United States General Accounting Office

GAO

Report to Congressional Requesters

FEDERAL CONSTRUCTION:

Use of Construction Management Servi

GAO

United States
General Accounting Office
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General Government Division

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The Honorable James M. Inhofe
The Honorable Larry E. Craig
The Honorable Douglas H. Bosco
The Honorable Howard C. Nielson
The Honorable Jim Lightfoot
The Honorable Christopher Shays
The Honorable Amo Houghton
The Honorable Dennis Hastert
House of Representatives

This report responds to your joint request letter and discusses the history and use of the construction management concept on building construction and renovation projects. It addresses your concern about whether the federal government has been using the concept, which can potentially save time and money on construction projects. As agreed with your offices, our objectives were to (1) obtain information on the extent the federal government has used the construction management concept and (2) assess the feasibility of adapting private sector construction management practices to the federal government. We also agreed to compile an inventory of recently completed federal building construction projects at selected agencies, determine the extent of time and cost increases on these projects, and compare the frequency of increases for projects that used construction management with those that did not use the concept.

This letter summarizes the results of our work and is supplemented by appendix I, which contains further details.

Background

The construction management concept is an alternative to the traditional sequential construction approach in which a party that needs a building—the owner—hires an architect/engineer to design the building and then hires a general contractor to build it. The concept involves a rearrangement of traditional construction responsibilities through the addition of a construction manager, who represents the owner in various aspects of project design and construction.

Owners contract for construction management services for different reasons. These include helping to realize major construction time and cost savings and obtaining the needed staff to monitor design and construction progress. The most ambitious approach to time and cost reduction,

known as "phased" or "fast-track" construction, involves constructing segments of a building while other parts are being designed.

Although there are many varieties of construction management, two principal forms can be discerned: agency construction management and contractor construction management. Under agency construction management, the construction manager is an agent of the owner who acts as a consultant and expert but generally does not make cost or schedule guarantees. Contracts for the construction work are between the construction contractors and the owner—not the construction manager. Under contractor construction management, the construction manager acts as an expert and consultant but also contracts directly with subcontractors to do the construction work and may make cost or schedule guarantees. Contractor construction management usually includes the construction manager taking the role of a general contractor during the construction portion of the project.

Results in Brief

The federal government has selectively used the construction management concept to some degree for two decades. Our work at eight agencies showed that six civilian agencies all had used some type of construction management, and the two defense agencies had not used outside construction managers because they rely on in-house staff. In total, the six civilian agencies used construction management techniques to some degree on 33 (about 30 percent) of their 113 construction and renovation projects that exceeded $10 million and were completed in fiscal years 1986, 1987, and 1988. On these projects the role of the construction manager generally was limited to an advisory role to supplement limited in-house staff.

Agencies have shown that private sector construction management techniques can be adapted to federal projects. However, agencies tend to use construction managers in an advisory role because the government has less flexibility than private firms, and other factors, such as competition and conflict of interest rules, discourage federal entities from using contractor construction management.

Past Use of the Construction Management Concept

In contrast with the agency construction management arrangements of the 1980s, during the 1970s, the General Services Administration (GSA) and the Department of Health and Human Services (HHS) experimented with arrangements for using construction managers more like general contractors to do phased construction. For the most part, they were

used in an effort to cut overall project time and cost. HHS adopted a contractor construction management arrangement while GSA generally followed the agency construction management concept but assigned additional management responsibilities to the construction manager. Both de-emphasized phased construction and modified their approaches to construction management after numerous contractors successfully filed legal claims arising from construction delays.

Adaptability of Private Sector Practices

Although past usage indicates that the private sector construction management concept can be adapted to federal construction programs, federal agencies have less flexibility than private firms in using the concept. Unlike private firms, federal agencies are limited by law in how much authority over spending and other decisions they can delegate to agents such as construction managers operating under agency construction management arrangements. Furthermore, the following factors discourage the federal government from using contractor construction management, a commonly used private sector approach:

- the results of an HHS experiment with this approach, which experienced legal claims for construction delays and raised questions about whether it saved money;
- regulations covering competition and potential conflicts of interest; and
- opposition from professional organizations involved with construction management.

Agency officials generally said that the government can benefit from the use of some forms of the construction management concept, but many also expressed the view that use of this concept cannot solve all the problems in federal construction. They said that construction management is just one tool available to help agencies manage their construction programs. The officials said that their federal agencies will continue to use the concept on selected projects.

