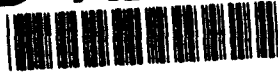


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PARTNERED PROJECT PERFORMANCE IN THE U. S.

NAVAL FACILITIES ENGINEERING COMMAND

by

KELLY JOSEPH SCHMADER, B.S.

THESIS

Presented to the Faculty of the Graduate School of

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ABSTRACT

**PARTNERED PROJECT PERFORMANCE IN THE U. S.
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by

Kelly Joseph Schmader, M.S.E.

The University of Texas at Austin, 1994

SUPERVISOR: G. Edward Gibson, Jr.

This thesis analyzes the performance of partnered military construction (MILCON) projects in the U. S. Naval Facilities Engineering Command (NAVFAC). Partnering in construction usually involves formation of strategic alliances, or agreements between owners and contractors to work together for extended periods over several consecutive contracts. Although federal procurement regulations prohibit establishing long-term relationships, NAVFAC has been successful in partnering on a project-by-project basis. There has been only one previous attempt at quantitatively measuring their success in this area. However, because of the limited time in which NAVFAC had been involved in partnering at the time of the study, the small sample size rendered the results inconclusive. This thesis compares the performance of 39 of the 41 projects NAVFAC has completed as of May 1994 with a similar sample of non-partnered projects. The criteria used are cost change, change order cost, claims cost, value engineering savings and duration change. Conclusions and recommendations are presented based on the results of the analysis.

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1. Introduction

1.1 Purpose

The purpose of this thesis is to analyze the performance of U. S. Naval Facilities Engineering Command (NAVFAC) military construction (MILCON) projects that have been administered under a formal partnering agreement. As of May 1994, 41 such projects had been completed.

Many of NAVFAC's Engineering Field Divisions (EFD's) and Engineering Field Activities (EFA's) have tracked their individual successes with partnered projects. However, only one study has attempted a NAVFAC-wide analysis (Pina 1993). Because that study was done in the early stages of NAVFAC partnering, only six completed partnered projects were available to base conclusions and recommendations upon. Consequently, the study was largely based upon subjective comments from various NAVFAC contracting representatives. Further, although the six partnered projects were all completed in the continental United States in five EFD's, the study compared their results to 300 MILCON projects completed worldwide.

This thesis will attempt to show whether partnered NAVFAC MILCON projects perform better on average than a similar sample of non-partnered NAVFAC MILCON projects. The non-partnered sample will be within the same time and cost range as the partnered sample, and a similar ratio of partnered and non-partnered projects will be taken from each EFD/EFA. This thesis will also present partnering perceptions from NAVFAC contract representatives and engineers to gauge their satisfaction with their partnering experience.

It should be noted that only MILCON projects will be used in this analysis. Because NAVFAC executes several other types of construction projects, they may be the basis for a separate, independent study in the future.

1.2 Scope

This thesis will analyze the performance of 39 of the 41 partnered MILCON projects completed within NAVFAC as of May 1994. The criteria for measuring project performance will be standard NAVFAC performance criteria, to be discussed in more detail in Chapter 3. Those criteria will be used to develop a comparison between the partnered projects and a similar, randomly selected sample of 100 non-partnered projects collected for this study. Additional subjective data for the partnering projects will be obtained through interviews with various NAVFAC contract representatives and engineers for those projects. These interviews will be used to portray the views of NAVFAC personnel towards their partnering experiences.

2. Background

2.1 Partnering Defined

In 1989, the Construction Industry Institute (CII) published an interim report that found that partnering could offer many opportunities to the construction industry by developing an atmosphere more conducive to innovation, teamwork, trust, and commitment. The task force defined partnering as ("In Search" 1991):

...a long term commitment between two or more organizations for the purpose of achieving specific business objectives by maximizing the effectiveness of each participant's resources. This requires changing traditional relationships to a shared culture without regard to organizational boundaries. This relationship is based upon trust, dedication to common goals, and an understanding of each other's individual expectations and values. Expected benefits include improved efficiency and cost effectiveness, increased opportunity for innovation, and the continuous improvement of quality products and services.

Simply stated, partnering is an attitude. It is a way of doing business that recognizes that the players in a construction contract have common goals which can be achieved through cooperation and open communications. The word may be new, but the concept is not. It has always been practiced by many contractors and owners, but now it has been given a new name and structure.

The primary advantage of partnering is that it recognizes the goals of all parties to create a synergism of effort. Owners want quality projects, completed safely, on time, and within budget. Contractors want to maximize profit and satisfy their customers to enhance future business opportunities. Customers want a quality product as soon as possible, and at minimal cost. These are not conflicting goals. Partnering provides the vehicle for enhancing the similarities and cooperatively working to accomplish these goals (*A Guide* 1990). In the partnering process, individual project goals are normally spelled out in a formal

partnering agreement signed by all project participants. A sample partnering agreement is shown in Appendix A.

2.2 Public Sector Constraints

Although the CII definition of partnering applies well to private sector construction, its scope is somewhat limited in public sector construction. For example, federal procurement regulations require, with few exceptions, the use of full and open, competitive, low bid contracting strategy for construction projects ("Competition" 1985). Thus, public agencies are not able to establish the long term relationships that are common to partnering in the private sector.

2.3 NAVFAC Partnering

While partnering is a relatively new term to the construction industry, it is an even newer term to the U.S. Navy. In carrying out its construction mission for the Navy and Marine Corps, NAVFAC has also discovered that many of its goals in administering construction projects mirror those of the contractor. They both want a quality product, completed on time and within budget. They both want procedures that streamline the contractual process, and both desire an atmosphere conducive to quality improvements and constructability. Through partnering, the commonality of these objectives crystallizes in the minds of all parties and the old paradigm that the other party has its own secret agenda disappears. Through communications inherent in the partnering process, mutual trust develops and the "win-win" situation evolves (Bottorff 1992).

2.4 Evolution of NAVFAC Partnering

NAVFAC initially provided formal partnering guidance to their EFD/EFA's in a letter dated February 1, 1991 (shown in Appendix B). Citing the successes that the U. S. Army Corps of Engineers had been having with partnering, NAVFAC authorized and encouraged its field contracts offices to

immediately apply partnering techniques to appropriate projects (Gunn 1991).

The contract that pioneered partnering for NAVFAC was the challenging \$114 million Naval Intelligence Center (NIC) in Suitland, MD, which was awarded in 1989. At the 35% design phase, the Navy was directed by Congress to resite the project from the river plain of Anacostia Naval Station to a wooded site at Suitland, MD, requiring a redesign of the structure's pile-supported foundation to a spread footing design. Additionally, while the initial site offered in-place roads and utilities, the new site was undeveloped, requiring access roads and utility connections to be extended to the nearest public utilities, more than a mile from the job site.

To keep the project on schedule, NAVFAC divided it into two packages. Package A was to be fast-tracked, while package B would be taken to 100% design prior to construction award. Due to extensive overlap, the package A contractor would have to carefully coordinate his work with the package B contractor. For these reasons, NAVFAC elected to use partnering on the project.

The results? Over \$300,000 of value engineering change proposals were approved, and both packages were completed on time, given numerous time extensions attributed to Government changes. No lost time injuries were reported, and there were no disputes on either package. These results are particularly impressive considering the project was constructed in phases based on a fast-track design (Holmes 1992).

The success of NAVFAC's partnering efforts is the reason its use is expanding so quickly throughout the Navy. As word of NIC's success spread, nine more partnered projects were added in 1990, 20 more in 1991, and the program continues to grow (Bottorff 1992). Appendix C contains a letter dated November 23, 1992 to all NAVFAC contracting agencies in which Rear Admiral Jack E. Buffington, Chief of Navy Civil Engineers, applauded the expansion of partnering throughout NAVFAC, and urged its continued use when it made good business sense. Admiral Buffington emphasized his policy that NAVFAC would not force partnering on their contractors, but would advise them of partnering benefits and past successes. By this time, NAVFAC had 58 ongoing partnering projects and 84 planned partnering projects identified (Buffington 1992). As of

May 1994, NAVFAC has completed 41 partnered MILCON projects, with an additional 83 under construction and another 108 future projects identified for partnering (Courtillet 1994).

More recent NAVFAC projects have also incurred tremendous success through partnering. On a \$52 million submarine wharf and maintenance building contract in Pearl Harbor, HI, partnering has been instrumental in placing the project a full year ahead of schedule. Also, through partnering, the owner, designer and contractor worked out a better method of installing a 2,000-ft gravity sewer. Specifications called for burying the sewer in a 24-ft deep open cut that crossed the naval base's main street. Instead, the contractor proposed, and NAVFAC accepted, micro-tunneling. The contractor bored a hole for a 38 inch steel jacket grouted around a 8 inch pipe, minimizing traffic snarls and producing far less contaminated soil for remediation from a pre-existing condition. Lastly, 120-ft piles with 800 psi prestress and 150 ton working load had been specified. However, through value engineering, the contractor got NAVFAC to agree to use 80-ft piles with 1,500 psi prestress and a 300 ton working load. NAVFAC and the contractor shared in the \$500,000 savings (Green 1993).

At the Marine Corps Air Station at Cherry Point, NC, a \$22 million, 202,000 square foot hospital project is over one year ahead of schedule, despite more than \$2 million of owner requested changes. This achievement is one reason the project received the Carolina Association of General Contractor's (AGC's) Pinnacle Award for best partnering project (Rave 1994).

NAVFAC's contractors are also enjoying recognition for their active participation in successful partnered projects. On a \$26 million drydock modernization in Portsmouth, NH, the contractor, George Hyman Construction Company, won an AGC award for best industrial project in 1992 (OBrien 1993). Additionally, on a \$8 million Secure Assembly and Test Facility project in San Diego, Kuass Construction Company won the Marvin M. Black award for excellence in partnering (Koziol 1994).

2.5 Previous Partnering Studies

Although there have been many reports of individual project successes achieved through partnering, a literature review performed by the author revealed that only two studies performed to date have compared the performance of partnered versus non-partnered projects. One of these was the aforementioned 1993 U. S. Navy study done by B. D. Pina, which compared the six partnered NAVFAC projects completed at that time against a sample of 300 non-partnered NAVFAC projects. The other comparative study to date, performed by D. C. Weston, analyzed the performance of 16 partnered U. S. Army projects against 28 non-partnered Army projects (Weston 1992, Weston and Gibson 1993). The analysis of data presented in Chapter 5 will briefly discuss any similarities between the results of this thesis and those of the studies mentioned above.

3. Research Methodology

This chapter outlines the methods used to gather the data presented in this thesis. Additionally, a brief description of the analysis techniques are presented.

3.1 Data Gathering

At the time of this study, NAVFAC was organized into six EFD's and four EFA's. However, EFA Naples, Italy was not included in this study, as projects to be analyzed were taken solely from the continental United States and Hawaii. Each EFD/EFA has cognizance of numerous field contracts offices, called ROICC (Resident Officer in Charge of Construction) offices, located throughout their geographic areas of responsibility. Appendix D illustrates the location and area of responsibility for each EFD/EFA. Note that although Appendix D shows seven EFD's, Chesapeake Division was recently converted to an EFA (EFA Chesapeake), reducing the number of EFD's to six.

Data collection was performed through a combination of written requests for information, facsimile surveys, telephone interviews, and analysis of microfiche data supplied to the author by NAVFAC. Initially, NAVFAC was asked whether contract information should be requested through them or solicited directly from EFD's, EFA's, and ROICC offices. NAVFAC subsequently provided the author with a list dated October 15, 1993 of all completed or ongoing partnered projects with anticipated completion dates prior to March 31, 1994, and permission to gather details directly from the field. During the following six months of data collection, over 200 NAVFAC contract representatives and engineers were ultimately contacted.

3.1.1 Partnered Project Data

Using the list of partnered projects provided by NAVFAC, the author sent facsimile surveys to individual ROICC offices soliciting project data. These sources, together with numerous telephone discussions with various EFD/EFA's

and ROICC offices, produced a total of 41 partnered projects completed as of May 1994. A copy of the survey is shown at Appendix E.

In addition, each EFD/EFA was telephoned to ascertain (1) the percentage of EFD/EFA's partnering on their construction projects, (2) the types of partnering being utilized in each EFD/EFA, and (3) the number of partnered projects completed.

3.1.2 Non-Partnered Project Data

A random sample of comparison projects that were not partnered was also collected. The majority of non-partnered information was obtained from a microfiche, provided by NAVFAC, which contained information on all ongoing MILCON projects as of December 17, 1993. The microfiche data are compiled from field input received through NAVFAC's Construction Management System (Courtillet 1994). The microfiche contained all the data required for this study, with the exception of original contract completion dates, and in some cases, claim amounts and final project costs. This information was gathered from individual ROICC offices via telephone interviews.

Although the microfiche projects ranged from 0-100% complete and were being performed worldwide, only those that were 99-100% complete and were being performed within the continental United States and Hawaii were considered. Further, only projects with an award price between \$980,641 and \$54,164,000 and having an award date of September 1989 or later were considered. This limiting criteria thus mirrored that of the partnered project sample.

From the constraints outlined above, 365 non-partnered projects were identified. In order to reduce the number of non-partnered projects to be analyzed to a manageable size, a sample of 100 projects was then randomly selected. As shown in Table 1, the numbers of non-partnered projects selected from each EFD/EFA were based on the composition of the partnered projects, such that a similar ratio of partnered and non-partnered projects from each EFD/EFA were included in the study.

Table 1: Partnered and Non-Partnered Samples by EFD/EFA

EFA/EFD (1)	# OF PROJECTS PARTNERED (2)	% OF SAMPLE (3)	# OF PROJECTS NON-PARTNERED (4)	% OF SAMPLE (5)
LANTDIV	4	10	9	9
NORTHDIV	4	10	10	10
SOUTHDIV	2	5	5	5
SOUTHWESTDIV	13	33	37	37
PACDIV	1	3	4	4
WESTDIV	9	23	21	21
CHESAPEAKE	3	8	7	7
MIDWEST	0	0	0	0
NORTHWEST	3	8	7	7
TOTALS	39	100	100	100

3.1.3 Subjective Data

Over 200 telephone interviews were conducted with various NAVFAC contract representatives and engineers to collect their views towards their partnering experiences. In order to generate candid comments, individuals were confidentially interviewed. Consequently, both positive and negative comments were received.

