director of Military Programs communicate these findings to USACE customers. Although USACE costs are currently competitive, we further recommend that the Chief of Construction Division encourage the continued cost competitiveness of Corps construction management by closely monitoring construction management expenditures to ensure that USACE construction management organizations are staffing and reorganizing to reflect changing workloads.				
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