Construction Delays and Cost Increases

During fiscal years 1986 through 1988, the six civilian and two defense agencies completed 268 building construction projects that cost more than $10 million each and totalled about $7 billion. In total, 117 projects (44 percent) experienced time delays that exceeded 6 months and 62 projects (23 percent) experienced cost increases exceeding 10 percent.

Our comparisons showed that the projects that used the construction management concept experienced time delays exceeding 6 months more

often than projects that did not use the concept; from a cost standpoint, construction management projects less often had cost increases that exceeded 10 percent. However, we were unable to determine from the available data whether the time and cost increases we observed resulted from poor performance by the agencies or—on the projects where it was used—the extent to which construction time and cost were affected by use of the construction management concept. Increases may have resulted from unexpected events, such as inclement weather and changes to building codes, or from other factors, such as project size and complexity.

Objectives, Scope, and Methodology

We did our review at the headquarters of the following eight selected agencies: GSA's Public Buildings Service, the U.S. Postal Service (USPS), the Naval Facilities Engineering Command (NAVFAC), the U.S. Army Corps of Engineers (COE), the Departments of Veterans Affairs (VA), Energy (DOE), and Health and Human Services (HHS), and the Bureau of Prisons (BOP). We interviewed agency officials to discuss their experiences using construction management and to obtain their views on the adaptability of the concept to federal building construction. Each agency also provided data on time and cost increases for new building construction and renovation projects costing more than $10 million and completed in fiscal years 1986 through 1988. We did not verify these statistics because of time and resource constraints.

We also reviewed literature on construction management usage, and obtained and analyzed the views of professional organizations on the use of construction management in and out of government. A listing of these organizations, together with a more detailed discussion of our objectives, scope, and methodology, is contained in appendix I.

We did our work between November 1988 and June 1989 and in accordance with generally accepted government auditing standards. We discussed the contents of this report with officials from the agencies we visited and the professional organizations involved with construction management. The officials agreed with the information we developed and their views have been incorporated into the report where appropriate.

As agreed with your offices, we are sending copies of this report to the heads of the agencies covered in the review, the federal and nonfederal

organizations that provided information, and other interested parties. Copies of this report will also be made available to others upon request.

The major contributors to this report are listed in appendix II. Please contact me at 275-8676 if you have any questions concerning the report.

L. Nye Stevens
Director, Government Business
Operations Issues

Contents

Abbreviations

A/E	Architect/Engineer
BOP	Bureau of Prisons
CMAA	Construction Management Association of America
COE	U.S. Army Corps of Engineers
DOE	Department of Energy
GSA	General Services Administration
HHS	Department of Health and Human Services
NAVFAC	Naval Facilities Engineering Command
NSPE	National Society of Professional Engineers
USPS	U.S. Postal Service
VA	Department of Veterans Affairs

Use of the Construction Management Concept by Selected Federal Agencies

Introduction

Construction is one of America's largest industries. The U.S. Department of Commerce reports that about $399 billion in new construction was put in place in the U.S. during 1987. New construction in the federal government that year was estimated at about $14 billion. Construction-related federal government expenditures for fiscal year 1987 totalled $45.9 billion.[1] How well construction is managed has important implications for the overall efficiency and effectiveness of many public and private sector activities.

Construction Management Differs From the Traditional Building Approach

The "traditional" or "conventional" approach to building construction consists of a sequence of events in which the owner first retains an architect/engineer (A/E) to design the building. The owner then solicits bids and awards the construction of the building as designed to a general contractor who builds it—typically with the help of many subcontractors. Industry experts often say that this traditional design-bid-build approach is characterized by a lack of coordination among project participants and problems in controlling project cost, timeliness, and quality.

Over the past 20 years, alternatives to the traditional building approach have been developed. One alternative, known as construction management, involves the rearrangement of traditional project roles and responsibilities by adding an outside construction manager to the building team of owner, designer, and contractor. Outside construction managers contract with the owner to act as the owner's agent or representative throughout some or all of the project. The Engineering News Record reported that the top 500 design firms and the top 400 contractors billed their clients about $3 billion for construction management services in 1988.[2]

Why Owners Use Construction Management

Owners contract for construction management services for different reasons. These include realizing major construction time and cost savings and obtaining the needed staff to monitor construction progress. The most ambitious approach to time and cost reduction, known as "phased"

[1]The U.S. Department of Commerce source for data on new construction put in place is Bureau of the Census, Statistical Abstract of the United States, 1989, and the source for data on construction-related federal expenditures is International Trade Administration, Construction Review (May-June 1989).