3.2 Analysis Methods

The collection of performance data allows for a quantitative analysis of partnered versus non-partnered project performance. The personal interviews provide subjective data that are helpful in analyzing the perceptions of NAVFAC contract representatives and engineers towards their partnering experiences.

3.2.1 Project Data Analysis

The criteria used in this study for measuring project performance will be cost change, change order cost, claims cost, value engineering savings and duration change. Each criterion was normalized as a percentage of either original

contract award price or original schedule duration. The criteria are then used to develop a comparison between the partnered projects and the sample of similar non-partnered projects using the mean value of each criterion. A z-test analysis of means will be used to determine if statistical validity has been achieved. A statistical analysis of variances and a statistical analysis of proportions will also be utilized.

3.2.2 Subjective Data Analysis

The validity of the partnering relationships established for the partnered projects will be assessed using the subjective data collected from interviews with NAVFAC contract representatives and engineers. An attempt will be made to determine if the relationships were genuine, and to measure the satisfaction of NAVFAC personnel with the partnering process.

4. Presentation of Data

4.1 Field Division and Field Activity Data Gathering

A survey of NAVFAC and the nine individual EFD/EFA's was completed as part of this research project. Table 2 shows the current state of partnering in each EFD/EFA. Column (1) lists the 9 EFD/EFA's, and columns (2), (3), and (4) show which of the three types of partnering relationships are being pursued. Column (5) shows the number of partnered projects completed within each EFD/EFA as of May, 1994. It should be noted that EFA Midwest, formerly a part of Northern Division (NORTHDIV), was not established until 1993, which explains why there have been no partnered projects completed within that EFA to date.

Table 2: Status of Partnering in EFD/EFA's

EFA/EFD (1)	DESIGN FIRMS (2)	CONSTRUCTION CONTRACTORS (3)	INTERAGENCY PARTNERING (4)	# OF PROJECTS COMPLETED (5)
LANTDIV	N	Y	Y	4
NORTHDIV	N	Y	Y	4
SOUTHDIV	N	Y	Y	2
SOUTHWESTDIV	Y	Y	Y	15
PACDIV	N	Y	Y	1
WESTDIV	N	Y	Y	9
CHESAPEAKE	N	Y	Y	3
MIDWEST	N	Y	Y	0
NORTHWEST	N	Y	Y	3
TOTALS	1	9	9	41

Currently, each EFD/EFA is using formalized partnering agreements. All nine EFD/EFA's are partnering with construction contractors and other governmental agencies, and 1 EFD/EFA is partnering with design firms.

Interagency partnering relationships are frequently being developed with the Environmental Protection Agency (EPA). Specifically, WESTDIV has established a partnering relationship with the EPA as part of environmental clean-up efforts taking place at Travis Air Force Base, California. SOUTHWESTDIV

has also partnered with the EPA, as well as with the Federal Fish and Wildlife Service. Another example of interagency partnering is taking place in NORTHDIV, where a partnering charter in the Philadelphia Naval Shipyard's weight handling department has significantly smoothed relations between inspectors and maintenance personnel.

Although all EFD/EFA's are including design firms in their construction partnering, only SOUTHWESTDIV has implemented partnering with design firms prior to contract award, reportedly during the planning of various base closures.

4.2 Partnered Projects

Information obtained from the EFD/EFA's and various ROICC offices revealed that 41 partnered projects have been completed as of May 1994. Figure 1 illustrates each EFD/EFA's number of completed partnered projects and percentage of the total completed within NAVFAC.

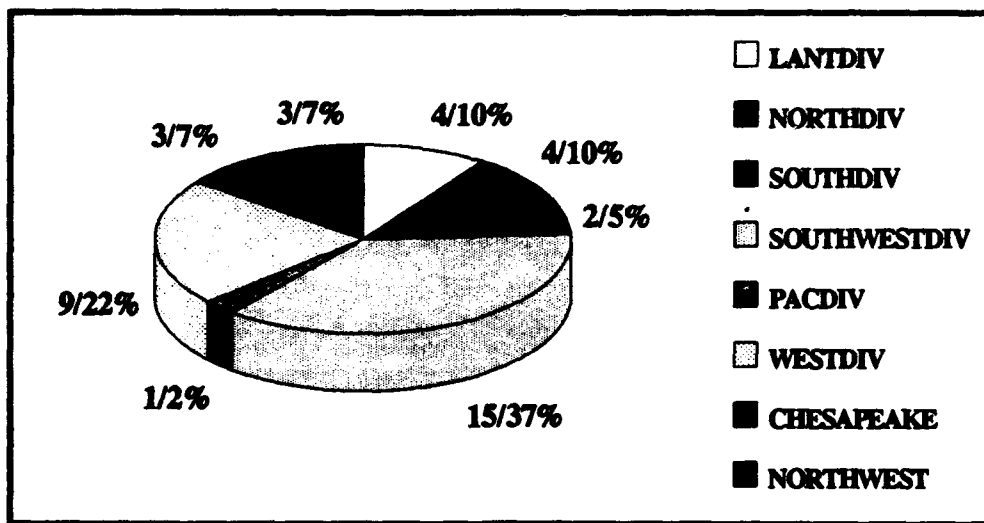


Figure 1: EFD/EFA's with Completed Partnered Projects, May 1994

It should be noted that the \$10 million Controlled Industrial Facility (CIF), the only partnered project completed to date within PACDIV, was not finished until June 15, 1994, two weeks beyond the data collection deadline. However, the CIF was included in this study to give visibility to the active partnering program now underway in Hawaii.

The author was able to obtain data for all 41 partnered projects. However, two of these projects were not included in the analysis. These projects, both of which were completed at the Marine Corps Air Station (MCAS) at El Toro, CA, had significant scope reductions implemented as a result of base closure decisions made subsequent to award of the contracts.

In the first of these two projects, the scope of a \$3.9 million contract to reroof Wherry Housing at MCAS El Toro was changed from new scissor trusses and a metal tile roofing system to composition shingles over the existing planking (Cook 1994). As a result, the project posted a cost reduction of 6% despite an additional 94 houses being added to the contract.

In the other project, over \$700,000 of work was deleted from a \$2.4 million contract to repair Hangar 296 at MCAS El Toro (Cook 1994). Because of this 29% reduction in the scope of work, a cost reduction of 13% and a schedule reduction of 2% were attained.

Because of these unusual circumstances, the results of these two projects were excluded from the analysis.

Appendix F contains the raw data for the 39 partnered projects selected. The criteria used in this study for measuring project performance were cost change, change order cost, claims cost, value engineering savings and duration change. Each criterion was normalized as a percentage of either original contract award price or original schedule duration. Table 3 shows the normalized criteria for each partnered project, arranged in descending order by contract award price.

Table 3: Partnered Project Data

PROJECT NO. (1)	AWARD PRICE (2)	% COST CHANGE (3)	% C/O COST (4)	% CLAIMS COST (5)	% VALUE ENGR (6)	% DURATION CHANGE (7)
1	54,164,000	20.01	20.19	0.00	0.18	20.51
2	37,777,000	5.14	5.14	0.00	0.00	6.91
3	37,200,000	6.17	6.31	0.00	0.14	23.52
4	28,369,292	18.61	18.61	0.00	0.00	14.93
5	28,047,000	1.89	2.61	0.00	0.71	30.34
6	26,050,869	14.03	14.03	0.00	0.00	1.28
7	17,877,474	18.20	18.20	0.00	0.00	9.92
8	16,139,000	9.42	9.42	0.00	0.00	53.45
9	15,763,000	6.18	5.64	0.63	0.09	21.60
10	12,137,800	18.42	18.42	0.00	0.00	5.41
11	11,468,820	5.01	5.01	0.00	0.00	23.03
12	10,877,877	13.71	13.71	0.00	0.00	23.86
13a	10,018,000	8.80	8.80	0.00	0.00	29.28
14	9,977,000	8.29	8.29	0.00	0.00	-20.62
15	9,038,000	3.23	3.23	0.00	0.00	-28.13
16	9,035,000	5.45	6.09	0.00	0.65	4.53
17	8,437,000	7.27	7.27	0.00	0.00	13.74
18	7,401,068	20.11	20.11	0.00	0.00	-7.43
19	6,702,435	1.03	1.03	0.00	0.00	9.74
20	6,568,494	14.41	13.85	0.56	0.00	-26.16
21	6,539,000	2.50	2.50	0.00	0.00	-15.61
22	6,498,000	31.58	31.58	0.00	0.00	79.52
23	6,190,000	5.01	5.01	0.00	0.00	9.40
24	6,156,788	2.33	3.54	0.00	1.22	0.00
25	5,977,000	0.53	4.03	0.00	3.50	9.19
26	5,836,092	18.23	18.23	0.00	0.00	24.47
27	5,021,355	6.77	6.77	0.00	0.00	38.10
28b	4,267,265	5.06	5.06	0.24	0.00	-24.72
29	3,669,115	11.21	11.21	0.00	0.00	42.16
30	3,650,399	31.68	31.68	0.00	0.00	43.91
31	3,068,000	1.60	1.60	0.00	0.00	-5.26
32	3,061,786	22.94	22.94	0.00	0.00	1.26
33	2,924,000	13.20	13.20	0.00	0.00	37.54
34	2,679,000	6.53	6.53	0.00	0.00	29.07
35	2,191,066	5.94	5.94	0.00	0.00	9.20
36	1,957,668	0.28	0.28	0.00	0.00	7.50
37	1,571,000	28.89	28.89	0.00	0.00	34.29
38	1,149,251	29.38	29.38	0.00	0.00	-1.49
39	980,641	7.79	7.79	0.00	0.00	0.00
AVERAGE	11,190,681	11.20	11.34	0.04	0.17	13.54
VARIANCE	1.39E+14	81.29	78.69	0.02	0.36	510.25

a-final completion date 6/15/94

b-pending claim not included in final cost

The contract award price for the partnered projects ranged from a low of \$980,641 to a high of \$54,164,000, with an average of \$11,190,681. Cost growth for the partnered projects averaged 11.20%, while change order costs averaged 11.34% of the award price. Claims costs averaged 0.04%, value engineering savings averaged 0.17%, and duration change averaged 13.54%. These results will be compared with those of a random sample of non-partnered projects using a z-test comparison of sample means.

Figures 2, 3, and 4 graphically illustrate the frequency of various ranges of percent cost change, change order cost, and duration change for the 39 partnered projects. The values along the x-axis represent ranges of 5% (i.e., 0 represents 0-4%, 5 represents 5-9%, etc.). In Chapter 5, these histograms will be compared to similar non-partnered histograms using the same scale along the x-axis for ease of comparison. Histograms for claims cost and value engineering savings are not presented, as the significance of these criteria are in the actual number of projects that experienced claims costs or value engineering savings, as will be further discussed in Chapter 5.

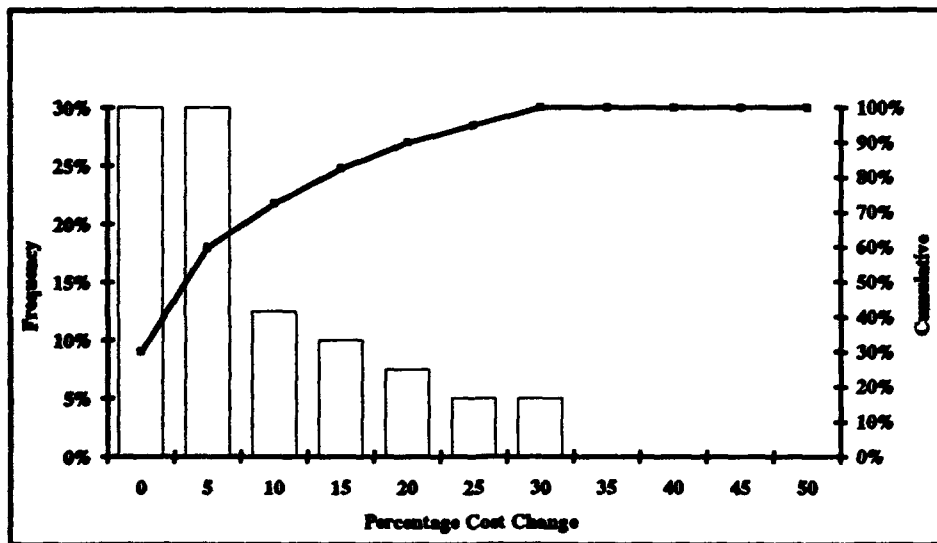


Figure 2: Partnered Percentage Cost Change Histogram

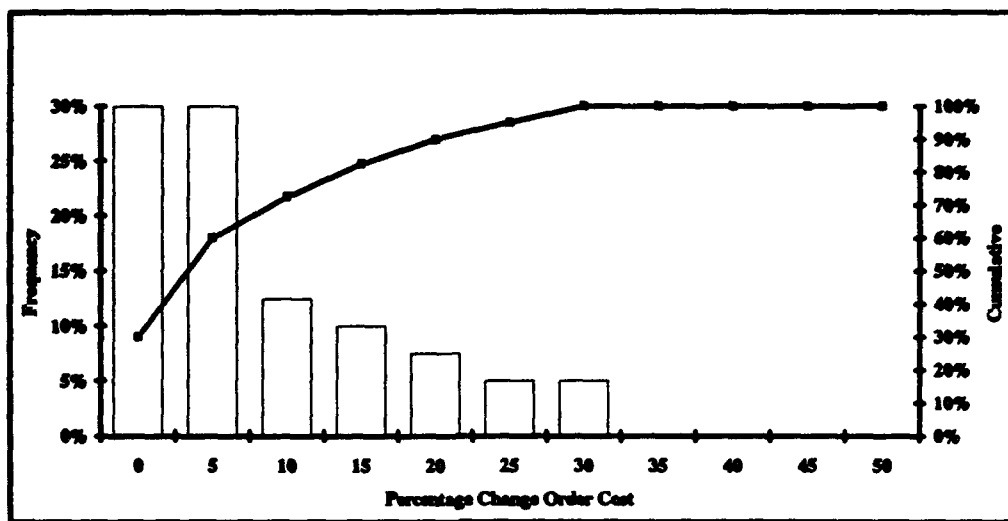


Figure 3: Partnered Percentage Change Order Cost Histogram

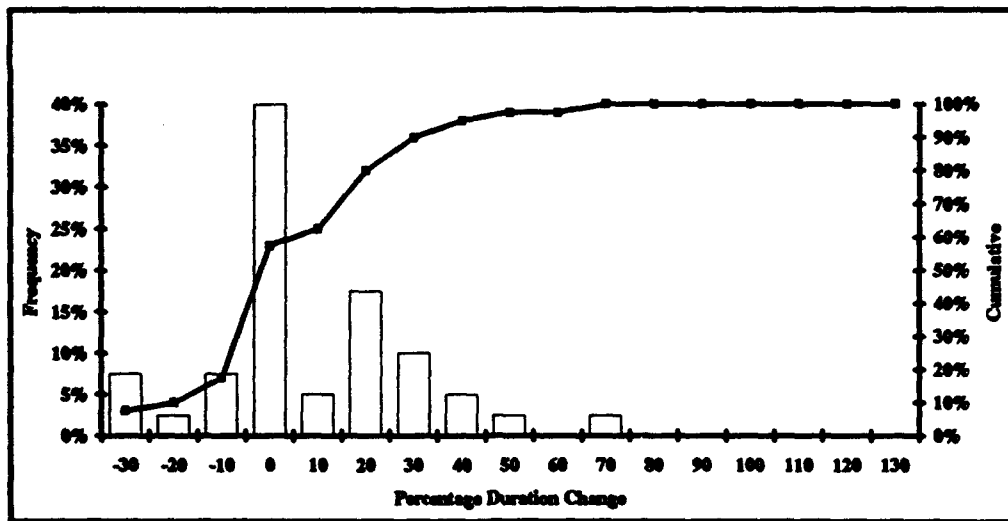


Figure 4: Partnered Percentage Duration Change Histogram

4.3 Non-Partnered Projects

As discussed in section 3.1.2, the non-partnered information was taken from a microfiche provided by NAVFAC. Raw data for the non-partnered projects are in Appendix G. Again, the performance criteria of cost change, change order cost, claims cost, value engineering savings and duration change for the non-partnered projects were normalized as a percentage of either original contract award price or original schedule duration. Table 4 shows the normalized criteria for each non-partnered project, listed in descending order by contract award price.

Table 4: Non-Partnered Project Data

PROJECT NO. (1)	AWARD PRICE (2)	% COST CHANGE (3)	% C/O COST (4)	% CLAIMS COST (5)	% VALUE ENGR (6)	% DURATION CHANGE (7)
1	27,922,600	3.01	3.01	0.00	0.00	0.00
2	16,969,631	38.27	38.04	0.24	0.00	-8.16
3 ^a	15,500,200	6.15	4.29	3.48	0.00	33.48
4 ^a	14,600,000	9.69	9.69	1.11	0.00	4.60
5	10,619,000	2.88	2.88	0.00	0.00	6.56
6	10,326,067	1.58	1.58	0.00	0.00	24.96
7	10,140,000	2.01	2.01	0.00	0.00	11.17
8	9,739,000	0.91	0.91	0.00	0.00	48.29
9	9,688,000	13.55	12.54	1.01	0.00	134.96
10	9,681,000	8.88	8.88	0.00	0.00	16.16
11	9,477,335	2.72	2.35	0.37	0.00	-4.70
12	9,138,000	6.87	6.87	0.00	0.00	59.61
13	8,796,283	6.23	6.23	0.00	0.00	49.52
14	8,648,700	2.43	2.43	0.00	0.00	-1.24
15	8,474,000	3.36	3.36	0.00	0.00	3.26
16	8,399,000	1.83	1.83	0.00	0.00	13.98
17	7,568,500	1.47	1.47	0.00	0.00	2.84
18 ^a	7,164,000	19.62	20.00	0.35	0.38	48.48
19	6,898,620	3.09	3.09	0.00	0.00	19.20
20	6,853,122	8.17	8.37	0.00	0.20	-2.26
21	6,525,000	3.35	3.35	0.00	0.00	19.59
22	6,484,900	3.75	3.75	0.00	0.00	-20.66
23	6,460,000	33.12	33.12	0.00	0.00	1.42
24	6,446,000	15.58	15.58	0.00	0.00	28.84
25	6,433,781	5.09	4.18	0.92	0.00	41.12
26	6,325,499	4.53	4.53	0.00	0.00	-8.04

^a-pending claim not included in final cost

Table 4: Non-Partnered Project Data (Continued)

PROJECT NO. (1)	AWARD PRICE (2)	% COST CHANGE (3)	% C/O COST (4)	% CLAIMS COST (5)	% VALUE ENGR (6)	% DURATION CHANGE (7)
27	6,321,837	9.80	9.80	0.00	0.00	-27.36
28	6,062,426	11.91	11.91	0.00	0.00	6.08
29	5,977,000	6.60	6.60	0.00	0.00	11.76
30	5,962,033	5.72	5.72	0.00	0.00	11.73
31	5,840,000	12.81	12.81	0.00	0.00	29.87
32	5,759,800	2.58	2.58	0.00	0.00	0.00
33	5,541,242	3.40	3.40	0.00	0.00	12.37
34	5,529,800	8.47	8.47	0.00	0.00	206.09
35	5,234,826	11.44	10.26	1.18	0.00	90.11
36	5,158,550	6.20	6.20	0.00	0.00	-0.75
37	5,131,700	35.89	35.89	0.00	0.00	37.21
38	5,060,000	13.46	13.46	0.00	0.00	103.22
39	4,933,425	17.91	17.91	0.00	0.00	8.54
40	4,776,061	2.56	2.56	0.00	0.00	18.41
41	4,633,750	27.90	27.90	0.00	0.00	5.33
42	4,621,669	6.68	6.68	0.00	0.00	23.58
43	4,456,071	9.44	9.44	0.00	0.00	23.74
44	4,291,596	5.56	5.56	0.00	0.00	5.81
45	4,256,958	5.34	5.34	0.00	0.00	20.60
46	4,223,484	51.25	51.25	0.00	0.00	23.53
47	4,103,147	25.92	25.92	0.00	0.00	0.00
48	4,090,000	2.08	2.08	0.00	0.00	7.98
49	4,077,516	9.43	9.43	0.00	0.00	32.00
50 ^a	3,888,000	1.80	1.80	5.38	0.00	38.77
51	3,851,359	8.09	8.09	0.00	0.00	8.40
52	3,736,000	1.88	1.60	0.28	0.00	0.00
53	3,675,000	12.77	11.12	1.65	0.00	47.23
54	3,450,387	2.45	2.45	0.00	0.00	22.22
55	3,410,000	10.65	10.65	0.00	0.00	84.88
56	3,389,000	7.98	7.02	0.96	0.00	36.32
57	3,344,608	6.17	6.17	0.00	0.00	3.84
58	3,309,429	4.20	4.20	0.00	0.00	-4.48
59	3,276,313	7.88	7.88	0.00	0.00	62.63
60	3,221,388	28.35	28.35	0.00	0.00	-2.76
61	3,220,307	0.88	1.18	0.00	0.29	43.51
62	3,167,000	1.31	1.31	0.00	0.00	-2.89
63	3,008,500	11.62	11.26	0.36	0.00	33.64
64	2,934,700	15.18	15.18	0.00	0.00	66.77
65	2,893,000	0.80	0.80	0.00	0.00	13.33
66	2,881,661	10.08	10.08	0.00	0.00	-1.30
67 ^a	2,866,693	15.56	15.56	6.24	0.00	52.41

^a-Pending claim not included in final cost

Table 4: Non-Partnered Project Data (Continued)

PROJECT NO. (1)	AWARD PRICE (2)	% COST CHANGE (3)	% C/O COST (4)	% CLAIMS COST (5)	% VALUE ENGR (6)	% DURATION CHANGE (7)
68	2,698,000	1.67	1.67	0.00	0.00	18.98
69	2,624,479	6.02	6.02	0.00	0.00	83.24
70	2,552,850	1.00	0.80	0.20	0.00	49.40
71	2,344,000	15.88	15.88	0.00	0.00	102.80
72	2,330,500	19.53	19.53	0.00	0.00	128.99
73	2,265,802	4.30	4.30	0.00	0.00	12.73
74	2,238,950	34.30	34.30	0.00	0.00	70.22
75	2,142,850	17.21	17.21	0.00	0.00	32.07
76	2,041,974	1.01	1.01	0.00	0.00	-1.01
77	1,965,300	6.25	6.25	0.00	0.00	13.68
78	1,931,919	41.82	41.82	0.00	0.00	0.00
79	1,920,000	7.97	7.51	0.46	0.00	-0.64
80	1,913,900	4.23	4.23	0.00	0.00	10.79
81	1,899,875	34.80	6.08	28.72	0.00	40.63
82	1,865,400	8.08	8.08	0.00	0.00	49.91
83	1,775,000	15.09	15.09	0.00	0.00	91.28
84	1,772,073	5.30	5.30	0.00	0.00	20.51
85	1,677,742	13.74	13.74	0.00	0.00	26.40
86	1,615,000	16.27	16.27	0.00	0.00	33.95
87	1,583,237	2.87	2.87	0.00	0.00	14.09
88	1,538,000	1.40	1.40	0.00	0.00	-0.21
89	1,478,000	3.15	3.15	0.00	0.00	10.66
90	1,470,670	9.57	9.57	0.00	0.00	33.08
91	1,455,700	5.13	5.13	0.00	0.00	45.08
92	1,443,421	2.35	2.35	0.00	0.00	-4.59
93	1,408,319	16.60	16.60	0.00	0.00	21.33
94	1,279,336	10.42	6.90	4.06	0.53	-10.18
95	1,188,750	2.23	2.23	0.00	0.00	-16.81
96	1,175,000	3.85	3.85	0.00	0.00	22.26
97	1,116,820	5.09	5.09	0.00	0.00	-2.41
98	1,090,415	2.83	2.83	0.00	0.00	8.80
99	1,072,665	4.86	4.86	0.00	0.00	13.53
100	1,039,658	5.84	5.84	0.00	0.00	-0.53
AVERAGE	4,887,600.89	9.79	9.38	0.57	0.01	25.93
VARIANCE	1.57725E+13	100.01	93.92	9.07	0.01	1279.69

The contract award price for the non-partnered projects ranged from a low of \$1,039,658 to a high of \$27,922,600, with an average of \$4,887,601. The average cost growth for the non-partnered projects was 9.79%, while the change order costs averaged 9.38% of the award price. Claims costs averaged 0.57%,

value engineering savings averaged 0.01%, and duration change averaged 25.93%. These results will be used to compare the performance of the non-partnered projects with the partnered projects using a z-test comparison of sample means.

Figures 5, 6, and 7 graphically illustrate the frequency of various ranges of percentage cost change, change order cost, and duration change for the non-partnered projects. The numbers along the x-axis represent ranges of 5% (i.e., 0 represents 0-4%, 5 represents 5-9%, etc.). As discussed earlier, these histograms will be compared to the partnered histograms (Figures 2, 3, and 4) in Chapter 5. Again, histograms for claims costs and value engineering savings are not presented, as the significance of these criteria are in the actual number of projects that experienced claims costs or value engineering savings, as will be further discussed in Chapter 5.