[2]Roger J. Hannan, "CM Gains Favor With Owners," Engineering News Record (June 15, 1989).

or "fast-track" construction, involves constructing segments of a building while other parts are being designed. Although this process can cut total construction time and substantially reduce costs, especially in periods of high inflation, it can also have the opposite effect if not properly managed. But not all construction management projects involve phasing. In many cases, an owner hires a construction manager because the owner lacks the necessary resources and expertise in-house to adequately monitor design and construction activities. Here construction managers basically supplement the owner's staff, typically acting as advisors or consultants.

No Standard Definition for Construction Management

Construction management has been used to characterize different design and construction services, provided by members of different professions (usually either an architect, consulting engineer, or contractor), under a variety of contractual arrangements. However, its use has developed to the point at which a number of common themes have emerged.

First, construction management envisions a team approach to building. The construction manager's role in improving project coordination addresses the fragmentation inherent in the traditional approach. On traditional projects, the owner usually deals separately with the A/E and general contractor, and interaction between an A/E and general contractor may be limited.

Second, construction managers can be involved in a project from the beginning of design or pre-design through construction, and can provide a range of services in each phase. A construction management contract might cover the following services: (1) cost management, including construction cost estimates, value engineering,[3] and project budgeting, (2) project scheduling, (3) design review, including construction feasibility, (4) managing the procurement effort, and (5) some type of on-site management, such as supervision, inspection, and administrative activities.

Third, out of the many variations of construction management, two principal forms can be discerned—agency construction management and contractor construction management. Under agency construction management, the construction manager is an agent of the owner and acts as a consultant and expert but generally does not make cost or schedule guarantees. The construction contracts are between the construction

[3]Value engineering in construction is a process to evaluate a project's proposed design and construction methods to identify ways to minimize costs over the life of the building.

contractors and the owner—not the construction manager. Under contractor construction management, the construction manager acts as an expert and consultant but also contracts directly with subcontractors to do the construction work. Contractor construction managers also may guarantee that construction will not cost the owner more than some specified amount, an arrangement known as guaranteed maximum price construction management. Contractor construction management usually includes the construction manager taking the role of a general contractor during the construction portion of the project.

Objectives, Scope, and Methodology

As agreed with the requesters, our objectives were to (1) obtain information on the extent the federal government has used the construction management concept in building construction and (2) assess the feasibility of adapting private sector construction management practices to the federal government. We also agreed to compile an inventory of major federal construction projects (those costing more than $10 million) completed by selected agencies during fiscal years 1986, 1987, and 1988, to determine the extent of time and cost increases on these projects, and to compare the frequency of increases for projects that used construction management with those that did not use the concept.

Our review was done at the headquarters of eight selected agencies: the General Services Administration's (GSA) Public Buildings Service, the U.S. Postal Service (USPS), the Naval Facilities Engineering Command (NAVFAC), the U.S. Army Corps of Engineers (COE), the Departments of Veterans Affairs (VA), Energy (DOE), and Health and Human Services (HHS), and the Bureau of Prisons (BOP).

We selected the first six agencies because they have traditionally been the federal government's major builders. We added HHS because our initial work showed that it made extensive use of construction management in the 1970s. We decided to include BOP because it is using construction management to assist with its large prison construction program.

To document the past use and assess the adaptability of different construction management practices to the federal government, we obtained information and reviewed available literature on construction management usage from the 1970s to the present. We interviewed responsible officials at the selected agencies and the Federal Construction Council. We also obtained the views of six professional organizations involved in the use of construction management both in and out of government: the

Construction Management Association of America (CMAA), the Associated General Contractors of America, the American Institute of Architects, the American Consulting Engineers Council, the National Society of Professional Engineers (NSPE), and the American Society of Civil Engineers.

To determine the extent of time and cost increases for recent federal construction projects, we compiled an inventory of federal construction projects at the eight selected agencies. The agencies provided cost and schedule data on new building construction and renovation (repair and alteration) projects costing more than $10 million that were completed in fiscal years 1986, 1987, or 1988. For each of the 268 projects identified, we obtained the estimated project completion date and cost at the time the construction contracts were awarded, and the actual project completion date and cost. The data provided also showed whether or not the projects used construction management. It should be recognized, however, that although they were completed in the 3 fiscal years, many of these projects were started years earlier. Similarly, agencies were using construction management on projects underway at the time of our review that do not appear in the statistics because they were not completed by the end of fiscal year 1988.