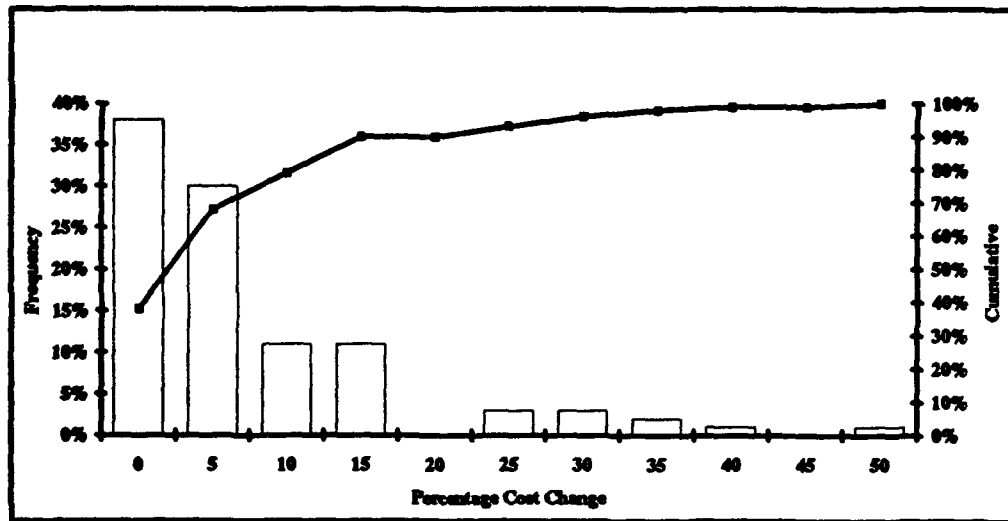


Figure 5: Non-Partnered Percentage Cost Change Histogram

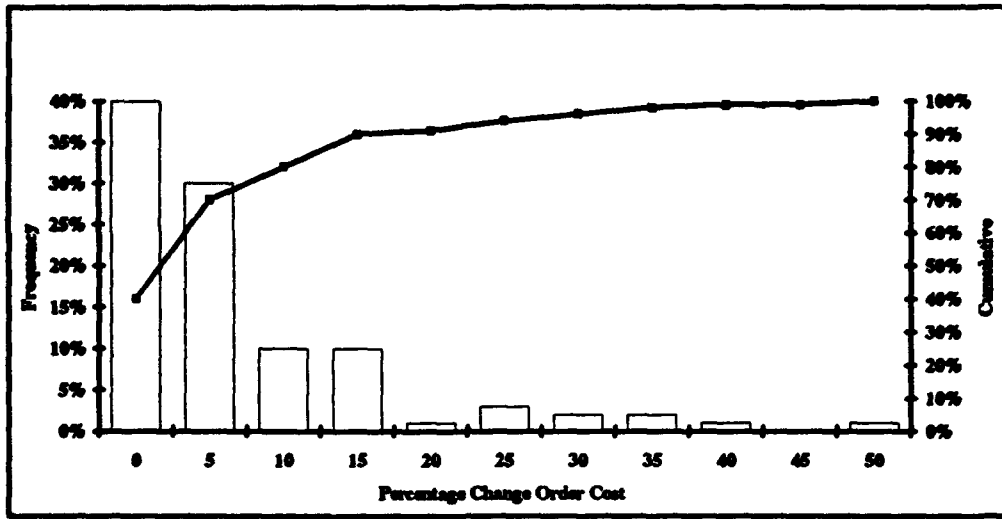


Figure 6: Non-Partnered Percentage Change Order Cost Histogram

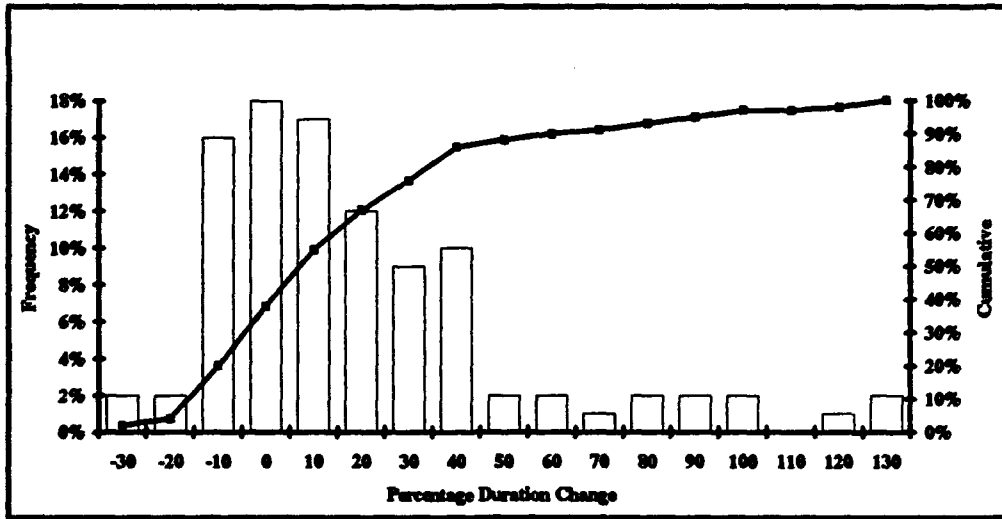


Figure 7: Non-Partnered Percentage Duration Change Histogram

4.4 Subjective Data

In completing this study, the author contacted over 200 NAVFAC contract representatives and engineers to gather project data for the thesis. Only three people had negative comments on the partnering process, while the remainder were totally positive. Selected positive comments are listed below.

"We avoided a claim by partnering. Also, customers became aware of potential problems early on, so a more usable project was ultimately delivered."

"Not all the partnering benefits are tangible. Because we partner the larger, more complicated projects, you can expect more changes. But you can't put a price tag on the good working relationships that are developed."

"The project team utilized partnering to overcome design issues created by fast track construction. The contractor also developed several value engineering proposals that saved the government time and money."

"Prior to implementing partnering on the project, the contractor was encountering differing site conditions on a daily basis, and the frustration on both sides built to an untenable management problem. Following the partnering session, both sides had new avenues for communication, and we began resolving the difficult issues that had plagued the project. We feel we successfully turned around a project that was going bad. We avoided a real liability problem for the Navy, and we give credit to changing the direction of the project to partnering."

"During initial excavation, an old dump site was revealed, which required numerous rounds of testing to categorize the site. Close partnering relationships between the ROICC, base environmental, state regulators, and the contractor helped get the project categorized and back on track in less than a month. This type of environmental problem historically has taken about one year to resolve."

Not all the comments received were completely positive. The following three negative comments were also received.

"There are not as many claims on the partnered projects because nobody wants to give the process a black eye, so they tend to pay the contractor off rather than hold the line."

"Partnering had a negative impact on the project schedule, because we were too patient with the contractor, often hesitating to implement remedies, issue delinquency letters, and retain funds."

"The customer was involved in the partnering sessions. Consequently, there was possibly too much access to parties other than the ROICC, which created more changes than if the customers were not party to the partnering sessions."

The results received by the author indicate that the vast majority of NAVFAC personnel associated with completed partnered projects are satisfied with their partnering experience, and feel that the process contributed to successful completion of the project.

5. Analysis of Data

This chapter will present a comparison of the mean criterion values of the partnered versus the non-partnered projects, and examine the significance of the differences using an analysis of means test. Additionally, an analysis of variances test and a comparison of histograms will be used to determine the predictability of the various performance criteria on the partnered and non-partnered projects. Finally, an analysis of proportions test will be used to examine the significance of the large disparity in the frequency of claims and value engineering proposals submitted on partnered versus non-partnered projects.

5.1 Comparison of Partnered and Non-Partnered Projects

The partnered and non-partnered projects were compared based on the criteria of cost change, change order cost, claims cost, value engineering savings and duration change. Table 5 lists the mean criterion values for both samples.

The largest disparity between the partnered and non-partnered projects occurred in the contract award price, claims costs, value engineering savings, and duration change. As shown in Table 5, the average award price of the partnered projects is more than double that of the non-partnered sample, indicating that NAVFAC is partnering their larger, more complex MILCON projects, where the cost of formalized partnering is more justified.

Table 5: Project Performance Comparison

MEAN CRITERION (1)	PARTNERED N=40 (2)	NON-PARTNERED N=100 (3)	DIFFERENCE (3)-(2) (4)
% COST CHANGE	11.20	9.79	-1.41
% CHANGE ORDER COST	11.34	9.38	-1.96
% CLAIMS COSTS	0.04	0.57	0.53
% V.E. SAVINGS	0.17	0.01	-0.16
% DURATION CHANGE	13.54	25.93	12.39
AWARD PRICE	\$11,190,681	\$4,887,601	-\$6,303,080

Claims are defined as any action where the contractor received or is seeking equitable adjustment under the disputes clause. For example, in some cases, resolved claims were not litigated. Rather, the issues were resolved "out of court", but because the resulting price adjustments were made under the disputes clause, they were properly coded as a claim (Collins 1994).

Claims costs averaged 0.57% for the non-partnered projects versus only 0.04% for the partnered projects. However, as stated in Chapter 4, the significance of the claims costs and value engineering savings is not found in these mean values, but in the percentage of projects that actually experienced claims costs or value engineering savings. Specifically, 18% of the non-partnered projects experienced claims costs, as opposed to only 7.69% (3 of 39) of the partnered projects, as illustrated in Figure 8.

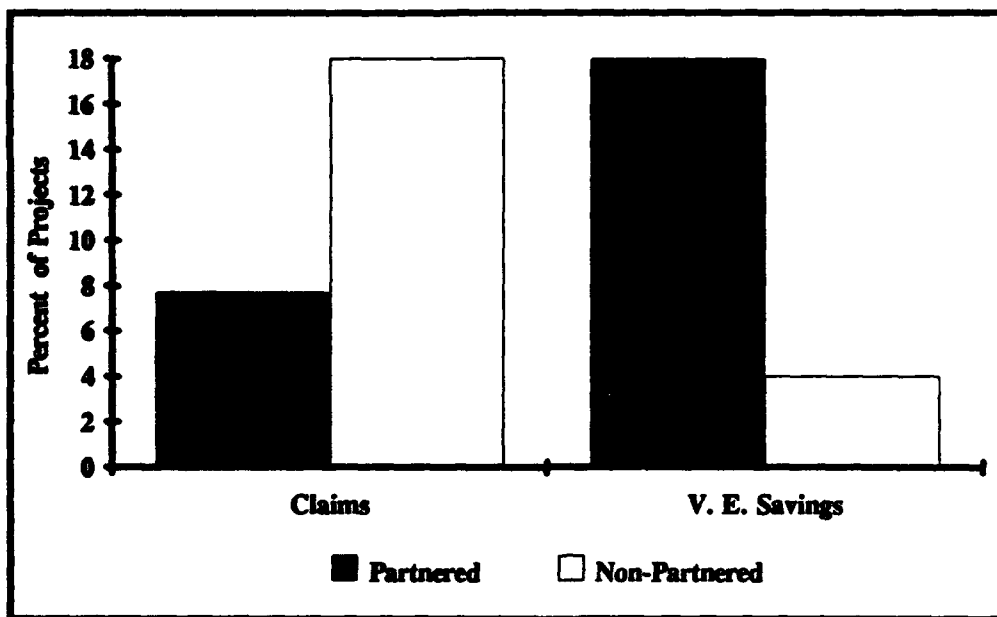


Figure 8: Performance Comparison of Claims and V. E. Savings

These results are consistent with those of Weston's recent Corps Of Engineers study, which concluded that the average claims cost in 29 U. S. Army

non-partnered projects was 4.86%, as opposed to only 0.67% for a similar sample of 16 partnered projects. Additionally, 38% of the non-partnered Army projects experienced claims costs, as opposed to only 12.5% of the partnered projects (Weston 1992).

Value engineering savings averaged 0.17% for the partnered projects versus 0.01% for the non-partnered projects. More significantly, as shown in Figure 8, 17.95% (7 of 39) of the partnered projects posted some value engineering savings, as compared to only 4% of the non-partnered projects. These results are also similar to Weston's study, which reported 44% of the partnered Army projects with some value engineering savings, as opposed to only 14% of the non-partnered projects.

The average duration change was the remaining criterion that exhibited a significant disparity. The non-partnered projects posted an average duration change of 25.93%, as opposed to 13.54% for the partnered projects. Moreover, nearly 75% of the partnered projects posted a duration change smaller than the average non-partnered duration change, indicating that partnering is having a positive impact on schedule adherence. Figure 9 shows the average duration change, as well as percent cost change and change order cost of both the partnered and non-partnered projects.

Figure 9 seems to indicate that partnering is not significantly impacting cost change or change order cost on NAVFAC MILCON projects. In fact, the partnered projects averaged higher percent cost change and change order cost than the non-partnered projects. These results are consistent with those of Pina's previous study of NAVFAC partnering (Pina 1993), which reported that the mean cost growth of the six partnered projects completed at that time was 10.75%, as opposed to 7.05% for a sample of 300 non-partnered projects. However, these results are contrary to Weston's Army study, which reported that 16 partnered Army projects averaged 3.86% cost growth and 3.90% change order costs, as opposed to 12.98% cost growth and 11.06% change order cost for 29 non-partnered projects.

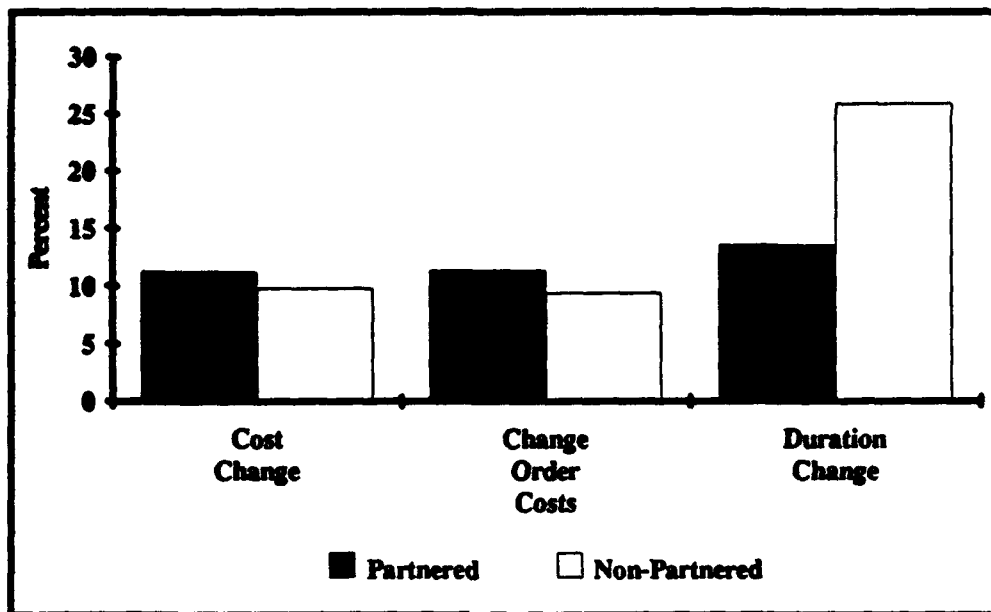


Figure 9: Performance Comparison of Cost Change, Change Order Cost and Duration Change

Figures 10, 11, and 12 are comparisons of the partnered and non-partnered histograms for percent cost change, change order costs, and duration change. Although the average values of percent cost change and change order cost are not significantly different, Figures 10 and 11 suggest that cost change and change order cost are more predictable on the partnered projects than on the non-partnered projects. Likewise, Figure 12 clearly indicates that duration change is much more predictable on the partnered projects than on the non-partnered projects.

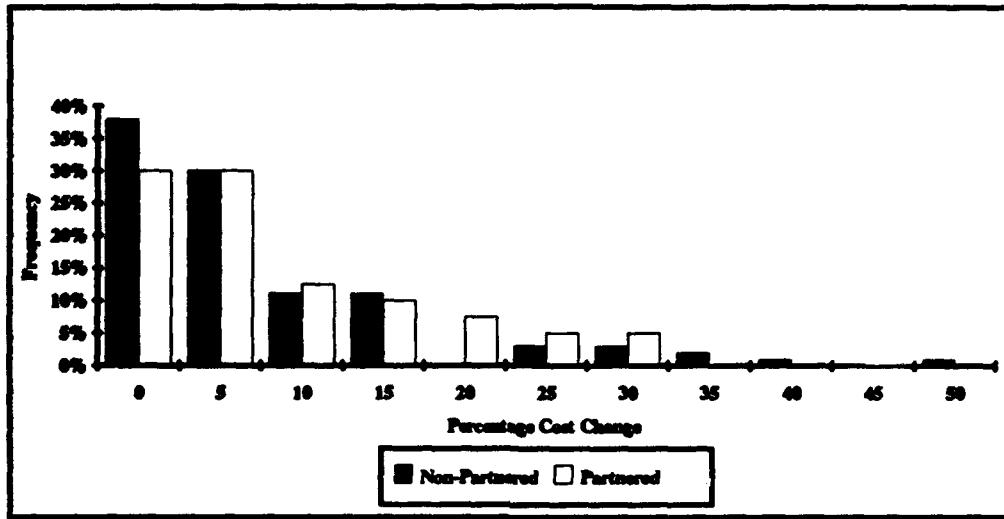


Figure 10: Percentage Cost Change Histogram Comparison

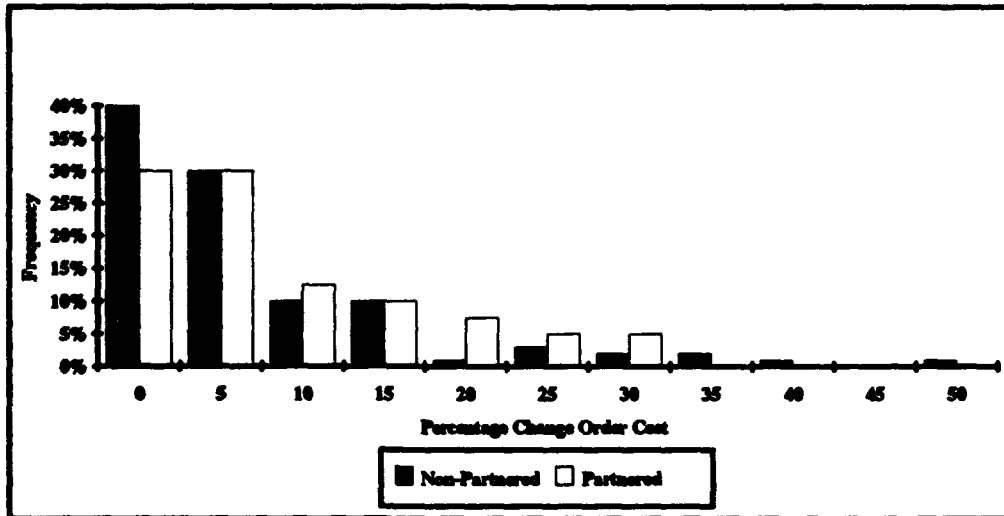


Figure 11: Percentage Change Order Cost Histogram Comparison

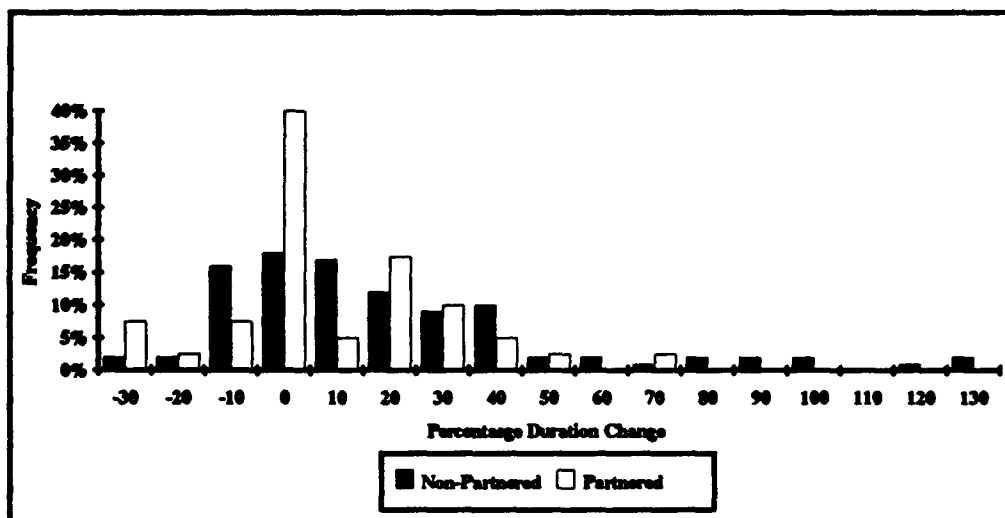


Figure 12: Percentage Duration Change Histogram Comparison

5.2 Statistical Analysis of Data

Although it is not possible to determine if the sample of non-partnered projects is representative of the average NAVFAC MILCON project, the sample of partnered projects represents 95% (39 of 41) of the projects completed as of May 1994, and is representative. The non-partnered sample was randomly selected from a pool of 365 non-partnered projects completed within the same geographic areas and within the same time and cost range as the partnered sample. This sample was selected in order to mirror that of the partnered project sample. With all other factors the same, the samples' only difference is the existence of partnering.

A z-test analysis of sample means will be used to determine whether the differences in sample means are significant, namely, whether they will enable the author to reject the null hypothesis. The null hypothesis is that the sample means are equal using a two-tail level of significance of 0.05 due to the large sample sizes. The level of significance is required to judge the merits of any conclusions made. It represents the probabilities of a Type I or Type II error, namely, the probabilities of erroneously rejecting or erroneously accepting a hypothesis

(Miller and Freund 1977). The results of the z-test, applied to the sample means for percent cost change, change order cost, claims cost, value engineering savings, and contract award price are shown in Table 6.

Table 6: Statistical Comparison of Sample Means

CRITERIA (1)	PARTNERED MEAN (2)	NON-PARTNERED MEAN (3)	t (4)
% COST CHANGE	11.26	9.79	0.8049194
% CHANGE ORDER COST	11.4	9.38	1.1370873
% CLAIMS COST	0.04	0.57	-1.1101247
% V. E. SAVINGS	0.17	0.01	2.5584887
% DURATION CHANGE	13.13	25.93	-2.0973237
AWARD PRICE	10,960,364	4,887,601	4.5762007

The null hypothesis can be rejected if the z-value listed in column (4) of Table 6 is greater than the $z_{0.05}$ value of 1.645 or less than the $-z_{0.05}$ value of -1.645. Thus, the z-test results lead the author to reject the null hypothesis for percent claims cost, value engineering savings, duration change, and contract award price, indicating that the differences in sample means are significant for these criteria. Likewise, the differences in sample means are not significant with respect to percent cost change and change order cost.

This analysis confirms that partnering does not significantly impact cost change and change order cost on NAVFAC MILCON projects, and that NAVFAC is partnering their larger, more complex MILCON projects. This may explain why the partnered projects are experiencing as much cost change and change order costs as the non-partnered projects. The analysis also confirms that partnering does have a positive impact on the average percent claims cost, value engineering savings and duration change of NAVFAC MILCON projects.

5.3 Sample Variances

An F-test analysis of sample variances will be used to determine whether the differences in sample variances are significant, namely, whether they will enable the author to reject the null hypothesis. The null hypothesis is that the

sample variances are equal using a two-tail significance of 0.05. The results of the *F*-test, applied to the sample variances for percent cost change, change order cost, claims cost, value engineering savings, and contract award price are shown in Table 7.

Table 7: Statistical Comparison of Sample Variances

CATEGORY (1)	PARTNERED VARIANCE (2)	NON-PARTNERED VARIANCE (3)	<i>F</i> (4)	<i>F</i> (5)
% COST CHANGE	84.20	100.01	0.81	1.23
% CHANGE ORDER COST	81.53	93.92	0.80	1.25
% CLAIMS COST	0.07	9.07	0.002	500
% V. E. SAVINGS	0.37	0.01	36	.003
% DURATION CHANGE	517.17	1279.69	0.40	2.50
AWARD PRICE	1.39E+14	1.57E+13	8.86	0.11

The alternative hypothesis for the *F*-values in column (4) of Table 7 is that the true variance of the partnered sample is greater than that of the non-partnered sample. The null hypothesis can be rejected if the *F*-value listed in column (4) is greater than the $F_{0.05}$ ($n_1=39$, $n_2=100$) value of 1.54 (Miller and Freund 1977). Thus, the *F*-test results lead the author to reject the null hypothesis for percent value engineering savings and contract award price, confirming that the true variance of the value engineering savings and award price of the partnered sample is greater than that of the non-partnered sample. However, because only 4% of the non-partnered sample posted a value engineering savings, the alternative hypothesis is probably not valid for this criterion.

The alternative hypothesis for the *F*-values in column (5) of Table 7 is that the true variance of the partnered sample is less than that of the non-partnered sample. The null hypothesis can be rejected if the *F*-value in column (5) is greater than the $F_{0.05}$ ($n_1=100$, $n_2=39$) value of 1.62 (Miller and Freund 1977). Thus, the *F*-test results lead the author to reject the null hypothesis for percent duration change, indicating that the true variance of the duration change of the partnered sample is less than that of the non-partnered sample.

As was suggested by Figure 12, analysis of Table 7 shows that partnered

projects perform more consistently in the area of duration change. However, analysis of Table 7 also indicates that partnering does not make a statistical difference in the predictability of percent cost change or change order cost. Finally, although analysis of Table 7 indicates that the partnered projects have a greater variance in value engineering savings than the non-partnered projects, this is most likely due to the fact that 96% of the non-partnered projects posted no value engineering savings.

5.4 Statistical Comparison of Proportions

As was illustrated in Figure 8, there was a dramatic difference in the percentage of partnered and non-partnered projects that posted claims costs and value engineering savings. To determine the statistical significance of these differences, a proportions test will be applied to these criteria, as summarized in Table 8.

Table 8: Statistical Comparison of Proportions

CATEGORY (1)	PARTNERED PROJECTS (2)	NON-PARTNERED PROJECTS (3)	Z (4)
% WITH CLAIMS	7.69	18.0	-1.53
% WITH V.E. SAVINGS	17.95	4.0	2.72

To determine whether the differences in proportions outlined in Table 8 can be attributed to chance, the null hypothesis that the proportions are equal will be tested at a 0.05 level of significance. The null hypothesis can be rejected if the z-value in column (4) is greater than the $z_{0.05}$ value of 1.645, in which case the true proportion of partnered projects would be greater than that of the non-partnered projects. If the z-value in column (4) is less than the $-z_{0.05}$ value of -1.645, the null hypothesis can also be rejected, but the true proportion of partnered projects would be less than that of the non-partnered projects (Miller and Freund 1977). Thus, the null hypothesis can be rejected for value engineering savings, indicating that the true proportion of projects with value

engineering savings is greater for partnered projects than for non-partnered projects. Conversely, the difference between the proportion of partnered and non-partnered projects with claims costs can be attributed to chance at a level of significance of 0.05.

Note that at a level of significance of 0.10, the $-z_{0.10}$ value is -1.282, and the null hypothesis can be rejected for claims costs, indicating that the true proportion of projects with claims costs is less for partnered projects than for non-partnered projects at a level of significance of 0.10.

6. Conclusions

NAVFAC's partnering program appears to be quite successful and in full gear. With the Chief of Navy Civil Engineers squarely behind the program, momentum is building. As word of individual successes spreads across the Navy, more and more projects are being planned for partnering. As of May 1994, 41 partnered MILCON projects have been completed, 83 are ongoing, and 108 future projects are planned for partnering.

The data collected by the author, together with that being reported on such projects as the \$114 million Naval Intelligence Center and \$52 million submarine wharf and maintenance building contract, indicate that partnering is having a positive impact on NAVFAC projects in the areas of claims avoidance, value engineering savings, and duration change. Specific conclusions are as follows:

- All nine of NAVFAC's EFD/EFA's are utilizing partnering on their construction projects to some extent. To date, one of every three completed partnered project was performed in SOUTHWESTDIV, although the large numbers of ongoing projects being partnered in the other EFD/EFA's should significantly reduce that ratio in the near future.
- Partnering is having a significant effect in reducing the occurrence of claims on NAVFAC MILCON projects. Eighteen percent of the non-partnered projects experienced claims costs, as opposed to 7.5 percent of the partnered projects. These findings are consistent with a similar study performed on U. S. Army Corps of Engineers data. A comparison of the samples indicates that the true proportion of projects with claims costs is less for the partnered projects than for non-partnered projects at a statistical level of significance of 0.10.
- Partnering is having a significant impact on the frequency of value engineering submissions on NAVFAC MILCON projects. Seventeen and one half percent of the partnered projects posted some value engineering savings, as opposed to only 4 percent of the non-partnered projects. These findings are also consistent with a similar study performed on U. S.

Army Corps of Engineers data. An analysis of the samples indicates that these proportions are statistically significant, namely, the true proportion of projects with value engineering savings is greater for the partnered projects than for the non-partnered projects at a level of significance of 0.05.

- Partnering is having a significant impact on the schedule adherence of NAVFAC MILCON projects. The partnered projects analyzed in this study posted an average duration change of 13.54 percent, as opposed to 25.93 percent of the non-partnered projects. A comparison of the samples indicates that the difference in these sample means are statistically significant.

- A comparison of the samples indicates that partnering is not having a statistically significant effect on cost change or change order cost in NAVFAC MILCON projects. Although this finding is consistent with that of a previous study performed on NAVFAC MILCON data, it is not consistent with the similar study of U. S. Army data.

- A comparison of the sample variances indicates that duration change is more predictable for the partnered projects than for the non-partnered projects. Also, contract award price and value engineering savings are more predictable on the non-partnered projects. However, the value engineering savings variance for the non-partnered projects is small because only 4 percent of the projects posted a value engineering savings.