We obtained the construction statistics from responsible officials at each selected agency. We did not verify these agency-provided data because of time and resource constraints. Because the agencies we selected do not constitute a random sample of all federal construction agencies, the findings cannot be projected to other agencies. Similarly, even in the agencies we reviewed, the results apply only to new building construction or repair and alteration projects costing more than $10 million and completed in fiscal years 1986 through 1988. The results cannot be projected to other construction projects because other projects may differ from the ones in our review.

Our review excluded two variations of conventional construction that are sometimes identified with construction management. The first involves construction monitoring and oversight by the same architect/engineer firm that designed a project, which is generally seen as an extension of its design responsibilities. Second, we excluded design-build, in which a single firm is given a contract to both design and construct a building. Because design-build involves the unique integration of architect/engineer and general contractor responsibilities into a single contractual agreement with the owner, there was agreement among

those we interviewed and the literature we reviewed that this approach differs qualitatively from construction management.

Federal Government Use of the Construction Management Concept

In the 1970s, GSA, HHS (then the Department of Health, Education and Welfare), and, to a lesser extent, VA experimented with using construction managers to manage phased construction in an effort to reduce construction time and cost. GSA used agency construction management, but it expected its construction managers to assume overall project management responsibility. HHS used contractor construction management. Our 1977 report on construction management[4] showed that design and construction time was reduced on three of nine construction management, phased construction projects reviewed at the three agencies and was reduced somewhat on one other project. But for the remaining projects, limited overlap occurred between design and construction, and little or no time savings were demonstrated. At that time, we concluded that using construction management, phased construction can produce savings when care is taken in deciding which projects will use the technique.

Efforts to give outside construction managers primary, direct responsibility for managing phased construction met with legal and other difficulties. By the early 1980s, GSA, VA, and HHS had de-emphasized phased construction and modified their approaches to construction management. At the time of our review, agencies were using construction managers in more limited roles to provide advice, assistance, monitoring, oversight, inspection, and other design and construction services. In general, this limited construction management consultant role was used to supplement in-house staff expertise. With few exceptions, the federal agencies we contacted generally were not using construction managers to (1) facilitate complex phased construction or (2) take the role of general contractors during the construction phase of projects.

GSA Led Federal Experiment With Construction Management

Taking the lead among federal agencies, in 1971 GSA began using construction managers under agency construction management arrangements to facilitate phased construction. These projects involved overlapping the design and construction of many different segments in an effort to reduce project time and cost. A 1970 GSA study had reported

[4]Use of New Construction Method on Federal Projects at Three Agencies Can Be Improved (GAO/LCD-77-348, Oct. 26, 1977).

that traditional building methods resulted in a total design and construction time of 59 months in the federal government compared with 24 months for similar projects in the private sector.

Under GSA's agency construction management approach, GSA—and not the construction manager—entered into the legal and contractual relationships with the various contractors doing the construction. GSA selected agency construction management because it wanted the construction manager to be free of personal considerations of financial gain or loss on the project, which GSA believed would better enable the construction manager to provide frank and objective advice. Despite the choice of the agency approach, GSA expected the construction manager to assume overall project management responsibility, and there was no private general contractor on the projects. Construction manager responsibilities included working with the architect to ensure that the design could be built within the project budget, controlling project scheduling, managing the procurement effort, superintending and inspecting construction, and providing value engineering and a range of other project support services.

The GSA experiment with construction management was temporarily discontinued in the spring of 1979. GSA officials said that the catalyst was a legal decision making GSA liable for delay claims when one contractor was delayed by another. On a traditional construction project, the use of a general contractor shields the government from subcontractor claims. But under GSA's construction management program, the direct contractual agreements between GSA and the contractors increased GSA's liability for problems at the construction site. Because the construction manager was only acting as GSA's agent or representative, GSA, and not the construction manager, was directly responsible for problems with construction contractors.

GSA officials and reports identified additional problems with GSA's use of agency construction management with phased construction. First, under the agency construction management approach, GSA was unable to delegate some authorities to the construction manager that could be given by a private sector owner. For example, GSA was required to retain authority to approve contractor payments. The construction manager's lack of authority to make such decisions hindered his ability to control and manage the job site. Second, according to a GSA official present at the time, the level of teamwork and cooperation among owner, A/E, construction manager, and contractors envisioned under the construction

management concept did not develop. He said that because the construction management contract was a fixed price agreement, without performance incentives, construction managers did the minimum amount required to meet contract requirements and maximize profits. The official concluded that this fostered an adversarial relationship between construction managers and GSA. Third, phased construction imposed an additional administrative burden on GSA that was very difficult to handle. Many of the administrative tasks that would have been done by a general contractor under conventional construction, such as the bidding and awarding of contracts, were shifted to the agency.