- NAVFAC is implementing partnering on their larger, more complex MILCON projects, where the cost of formalized partnering is more justified. The average award price for the partnered projects in this study was more than twice as great as that of the non-partnered sample.

- Subjective analysis indicates that the vast majority of NAVFAC personnel are satisfied with their partnering experience, and feel that the process contributed to successful completion of the project. From over 200 personnel interviewed, only 3 negative comments were received.

NAVFAC executes millions of dollars worth of MILCON projects every

year. Through reduced frequency of claims, increased frequency of value engineering submissions, and improved schedule adherence, partnering presents a huge potential for cost savings on future NAVFAC projects. In addition, there appears to be very little risk associated with partnering, which makes it an even more attractive and viable contract administration alternative for NAVFAC projects.

7. Recommendations

7.1 Actions Based on Analysis of Research

The results of this study indicate that NAVFAC has been successful in implementing partnering on their MILCON projects. In furtherance of that effort, the following recommendations are offered:

- NAVFAC should continue to encourage the application of partnering to projects with an award price within the range of this study. The average award price of the partnered and non-partnered samples presented indicates that only the larger, more complex projects are currently being partnered. Although partnering may not be as cost effective on contracts below the price range of this study, increased benefits would be realized if more projects at the lower end of this spectrum were partnered.
- NAVFAC should investigate why such a low percentage of their non-partnered projects are receiving value engineering proposals. While this may be attributed to the relative simplicity and repetitiveness of the projects being constructed, an investigation into the value engineering program might prove beneficial.
- NAVFAC should use this study as a resource for encouraging the spread of partnering. Additionally, NAVFAC personnel should continue to receive training in partnering mechanics and philosophy.
- NAVFAC may benefit from further analysis of the microfiche data being gathered through their CMS or other database systems. This information could be beneficial in identifying trends or better business practices within individual EFD's. For example, the author performed a claims analysis of all the microfiche non-partnered projects within the cost and time range of this study. WESTDIV experienced claims on 16.1 percent (10 of 62) of their non-partnered projects; SOUTHWESTDIV also experienced claims costs on 16.2 percent (16 of 99) of their non-partnered projects. However, LANTDIV only experienced claims on 8.6 percent (5 of 58) of their non-partnered projects. A closer look at the data might reveal the

reason for these types of disparities.

7.2 Recommendations for Future Research

This study considered only those MILCON projects that were completed as of May 1994. Considering the large number of ongoing MILCON projects currently being partnered, the number of completed partnered projects will dramatically increase in the near future. It is therefore recommended that another study be completed at that time. Other recommendations for future research include:

- NAVFAC executes many other construction programs besides MILCON, and many of those projects are also being partnered. A study of partnering performance on these other construction programs is warranted.
- NAVFAC's partnering program should be extended to increase the amount of interagency partnering in an effort to improve scope definition, the permitting process, and customer satisfaction.
- Partnering should be more extensively pursued with design firms. The benefits of partnering during the construction phase are greatly limited by the quality of the design. Partnering during the design phase may produce cost savings and instill quality improvement into NAVFAC projects.

APPENDICES

Appendix A: Sample Partnering Agreement

Partnering Agreement



FLF



We, the "Partners in Quality" for the construction of the Hospital and Dental Health Care Facility at the Marine Corps Air Station, Cherry Point, North Carolina, hereby commit ourselves to the following:

- Provide a quality health care facility
- Have no lost time accidents
- Have satisfied stakeholders
- Complete the project on time within financial objectives of all parties
- Resolve problems at the local level in a timely manner
- Endeavor to strengthen our Partnership as we build our health care facility
- Enjoy our journey

We further commit to achieve these goals through an open, honest and trusting relationship. By our signatures below, we fully embrace and commit ourselves to these principles.

Debbie Riddle
H. J. [unclear]
[unclear]
Rick Johnson
L. [unclear]
Omer [unclear]
[unclear]
[unclear]
Paul [unclear]
Charles A. Hutchison
J. [unclear]
[unclear]

Stanley G. Carr
[unclear]
James [unclear]
[unclear]
B. [unclear]
[unclear]
K. A. Decker
Kenneth [unclear]
[unclear]
[unclear]
[unclear]
[unclear]

Appendix B: Initial Partnering Guidance to EFD/EFA's



DEPARTMENT OF THE NAVY

NAVAL FACILITIES ENGINEERING COMMAND
300 STOVALL STREET
ALEXANDRIA, VA 22304-5000

IN REPLY REFER TO

FEP 01 X-1

From: Commander Naval Facilities Engineering Command

Subj: PARTNERING

Encl: (1) A Guide to Partnering for Construction Projects

1. We are currently evaluating a relatively new concept initially developed by the Construction Industry Institute (CII). The "CII partnering" concept advocates a teamwork approach for successful construction completion of a project by involving the owner, designer, and contractor during the entire planning, design, and construction phases of a project. The involvement up front and throughout the entire project development and construction by key players has many advantages. Due to federal procurement regulations, NAVFAC's use of the partnering concept is limited to the construction phase of the project only.

2. Partnering as used by the Navy, establishes mutual contractor-government goals that both parties formally sign up to and work to accomplish. A three to five day workshop is scheduled shortly after construction award where this arrangement is developed and set in motion by partnering facilitators. A plan is also developed at this workshop that promotes the continuance of this concept and achievement of the mutually established goals by the end of the construction period.

3. The Army Corps of Engineers (COE) has utilized the partnering process and has been successful in their use of this concept. They are currently using it on a Navy MCON project on which they are the design and construction agent. CHESDIV is using the method on a FY 1989 and 1991 MCON \$114M Naval Investigative Command (NIC) Headquarters building in Suitland Maryland, a facilities service contract at the Naval Air Test Center (NATC), Patuxent River, Maryland, as well as informally on a FY 1990 MCON project, a \$15M Hangar building, also at NATC Patuxent River. LANTDIV soon plans to employ the method on a replacement hospital project at Naval Hospital, Portsmouth, Virginia. Results are very encouraging. Some of the goals and results include: early formation of working relationships and recognition of concerns of parties involved, timely problem identification and resolution, timely submittal processing, reduced requests for information, minimization of project cost growth, and in general, more communication and effort from active parties involved in a contract in achieving common objectives and benefits. Due to the encouraging results to date, you are authorized and encouraged to apply partnering techniques to appropriate projects immediately.

Subj: PARTNERING

4. Enclosure (1) is an implementation guide assembled by the Corps of Engineers' Mobile District and is provided for your use. Additional information is available and can be provided, if necessary.

5. NAVFACENGCOM Headquarters POCs are Mr. J. Courtillet, Code 0511, (703) 325-0821, auto von prefix is 221, and Mr. Paul Miller, Code 05A1, (703) 325-9188.



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Appendix C: Partnering Policy Memorandum



DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND
300 STONALL STREET
ALEXANDRIA, VA 22304-5000 J

23 November 1992

From: Commander, Naval Facilities Engineering Command

Subj: PARTNERING

Encl: (1) Partnering Benefits
(2) NAVFAC Partnering Projects
(3) NAVFAC Partnering Contacts

1. "Partnering" is a common sense communication process which I fully endorse.
2. Very simply, it establishes effective working relationships between the partners and makes their job easier. Through commitment, trust, communications and shared objectives, partnering creates an attitude of teamwork and an atmosphere for effective problem solving. This results in a win-win situation for all members of the partnerships.
3. Partnering can be used not only on government contracts (e.g. - construction, design, FSC, etc.) but also in non-contractual relationships (e.g. - with regulators and other government agencies, people within your organization, etc.) when the use of the teambuilding and cooperative aspects of partnering would be beneficial.
4. A basic principle of partnering is that participation is voluntary. Willing partners provide maximum success. We will not force the process on our contractors, A/E's or customers. We should, however, do our best to advise them of partnering's benefits (enclosure (1)) and past successes.
5. The partnering process normally begins with a workshop facilitated by a qualified professional facilitator, either contract or in-house. The costs for these workshops should be shared between the primary players (e.g. - contractor and government on construction contract, A/E and government on design contract, etc.). Costs incurred by the secondary partners (e.g. - A/E, customer, etc. on a construction contract) should be minimized to ensure maximum partnering participation.
6. I am pleased to see the use of partnering expand throughout NAVFAC (enclosure (2)) and urge all of you to use it whenever it makes good business sense. For information about partnering and

Subj: PARTNERING

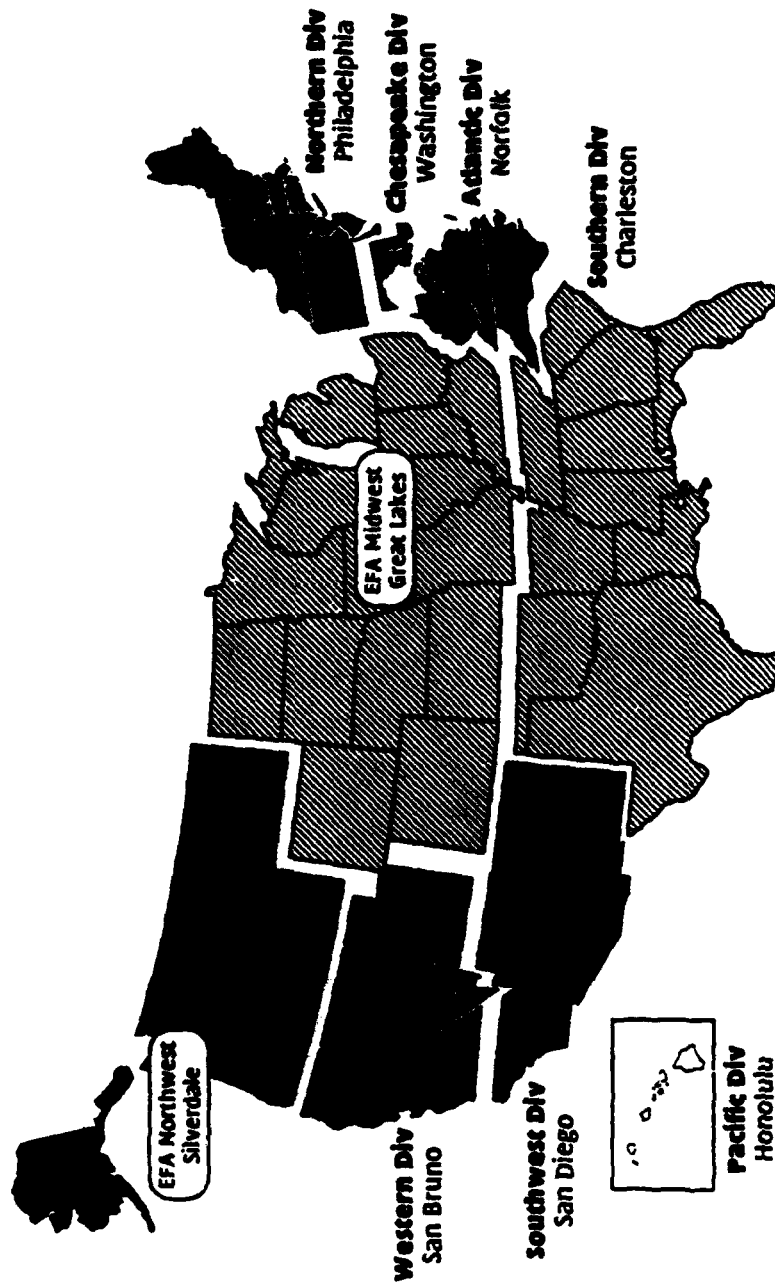
experienced field contacts, see headquarters POC's in enclosure (3). Partnering will not only help us serve our customers better, faster, and with less costs, but also make our people's jobs more enjoyable by reducing conflict with our customers and suppliers.



JACK E. BUFFINGTON.

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CO PWC GREAT LAKES
CO PWC GUAM
CO PWC NORFOLK
CO PWC PEARL HARBOR
CO PWC PENSACOLA
CO PWC SAN DIEGO
CO PWC SAN FRANCISCO
CO PWC YOKOSUKA
CO PWC WASHINGTON
CO PWC JACKSONVILLE
COMNAVFACENGCOM DET PWC CHARLESTON
CO CBC DAVISVILLE
CO CBC GULFPORT
CO CBC PORT HUENEME
CO NEESA
CO NAVCIVENGLAB
CO ENGFLDACT MW GREAT LAKES
CO ENGFLDACT NW SILVERDALE
NAVSCOLCECOFF PORT HUENEME
NAVFACCONTRACEN

Appendix D: EFD/EFA Location and Area of Responsibility



Appendix E: Partnering Information Survey

- A. EFD/EFA: _____
- B. ROICC OFFICE: _____
- C. PROJECT NAME: _____
- D. CONTRACT NUMBER: _____
- E. POINT OF CONTACT AND
PHONE: _____
- F. TYPE SOLICITATION: _____
- G. AWARD PRICE: _____
- H. FINAL COST: _____
- I. CHANGE ORDER COSTS: _____
- J. TOTAL CLAIMS COSTS: _____
- K. VALUE ENGINEERING SAVINGS: _____
- L. ORIGINAL COMPLETION DATE: _____
- M. ACTUAL COMPLETION DATE: _____
- N. COMMENTS (IF ANY): _____

O. PLEASE RETURN COMPLETED FORMS TO:

LT Kelly J. Schmader
c/o Dr. G. Edward Gibson, Jr.
Dept. of Civil Engineering ECJ 5.200
University of Texas
Austin, Texas 78712-1076
(512) 471-4648
FAX (512) 471-3191

Appendix F: Partnered Project Data

EFD/EFA	PROJECT NAME	CONTRACT #
CHESAPEAKE	PHASE II NAVAL INTELLIGENCE CTR	89-0080
	PROJECT COST	DURATION
ORIGINAL	\$54,164,000	746
FINAL	\$65,000,000	899
% CHANGE	20.01%	20.51%
	CHANGE ORDERS	CLAIMS
COST	\$10,936,000	\$0
% PROJECT	20.19%	1.48%
	VALUE ENGINEERING	PROJECT #
COST	\$100,000	1
% PROJECT	0.18%	