VA Experiences With Construction Management

In the 1970s, the Veterans Administration (now the Department of Veterans Affairs) used an agency construction management, phased construction approach similar to GSA's to build a hospital in New York City. VA hired a construction manager to do the work a general contractor would have done, such as coordinating the overlapping activities of different construction contractors.

As at GSA, the VA project had experienced delay claims when some contractors were held up by others from the overlapping construction activities associated with the phasing process. At the time of our review, VA had paid out $4.35 million (plus interest) in claims settlements, and another claim was still being negotiated. VA officials reported that this experience was their only attempt to use construction management with phased construction and that it dampened VA interest in projects of this type.

HHS Construction Management Experience

The Department of Health, Education and Welfare (now HHS) also adopted a phased construction management program similar to GSA's in the 1970s, with one major exception. After providing various design support and other pre-construction services as the owner's agent or advisor, the construction manager then entered into a guaranteed maximum price contractor construction management agreement with HHS for the construction portion of the project. HHS expected the construction manager to assume the management functions of a general contractor during construction. This included completing the project with available funds and within established time frames.

The HHS experience went very much like GSA's and VA's. For example, legal problems were encountered on the construction management project in Research Triangle Park, North Carolina. When delay claims arose

on the project in 1980, the construction management firm argued that it was not an independent contractor but an agent of the owner. HHS had retained some control and authority over the construction manager that a general contractor would not experience. While the most recent legal decision regarding this project (1983) established that the construction manager was not an agent of the government, delay claims were still being litigated at the time of our review.

The problems on the Research Triangle Park project led HHS to impose a national moratorium on new construction management awards in March 1981. This was followed by an overall internal evaluation of its construction management projects. The evaluation reported on additional difficulties with construction management at HHS. The selection of the construction manager to be the general contractor eliminated competition for the general construction award, since only the construction management firm was eligible to receive it. The HHS review questioned whether guaranteed maximum price construction management projects saved money compared with the traditional building approach, which awarded general contractor contracts competitively.

The internal review also concluded that the "guaranteed maximum price" label was misleading, since construction cost could go much higher than the guaranteed maximum price. This occurred because various contingency funds were available to the construction manager within the guaranteed maximum price framework. General contractors on traditional construction projects generally do not have such funds available.

In addition, the internal review found that for most HHS construction management projects, HHS did not contract for construction management services until after project design was completed. It was therefore too late for the construction manager to facilitate the simultaneous design and construction that is central to phasing. Our 1977 report on construction management also noted that design and construction were not overlapped on the HHS projects reviewed. We concluded that HHS's guaranteed maximum price approach precluded the full benefits of phased construction.

On September 30, 1982, HHS issued a departmental policy that required approval by the Office of Facilities Engineering Director before construction management arrangements could be used on directly funded federal projects.

Construction Management in the 1980s

During the 1980s, federal agencies have generally used construction managers as advisors or consultants under the agency form of construction management. However, unlike some construction management projects of the 1970s, agency construction managers have been used together with, rather than in place of, general contractors. Most of the agencies we reviewed used construction managers to supplement in-house construction resources and expertise.

NAVFAC and COE are exceptions to this general pattern of construction management use. Both of these agencies rely on in-house construction expertise and do not contract for construction management services.

GSA Construction Management Program

GSA's Public Buildings Service has instituted a new agency construction management program. The new program, called Construction Quality Management, has been in operation since 1986. Projects selected for construction quality management use one of two contracting approaches, depending upon project cost. For selected projects costing less than $10 million, a 1-year construction quality management contract (with 2 additional option years) exists for each GSA region. The firm with this contract provides all necessary construction management services on these projects throughout the contract period. For construction quality management projects that exceed $10 million, the contracts are separately negotiated.

The construction quality management program differs from GSA's earlier construction management program in several important respects. First, the main objectives are different. GSA's construction management program in the 1970s sought to cut project time and cost through phasing. Now GSA pursues construction quality management mainly because the agency believes it no longer has adequate in-house staff to oversee its construction activities and therefore needs outside help. GSA's total design and construction staff decreased from about 940 in 1981 to 691 as of June 30, 1989. Moreover, GSA officials said that, compared with the 1970s, its construction work load is irregular. They said that contracting out for construction quality management and other services provides greater flexibility to handle work load fluctuations.

Second, GSA has de-emphasized the use of phased construction and now contracts with both construction managers and general contractors on its projects. Unlike GSA's phased construction management program, in which GSA and the construction manager had to coordinate as many as

25 separate construction contracts, a single general contractor now subcontracts to do most of this work. The construction manager's role is generally limited to what GSA calls management and inspection services. According to GSA officials, these changes have resulted in less contractor overlap and fewer holdups and delay claims.

Third, the construction quality manager's services and their expected costs are defined more precisely than they were under construction management. GSA has issued design and construction services tables as a guide to assist regional staff. The tables provide guidance on expected hours and cost of construction management services on projects of different sizes.

Use of Construction Management at HHS

At HHS, the policy issued in 1982 limiting the use of construction management on direct federal construction projects remained in effect at the time of our review. Agency officials said that although HHS hires inspectors to provide construction inspection services, the department does not plan to use contractor construction management on any future projects.

VA and USPS Use Limited Forms of Construction Management

VA has hired construction consultants in the design phase of some projects to review designs for their construction feasibility. At the time of our review, VA referred to this approach as limited construction management. According to VA officials, the department plans to use limited construction management on 10 major projects between 1989 and 1993. In addition, they said that VA is seriously exploring the use of other construction management techniques on selected future projects.

The U.S. Postal Service has used agency construction management services since the 1970s. Until about 2 or 3 years ago, USPS obtained many of these services through its National Construction Management Support Contract. This contract awarded USPS construction management support work to a single firm on an annual basis. Following an internal reorganization, the national contract was replaced by smaller "field service" contracts at USPS construction field offices. In addition to the field service contracts, USPS sometimes relies upon in-house and A/E expertise for construction support. USPS officials told us that USPS has not used construction managers in place of general contractors.

BOP Is Experimenting With Different Construction Management Approaches

The Bureau of Prisons in the Department of Justice has been experimenting with different limited construction management approaches. BOP officials reported that they use construction management to supplement in-house staff capabilities to support the agency's expanded construction program. BOP primarily uses construction managers during the construction portion of a project, when they perform construction inspection and contract administration services. BOP is expanding construction management into the design phase on one current and one upcoming project. BOP had nine correctional institution projects under design or construction as of November 1, 1988. A BOP official said that five of these projects are using some form of construction management.

Different Approaches to Construction Management at DOE

DOE's construction management program permits the use of both agency and contractor construction management approaches. However, according to a DOE official, the department has normally used agency construction managers—that is, providers of professional services who assist in managing the construction effort. The official said that the use of contractor construction management is not suited to DOE. She explained that the use of a guaranteed maximum price is more suited to projects that are conventional and repetitive with limited risks, whereas DOE construction normally involves "one-of-a-kind" projects. DOE officials told us that DOE sometimes uses outside construction management services when the construction phasing technique is required to fast-track complex projects.

Defense Uses In-House Construction Expertise Rather Than Outside Construction Managers

Officials at the Army Corps of Engineers and Naval Facilities Engineering Command, the Department of Defense construction agencies, told us they do not use outside construction managers for assistance. Instead, both rely on the expertise of their in-house construction staffs when building for themselves or for their client agencies. The officials said that in-house construction staff can perform the types of services offered by construction managers hired on a contract basis. For example, COE has used its in-house construction capabilities to carry out phased or fast-track construction projects. Because we focused on the use of outside construction management, we did not obtain detailed information on their in-house construction management activities.

Feasibility of the Federal Government's Adapting Construction Management Practices Used by the Private Sector

Federal agencies have primarily used an agency form of construction management rather than contractor construction management. Unlike private firms, however, federal agencies are limited in how much authority over spending and other decisions they can delegate to construction managers under contract as agents of the government. This contributed to GSA's problems with construction management in the 1970s. Furthermore, the following factors discourage the federal government from using contractor construction management, a commonly used private sector approach:

- the results of an HHS experiment with this approach, which experienced legal claims for construction delays and raised questions about whether it saved money;
- regulations covering competition and potential conflicts of interest; and
- opposition from professional organizations involved with construction management.

GSA Had Problems With Delegation of Authority to Agency Construction Managers

Compared with private firms, federal agencies are limited in how much authority they can delegate to a construction manager under contract as an agent of the government. For example, at GSA the Administrator is prohibited by law (40 U.S.C. Section 609(c), 1982) from delegating the authority to interpret construction contracts, approve materials and workmanship, approve construction contract changes, certify vouchers for contractor payment, and conduct final contract settlement.[5] By comparison, private owners often give their agency construction managers these authorities, including the approval of contractor payments.