EFD/EFA	PROJECT NAME	CONTRACT #
SOUTH DIV	EXPLOSIVE HANDLING WHARF	88-0635
	PROJECT COST	DURATION
ORIGINAL	\$37,777,000	825
FINAL	\$39,718,924	882
% CHANGE	5.14%	6.91%
	CHANGE ORDERS	CLAIMS
COST	\$1,941,924	\$0
% PROJECT	5.14%	0.00%
	VALUE ENGINEERING	PROJECT #
COST	\$0	2
% PROJECT	0.00%	

EFD/EFA	PROJECT NAME	CONTRACT #
SO. WEST DIV	NAVAL HOSPITAL/DENTAL CLINIC	86-0606
	PROJECT COST	DURATION
ORIGINAL	\$37,200,000	608
FINAL	\$39,495,600	751
% CHANGE	6.17%	23.52%
	CHANGE ORDERS	CLAIMS
COST	\$2,347,600	\$0
% PROJECT	6.31%	0.00%
	VALUE ENGINEERING	PROJECT #
COST	\$52,000	3
% PROJECT	0.14%	

EFD/EFA	PROJECT NAME	CONTRACT #
LANT DIV	REPLACEMENT HOSPITAL PHASE III	89-9152
	PROJECT COST	DURATION
ORIGINAL	\$28,369,292	556
FINAL	\$33,650,000	639
% CHANGE	18.61%	14.93%
	CHANGE ORDERS	CLAIMS
COST	\$5,280,708	\$0
% PROJECT	18.61%	0.00%
	VALUE ENGINEERING	PROJECT #
COST	\$0	4
% PROJECT	0.00%	

EFD/EFA	PROJECT NAME	CONTRACT #
CHESAPEAKE	PHASE I NAVAL INTELLIGENCE CTR	86-0217
	PROJECT COST	DURATION
ORIGINAL	\$28,047,000	735
FINAL	\$28,578,233	958
% CHANGE	1.89%	30.34%
	CHANGE ORDERS	CLAIMS
COST	\$731,233	\$0
% PROJECT	2.61%	0.00%
	VALUE ENGINEERING	PROJECT #
COST	\$200,000	5
% PROJECT	0.71%	

EFD/EFA	PROJECT NAME	CONTRACT #
NORTHDIV	DRY DOCK 2 MODERNIZATION	89-0010
	PROJECT COST	DURATION
ORIGINAL	\$26,050,869	547
FINAL	\$29,705,908	554
% CHANGE	14.03%	1.28%
	CHANGE ORDERS	CLAIMS
COST	\$3,655,039	\$0
% PROJECT	14.03%	0.00%
	VALUE ENGINEERING	PROJECT #
COST	\$0	6
% PROJECT	0.00%	

EFD/EFA	PROJECT NAME	CONTRACT #
SO.WESTDIV	FAA TRACON PROJECT	91-0126
	PROJECT COST	DURATION
ORIGINAL	\$17,877,474	625
FINAL	\$21,131,661	687
% CHANGE	18.20%	9.92%
	CHANGE ORDERS	CLAIMS
COST	\$3,254,187	\$0
% PROJECT	18.20%	0.00%
	VALUE ENGINEERING	PROJECT #
COST	\$0	7
% PROJECT	0.00%	

EFD/EFA	PROJECT NAME	CONTRACT #
NORTHDIV	WATER DISTRIBUTION SYSTEM	89-0295
	PROJECT COST	DURATION
ORIGINAL	\$16,139,000	913
FINAL	\$17,658,891	1401
% CHANGE	9.42%	53.45%
	CHANGE ORDERS	CLAIMS
COST	\$1,519,891	\$0
% PROJECT	9.42%	0.00%
	VALUE ENGINEERING	PROJECT #
COST	\$0	8
% PROJECT	0.00%	

EFD/EFA	PROJECT NAME	CONTRACT #
SOUTH DIV	PROPULSION TRAINING FACILITY	87-0666
	PROJECT COST	DURATION
ORIGINAL	\$15,763,000	625
FINAL	\$16,737,684	760
% CHANGE	6.18%	21.60%
	CHANGE ORDERS	CLAIMS
COST	\$889,359	\$100,000
% PROJECT	5.64%	0.63
	VALUE ENGINEERING	PROJECT #
COST	\$14,675	9
% PROJECT	0.09%	

EFD/EFA	PROJECT NAME	CONTRACT #
LANT DIV	FIRE FIGHTING TRAINER	86-6024
	PROJECT COST	DURATION
ORIGINAL	\$12,137,800	925
FINAL	\$14,373,123	975
% CHANGE	18.42%	5.41%
	CHANGE ORDERS	CLAIMS
COST	\$2,235,323	\$0
% PROJECT	18.42%	0.00%
	VALUE ENGINEERING	PROJECT #
COST	\$0	10
% PROJECT	0.00%	

EFD/EFA	PROJECT NAME	CONTRACT #
SO. WEST DIV	NORTH BAY MEDICAL CLINIC	90-0128
	PROJECT COST	DURATION
ORIGINAL	\$11,468,820	495
FINAL	\$12,043,153	609
% CHANGE	5.01%	23.03%
	CHANGE ORDERS	CLAIMS
COST	\$574,333	\$0
% PROJECT	5.01%	0.00%
	VALUE ENGINEERING	PROJECT #
COST	\$0	11
% PROJECT	0.00%	

EFD/EFA	PROJECT NAME	CONTRACT #
SO. WEST DIV	BACHELOR ENLISTED QUARTERS	91-0128
	PROJECT COST	DURATION
ORIGINAL	\$10,877,877	440
FINAL	\$12,369,000	545
% CHANGE	13.71%	23.86%
	CHANGE ORDERS	CLAIMS
COST	\$1,491,123	\$0
% PROJECT	13.71%	0.00%
	VALUE ENGINEERING	PROJECT #
COST	\$0	12
% PROJECT	0.00%	

EFD/EFA	PROJECT NAME	CONTRACT #
PACDIV	CONTROLLED INDUSTRIAL FACILITY	90-0516
	PROJECT COST	DURATION
ORIGINAL	\$10,018,000	765
FINAL	\$10,900,000	989
% CHANGE	8.80%	29.28%
	CHANGE ORDERS	CLAIMS
COST	\$882,000	\$0
% PROJECT	8.80%	0.00%
	VALUE ENGINEERING	PROJECT #
COST	\$0	13
% PROJECT	0.00%	

EFD/EFA	PROJECT NAME	CONTRACT #
WESTDIV	100 NEW HOUSING UNITS	91-9537
	PROJECT COST	DURATION
ORIGINAL	\$9,977,000	451
FINAL	\$10,804,403	358
% CHANGE	8.29%	-20.62%
	CHANGE ORDERS	CLAIMS
COST	\$827,403	\$0
% PROJECT	8.29%	0.00%
	VALUE ENGINEERING	PROJECT #
COST	\$0	14
% PROJECT	0.00%	

EFD/EFA	PROJECT NAME	CONTRACT #
WESTDIV	80 NEW HOUSING UNITS	91-9480
	PROJECT COST	DURATION
ORIGINAL	\$9,038,000	615
FINAL	\$9,329,655	442
% CHANGE	3.23%	-28.13%
	CHANGE ORDERS	CLAIMS
COST	\$291,655	\$0
% PROJECT	3.23%	0.00%
	VALUE ENGINEERING	PROJECT #
COST	\$0	15
% PROJECT	0.00%	

EFD/EFA	PROJECT NAME	CONTRACT #
LANTDIV	UPGRADE WASTE WATER TREATMENT PLANT	90-0097
	PROJECT COST	DURATION
ORIGINAL	\$9,035,000	596
FINAL	\$9,527,000	623
% CHANGE	5.44%	4.53%
	CHANGE ORDERS	CLAIMS
COST	\$550,420	\$0
% PROJECT	6.09%	0.00%
	VALUE ENGINEERING	PROJECT #
COST	\$58,420	16
% PROJECT	0.65%	

EFD/EFA	PROJECT NAME	CONTRACT #
NORTHWEST	ADMINISTRATION FACILITY	89-6818
	PROJECT COST	DURATION
ORIGINAL	\$8,437,000	495
FINAL	\$9,050,000	563
% CHANGE	7.27%	13.74%
	CHANGE ORDERS	CLAIMS
COST	\$613,000	\$0
% PROJECT	7.27%	0.00%
	VALUE ENGINEERING	PROJECT #
COST	\$0	17
% PROJECT	0.00%	

EFD/EFA	PROJECT NAME	CONTRACT #
SO. WESTDIV	SECURE ASSEMBLY/TEST FACILITY	89-1007
	PROJECT COST	DURATION
ORIGINAL	\$7,401,068	740
FINAL	\$8,889,489	685
% CHANGE	20.11%	-7.43%
	CHANGE ORDERS	CLAIMS
COST	\$1,488,421	\$0
% PROJECT	20.11%	0.00%
	VALUE ENGINEERING	PROJECT #
COST	\$0	18
% PROJECT	0.00%	

EFD/EFA	PROJECT NAME	CONTRACT #
NORTHWEST	UTILITIES/SITE IMPROVEMENTS	90-1842
	PROJECT COST	DURATION
ORIGINAL	\$6,702,435	195
FINAL	\$6,771,351	214
% CHANGE	1.03%	9.74%
	CHANGE ORDERS	CLAIMS
COST	\$68,916	\$0
% PROJECT	1.03%	0.00%
	VALUE ENGINEERING	PROJECT #
COST	\$0	19
% PROJECT	0.00%	

EFD/EFA	PROJECT NAME	CONTRACT #
SO. WESTDIV	URBAN TRAINING FACILITY	89-1002
	PROJECT COST	DURATION
ORIGINAL	\$6,568,494	623
FINAL	\$7,515,307	460
% CHANGE	14.41%	-26.16%
	CHANGE ORDERS	CLAIMS
COST	\$910,055	\$36,758
% PROJECT	13.85%	0.56%
	VALUE ENGINEERING	PROJECT #
COST	\$0	20
% PROJECT	0.00%	

EFD/EFA	PROJECT NAME	CONTRACT #
SO.WESTDIV	ELECTRICAL DISTRIBUTION SYSTEM	90-0717
	PROJECT COST	DURATION
ORIGINAL	\$6,539,000	615
FINAL	\$6,702,794	519
% CHANGE	2.50%	-15.61%
	CHANGE ORDERS	CLAIMS
COST	\$163,794	\$0
% PROJECT	2.50%	0.00%
	VALUE ENGINEERING	PROJECT #
COST	\$0	21
% PROJECT	0.00%	

EFD/EFA	PROJECT NAME	CONTRACT #
WESTDIV	WEAPONS SYSTEM INTEGRATION LAB	85-5785
	PROJECT COST	DURATION
ORIGINAL	\$6,498,000	415
FINAL	\$8,549,902	745
% CHANGE	31.58%	79.52%
	CHANGE ORDERS	CLAIMS
COST	\$2,051,902	\$0
% PROJECT	31.58%	0.00%
	VALUE ENGINEERING	PROJECT #
COST	\$0	22
% PROJECT	0.00%	

EFD/EFA	PROJECT NAME	CONTRACT #
LANTDIV	LCAC PHASE III	90-0102
	PROJECT COST	DURATION
ORIGINAL	\$6,190,000	553
FINAL	\$6,500,000	605
% CHANGE	5.01%	9.40%
	CHANGE ORDERS	CLAIMS
COST	\$310,000	\$0
% PROJECT	5.01%	0.00%
	VALUE ENGINEERING	PROJECT #
COST	\$0	23
% PROJECT	0.00%	

EFD/EFA	PROJECT NAME	CONTRACT #
CHESAPEAKE	PHASE III NAVAL INTELLIGENCE CTR	90-0131
	PROJECT COST	DURATION
ORIGINAL	\$6,156,788	371
FINAL	\$6,300,000	371
% CHANGE	2.33%	0.00%
	CHANGE ORDERS	CLAIMS
COST	\$218,212	\$0
% PROJECT	3.54%	0.00%
	VALUE ENGINEERING	PROJECT #
COST	\$75,000	24
% PROJECT	1.22%	

EFD/EFA	PROJECT NAME	CONTRACT #
SO.WESTDIV	INDUSTRIAL WASTE TREATMENT PLANT	88-4405
	PROJECT COST	DURATION
ORIGINAL	\$5,977,000	555
FINAL	\$6,008,850	606
% CHANGE	0.53%	9.19%
	CHANGE ORDERS	CLAIMS
COST	\$240,850	\$0
% PROJECT	4.03%	0.00%
	VALUE ENGINEERING	PROJECT #
COST	\$209,000	25
% PROJECT	3.50%	

EFD/EFA	PROJECT NAME	CONTRACT #
WESTDIV	FLEET LOGISTICS SUPPORT CENTER	89-6697
	PROJECT COST	DURATION
ORIGINAL	\$5,836,092	380
FINAL	\$6,899,818	473
% CHANGE	18.23%	24.47%
	CHANGE ORDERS	CLAIMS
COST	\$1,063,726	\$0
% PROJECT	18.23%	0.00%
	VALUE ENGINEERING	PROJECT #
COST	\$0	26
% PROJECT	0.00%	

EFD/EFA	PROJECT NAME	CONTRACT #
WESTDIV	REPAIR AIRFIELD DAMAGE	91-9614
	PROJECT COST	DURATION
ORIGINAL	\$5,021,355	420
FINAL	\$5,361,331	580
% CHANGE	6.77%	38.10%
	CHANGE ORDERS	CLAIMS
COST	\$339,976	\$0
% PROJECT	6.77%	0.00%
	VALUE ENGINEERING	PROJECT #
COST	\$0	27
% PROJECT	0.00%	

EFD/EFA	PROJECT NAME	CONTRACT #
WESTDIV	METEOROLOGICAL BUILDING	84-4014
	PROJECT COST	DURATION
ORIGINAL	\$4,267,265	631
FINAL	\$4,483,318	?
% CHANGE	5.06%	?%
	CHANGE ORDERS	CLAIMS
COST	\$216,053	\$10,275^P
% PROJECT	5.06%	0.24%
	VALUE ENGINEERING	PROJECT #
COST	\$0	28
% PROJECT	0.00%	