According to a former Public Buildings Service official, this restriction on delegation authority was one reason that GSA's phased construction management program in the 1970s did not work as well as construction management, phased construction in the private sector. GSA's inability to give construction managers authority commensurate with their responsibilities to direct and coordinate phased construction made it difficult for construction managers to effectively control and manage the job site. For example, GSA found that once it became apparent to contractors that the construction managers could not authorize key decisions, some contractors circumvented or ignored the construction manager and dealt directly with GSA officials. GSA has avoided this problem by using both

[5]David R. Dibner, "Construction Management and Design-Build: An Owner's Experience in the Public Sector," Law and Contemporary Problems, Vol. 46, No. 1 (Winter 1983).

construction managers and general contractors in its construction quality management program.

The other agencies we reviewed are generally bound by the same or similar restrictions as GSA for delegating authority to agency construction managers.

Contractor Construction Management

One arrangement that private owners use to put construction managers directly in charge of construction is to have the construction manager provide advisory services during project design and then take over construction as the general contractor. None of the agencies we contacted were using this approach at the time of our review. We identified the following factors that discourage the use of contractor construction management by the federal government.

The HHS Experiment With Contractor Construction Management Encountered Problems

The HHS experience in the 1970s with awarding contracts making construction managers general contractors generally was not successful. Litigation over construction delays was still continuing at the time of our review. (See pp. 14-15.) Drawing from the experiences with contractor construction management, in 1981 the Director of the HHS Office of Facilities Engineering observed that the incentives for using construction management generally are not present in federally funded projects. He noted that there are more compelling reasons to use construction management in the private sector where the incentives of competition arise more often to speed project completion and realize profits. His observations were reinforced by an internal study also done in 1981. The study questioned whether the HHS construction management projects saved money compared with the traditional HHS building approach, which followed competitive procedures for awarding general construction contracts. In turn, as discussed earlier in this appendix, in 1982 he issued the policy directive limiting the use of construction management at HHS.

Federal Contracting Requirements Restrict the Use of Contractor Construction Management

Another reason the use of contractor construction management is discouraged in the federal government is that, subsequent to the HHS policy decision, revisions to federal contracting requirements made it more difficult for federal agencies to have their construction managers who are involved in project design become general contractors. Unlike private construction, federal regulations generally permit all qualified firms to compete for public construction contracts. This requirement cannot be met if only the construction manager is eligible to receive the contract award for the general construction.

Furthermore, allowing other firms to compete with the construction manager to become the general contractor would not necessarily solve the problem. This practice could be perceived as giving the construction manager an unfair advantage because of knowledge gained during the design phase that is not available to other competitors. This may result in an organizational conflict of interest. According to the Federal Acquisition Regulation, an organizational conflict exists when the nature of the work to be performed under a proposed government contract may, without some restriction on future activities, (a) result in an unfair competitive advantage to the contractor or (b) impair the contractor's objectivity in performing the contract work. The Federal Acquisition Regulation directs contracting officers to avoid, neutralize, or mitigate significant organizational conflicts of interest before making a contract award. This includes denying a contract to firms that may have an unfair competitive advantage.

Professional Organizations Oppose Contractor Construction Management

Four of the six professional organizations we contacted expressed reservations about allowing a construction manager who provides construction management services during design and construction to also take the role of the general contractor during project construction. The Associated General Contractors of America opposed this approach on federal construction projects, arguing that it undermines the integrity of open competition for construction contracts. Three other organizations had reservations about contractor construction management in both the public and private sectors. The Construction Management Association of America prefers the agency form of construction management, recognizing that any requirement to contract directly with the contractors and guarantee project cost may introduce some degree of conflict of interest not present in the agency format. The CMAA nevertheless believes the construction manager can provide the same level of service while guaranteeing the cost of construction. According to a National Society of Professional Engineers committee chairman, NSPE does not endorse contractor construction management because a conflict of interest is created when a general contractor builds a project and at the same time acts in the capacity of a construction manager. Similarly, the American Institute of Architects takes the position that the "construction manager may have a serious conflict of interest with the owner when the construction manager has the opportunity to make a profit on furnishing the construction labor and buying the materials to be incorporated into the owner's building."

The two other professional organizations provided the following comments. The American Consulting Engineers Council takes the position

that if a public or private owner uses contractor construction management, the owner should be directly represented during construction by an independent design consultant or by in-house professional design staff to obtain technical advice, construction observation services, and guidance on the project. The American Society of Civil Engineers did not take a position on this issue.

Statistics on Recent Federal Building Construction by Selected Agencies

The eight agencies we reviewed provided data on 268 building construction and renovation projects costing more than $10 million each and completed in fiscal years 1986, 1987, or 1988. The total cost of these projects was $6.96 billion. Of the 268 projects identified, the civilian agencies completed 113 at a total cost of $3.78 billion. The defense agencies completed 155 projects at a total cost of $3.18 billion.

Table I.1 shows that the use of construction management varied across the agencies we reviewed. Thirty-three of the 268 projects, or 12 percent, used construction management techniques to some degree. All 33 of the projects that used construction management were done by the civilian agencies, or about 30 percent of the 113 civilian projects. USPS accounted for more than two-thirds of the 33 civilian construction management projects, using the concept on 23 of its 32 projects, or 72 percent of the time. Four other civilian agencies used construction management on from 10 to 17 percent of their projects. None of the 155 projects completed by the two defense agencies had used contracts for construction management services.

Table I.1: Agency Use of Construction Management on Building Construction Projects Costing More Than $10 Million and Completed in Fiscal Years 1986, 1987, and 1988

Agency	Number of projects	Number of projects using construction management	Frequency of construction management use (percent)
Civilian			
DOE	41	4	10
USPS	32	23	72
VA	24	4	17
HHS	8	1	13
GSA	7	1	14
BOP	1	0	0
Subtotal	**113**	**33**	**29**
Defense			
COE	97	0	0
NAVFAC	58	0	0
Subtotal	**155**	**0**	**0**
Total	**268**	**33**	**12**

Construction Time and Cost Increases

There are many valid reasons for construction project time and cost to increase between contract award and project completion. Changes can occur for many different reasons other than poor performance by the building team. For example, new or previously unrecognized user needs may have to be incorporated, building codes or agency construction criteria can change, and unanticipated events can occur, such as inclement weather or the discovery of an underground spring on the construction site.

We found that all of the agencies had projects that took longer or cost more to complete than originally estimated. As agreed with the requesters, we defined a significant delay as one that exceeded 6 months and a significant cost increase as one in which the contract cost estimate was exceeded by 10 percent or more. We applied these criteria to the 268 projects in our review

Significant time increases occurred almost twice as often as significant cost increases. Forty-four percent (117 of the 268) of the projects were completed more than 6 months after the estimated contract completion

date. Actual project costs were more than 10 percent over contracted cost estimates on 23 percent of all projects, or 62 of the 268.

Agency-By-Agency Comparisons of Construction Data Are Not Appropriate

We did not compare the records of different agencies in meeting construction time and cost estimates because of the many ways agency construction programs can differ. As we noted in our 1985 report on value engineering,[6] agencies have different missions, undertake different numbers and types of construction projects, and can have different operating cost efficiencies.

Comparison of Time and Cost Increases Between Construction Management Projects and Projects That Did Not Use the Concept

We compared construction management with nonconstruction management projects on the frequency of time and cost increases. For the 268 projects examined, the construction management projects more often experienced time increases of 6 months or more than the projects that did not use the concept. Sixty-four percent of the construction management projects (21 of 33) were delayed more than 6 months after the estimated contract completion date. This compares with 41 percent (96 of 235) of the projects that did not use construction management. However, from a cost standpoint, projects that used construction management less often experienced cost increases. Only 6 percent of the construction management projects (2 of 33) cost more than 10 percent over the estimated cost, while the corresponding figure for nonconstruction management projects was 26 percent (60 of 235).

The higher frequency of significant time increases and the lower frequency of significant cost increases on projects that used the construction management concept should be interpreted with caution. We cannot conclude that the use or nonuse of construction management affected these results. They may have been caused by other possible differences between construction management and nonconstruction management projects, such as project size and complexity.

Agency Views

Agency officials generally said that the government can benefit from the use of some forms of the construction management concept, but many also expressed the view that use of this concept cannot solve all the

[6]Information on the Use of Value Engineering in Federal Design and Construction (GAO/GGD-85-44, Apr. 5, 1985).

problems in federal construction. They said that construction management is just one tool available to help agencies manage their construction programs. The officials said that their federal agencies will continue to use the construction management concept on selected projects.

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