EFD/EFA	PROJECT NAME	CONTRACT #
NORTHDIV	UTILITIES FOR FORT WADSWORTH	88-0036
	PROJECT COST	DURATION
ORIGINAL	\$3,669,115	555
FINAL	\$4,080,308	789
% CHANGE	11.21%	42.16%
	CHANGE ORDERS	CLAIMS
COST	\$411,193	\$0
% PROJECT	11.21%	0.00%
	VALUE ENGINEERING	PROJECT #
COST	\$0	29
% PROJECT	0.00%	

EFD/EFA	PROJECT NAME	CONTRACT #
SO.WESTDIV	TOPGUN ACADEMIC FACILITY	89-1039
	PROJECT COST	DURATION
ORIGINAL	\$3,630,399	435
FINAL	\$4,807,002	626
% CHANGE	31.68%	43.91%
	CHANGE ORDERS	CLAIMS
COST	\$1,156,603	\$0
% PROJECT	31.68%	0.00%
	VALUE ENGINEERING	PROJECT #
COST	\$0	30
% PROJECT	0.00%	

EFD/EFA	PROJECT NAME	CONTRACT #
SO.WESTDIV	BACHELOR ENLISTED QUARTERS	92-4746
	PROJECT COST	DURATION
ORIGINAL	\$3,068,000	380
FINAL	\$3,117,110	360
% CHANGE	1.60%	-5.26%
	CHANGE ORDERS	CLAIMS
COST	\$49,110	\$0
% PROJECT	1.60%	0.00%
	VALUE ENGINEERING	PROJECT #
COST	\$0	31
% PROJECT	0.00%	

EFD/EFA	PROJECT NAME	CONTRACT #
NORTHDIV	SITE IMPROVEMENTS	89-0003
	PROJECT COST	DURATION
ORIGINAL	\$3,061,786	556
FINAL	\$3,764,311	563
% CHANGE	22.94%	1.26%
	CHANGE ORDERS	CLAIMS
COST	\$702,525	\$0
% PROJECT	22.94%	0.00%
	VALUE ENGINEERING	PROJECT #
COST	\$0	32
% PROJECT	0.00%	

EFD/EFA	PROJECT NAME	CONTRACT #
WESTDIV	FUEL/MAINT/CORROSION CTL HANGAR	91-9702
	PROJECT COST	DURATION
ORIGINAL	\$2,924,000	349
FINAL	\$3,310,000	480
% CHANGE	13.20%	37.54%
	CHANGE ORDERS	CLAIMS
COST	\$386,000	\$0
% PROJECT	13.20%	0.00%
	VALUE ENGINEERING	PROJECT #
COST	\$0	33
% PROJECT	0.00%	

EFD/EFA	PROJECT NAME	CONTRACT #
WESTDIV	POL COMPLEX	92-3589
	PROJECT COST	DURATION
ORIGINAL	\$2,679,000	375
FINAL	\$2,854,068	484
% CHANGE	6.53%	29.07%
	CHANGE ORDERS	CLAIMS
COST	\$175,068	\$0
% PROJECT	6.53%	0.00%
	VALUE ENGINEERING	PROJECT #
COST	\$0	34
% PROJECT	0.00%	

EFD/EFA	PROJECT NAME	CONTRACT #
WESTDIV	KING HALL UPGRADE	86-0209
	PROJECT COST	DURATION
ORIGINAL	\$2,191,066	413
FINAL	\$2,321,160	451
% CHANGE	5.94%	9.20%
	CHANGE ORDERS	CLAIMS
COST	\$130,094	\$0
% PROJECT	5.94%	0.00%
	VALUE ENGINEERING	PROJECT #
COST	\$0	35
% PROJECT	0.00%	

EFD/EFA	PROJECT NAME	CONTRACT #
NORTHWEST	DATA PROCESSING ADDITION	89-6912
	PROJECT COST	DURATION
ORIGINAL	\$1,957,668	320
FINAL	\$1,963,056	344
% CHANGE	0.28%	7.50%
	CHANGE ORDERS	CLAIMS
COST	\$5,388	\$0
% PROJECT	0.28%	0.00%
	VALUE ENGINEERING	PROJECT #
COST	\$0	36
% PROJECT	0.00%	

EFD/EFA	PROJECT NAME	CONTRACT #
SO.WESTDIV	CHILD DEVELOPMENT CENTER	91-0122
	PROJECT COST	DURATION
ORIGINAL	\$1,571,000	315
FINAL	\$2,024,912	423
% CHANGE	28.89%	34.29%
	CHANGE ORDERS	CLAIMS
COST	\$453,912	\$0
% PROJECT	28.89%	0.00%
	VALUE ENGINEERING	PROJECT #
COST	\$0	37
% PROJECT	0.00%	

EFD/EFA	PROJECT NAME	CONTRACT #
WESTDIV	FIRE PROTECTION SYSTEM	89-6868
	PROJECT COST	DURATION
ORIGINAL	\$1,149,251	605
FINAL	\$1,486,908	596
% CHANGE	29.38%	-1.49%
	CHANGE ORDERS	CLAIMS
COST	\$337,657	\$0
% PROJECT	29.38%	0.00%
	VALUE ENGINEERING	PROJECT #
COST	\$0	38
% PROJECT	0.00%	

EFD/EFA	PROJECT NAME	CONTRACT #
SO.WESTDIV	CASS TRAINING BUILDING	89-1022
	PROJECT COST	DURATION
ORIGINAL	\$980,641	285
FINAL	\$1,057,042	285
% CHANGE	7.79%	0.00%
	CHANGE ORDERS	CLAIMS
COST	\$76,401	\$0
% PROJECT	7.79%	0.00%
	VALUE ENGINEERING	PROJECT #
COST	\$0	39
% PROJECT	0.00%	

Appendix G: Non-Partnered Project Data

EFD/EFA	PROJECT NAME	CONTRACT #
WESTDIV	NEW FAMILY HOUSING	87-7769
	PROJECT COST	DURATION
ORIGINAL	\$27,922,600	765
FINAL	\$28,763,496	765
% CHANGE	3.01%	0.00%
	CHANGE ORDERS	CLAIMS
COST	\$840,896	\$0
% PROJECT	3.01%	0.00%
	VALUE ENGINEERING	PROJECT #
COST	\$0	1
% PROJECT	0.00%	

EFD/EFA	PROJECT NAME	CONTRACT #
LANTDIV	SURVEY SUPPORT FACILITY	88-8132
	PROJECT COST	DURATION
ORIGINAL	\$16,969,631	735
FINAL	\$23,464,193	675
% CHANGE	38.27%	-8.16%
	CHANGE ORDERS	CLAIMS
COST	\$6,454,562	\$40,000
% PROJECT	38.04%	0.24%
	VALUE ENGINEERING	PROJECT #
COST	\$0	2
% PROJECT	0.00%	

EFD/EFA	PROJECT NAME	CONTRACT #
WESTDIV	CLASSROOM LABORATORY FACILITY	84-4146
	PROJECT COST	DURATION
ORIGINAL	\$15,500,200	675
FINAL	\$16,453,993	901
% CHANGE	6.15%	33.48%
	CHANGE ORDERS	CLAIMS
COST	\$664,793	\$539,000 ^a
% PROJECT	4.29%	3.48%
	VALUE ENGINEERING	PROJECT #
COST	\$0	3
% PROJECT	0.00%	

EFD/EFA	PROJECT NAME	CONTRACT #
SOUTHDIV	MAGNETIC SILENCING FACILITY	88-0148
	PROJECT COST	DURATION
ORIGINAL	\$14,600,000	565
FINAL	\$16,014,694	591
% CHANGE	9.69%	4.60%
	CHANGE ORDERS	CLAIMS
COST	\$1,414,694	\$162,018 ^a
% PROJECT	9.69%	1.11%
	VALUE ENGINEERING	PROJECT #
COST	\$0	4
% PROJECT	0.00%	

EFD/EFA	PROJECT NAME	CONTRACT #
NORTHDIV	SMOKELESS PROJECTILE MAGAZINES	86-0121
	PROJECT COST	DURATION
ORIGINAL	\$10,619,000	915
FINAL	\$10,924,685	975
% CHANGE	2.88%	6.56%
	CHANGE ORDERS	CLAIMS
COST	\$305,685	\$0
% PROJECT	2.88%	0.00%
	VALUE ENGINEERING	PROJECT #
COST	\$0	5
% PROJECT	0.00%	

EFD/EFA	PROJECT NAME	CONTRACT #
SO.WESTDIV	SEAL DEMOLITION FACILITY	86-0046
	PROJECT COST	DURATION
ORIGINAL	\$10,326,067	617
FINAL	\$10,489,103	771
% CHANGE	1.58%	24.96%
	CHANGE ORDERS	CLAIMS
COST	\$163,036	\$0
% PROJECT	1.58%	0.00%
	VALUE ENGINEERING	PROJECT #
COST	\$0	6
% PROJECT	0.00%	

EFD/EFA	PROJECT NAME	CONTRACT #
SO.WESTDIV	BACHELOR ENLISTED QUARTERS	89-6685
	PROJECT COST	DURATION
ORIGINAL	\$10,140,000	555
FINAL	\$10,343,881	617
% CHANGE	2.01%	11.17%
	CHANGE ORDERS	CLAIMS
COST	\$203,881	\$0
% PROJECT	2.01%	0.00%
	VALUE ENGINEERING	PROJECT #
COST	\$0	7
% PROJECT	0.00%	

EFD/EFA	PROJECT NAME	CONTRACT #
SO.WESTDIV	STANDARD MISSILE FACILITY	86-0151
	PROJECT COST	DURATION
ORIGINAL	\$9,739,000	555
FINAL	\$9,827,805	823
% CHANGE	0.91%	48.29%
	CHANGE ORDERS	CLAIMS
COST	\$88,805	\$0
% PROJECT	0.91%	0.00%
	VALUE ENGINEERING	PROJECT #
COST	\$0	8
% PROJECT	0.00%	

EFD/EFA	PROJECT NAME	CONTRACT #
SO.WESTDIV	EQUIPMENT MAINTENANCE FACILITY	86-0238
	PROJECT COST	DURATION
ORIGINAL	\$9,688,000	655
FINAL	\$11,001,187	1539
% CHANGE	13.55%	134.96%
	CHANGE ORDERS	CLAIMS
COST	\$1,215,225	\$97,962
% PROJECT	12.54%	1.01%
	VALUE ENGINEERING	PROJECT #
COST	\$0	9
% PROJECT	0.00%	

EFD/EFA	PROJECT NAME	CONTRACT #
NORTHDIV	FIRE FIGHTING TRAINER	88-0017
	PROJECT COST	DURATION
ORIGINAL	\$ 9,681,000	464
FINAL	\$10,541,011	539
% CHANGE	8.88%	16.16%
	CHANGE ORDERS	CLAIMS
COST	\$860,011	\$0
% PROJECT	8.88%	0.00%
	VALUE ENGINEERING	PROJECT #
COST	\$0	10
% PROJECT	0.00%	

EFD/EFA	PROJECT NAME	CONTRACT #
SO.WESTDIV	SRA SUPPORT FACILITY	89-1006
	PROJECT COST	DURATION
ORIGINAL	\$9,477,335	595
FINAL	\$9,734,993	567
% CHANGE	2.35%	-4.70%
	CHANGE ORDERS	CLAIMS
COST	\$222,658	\$35,000
% PROJECT	2.72%	0.37%
	VALUE ENGINEERING	PROJECT #
COST	\$0	11
% PROJECT	0.00%	

EFD/EFA	PROJECT NAME	CONTRACT #
WESTDIV	MEDICAL/DENTAL CLINIC	85-5801
	PROJECT COST	DURATION
ORIGINAL	\$9,138,000	515
FINAL	\$9,765,725	822
% CHANGE	6.87%	59.61%
	CHANGE ORDERS	CLAIMS
COST	\$627,725	\$0
% PROJECT	6.87%	0.00%
	VALUE ENGINEERING	PROJECT #
COST	\$0	12
% PROJECT	0.00%	

EFD/EFA	PROJECT NAME	CONTRACT #
WESTDIV	HOSPITAL MODIFICATIONS	90-1042
	PROJECT COST	DURATION
ORIGINAL	\$8,796,283	733
FINAL	\$9,344,135	1096
% CHANGE	6.23%	49.52%
	CHANGE ORDERS	CLAIMS
COST	\$547,852	\$0
% PROJECT	6.23%	0.00%
	VALUE ENGINEERING	PROJECT #
COST	\$0	13
% PROJECT	0.00%	

EFD/EFA	PROJECT NAME	CONTRACT #
SOUTH DIV	ELECTRONIC TECHNICIAN SCHOOL	87-0692
	PROJECT COST	DURATION
ORIGINAL	\$8,648,700	565
FINAL	\$8,858,606	558
% CHANGE	2.43%	-1.24%
	CHANGE ORDERS	CLAIMS
COST	\$209,906	\$0
% PROJECT	2.43%	0.00%
	VALUE ENGINEERING	PROJECT #
COST	\$0	14
% PROJECT	0.00%	

EFD/EFA	PROJECT NAME	CONTRACT #
PACDIV	NAVAL STATION BRIG	86-1377
	PROJECT COST	DURATION
ORIGINAL	\$8,474,000	645
FINAL	\$8,758,526	666
% CHANGE	3.36%	3.26%
	CHANGE ORDERS	CLAIMS
COST	\$284,526	\$0
% PROJECT	3.36%	0.00%
	VALUE ENGINEERING	PROJECT #
COST	\$0	15
% PROJECT	0.00%	

EFD/EFA	PROJECT NAME	CONTRACT #
WESTDIV	ACOUSTICAL ENCLOSURE	86-0072
	PROJECT COST	DURATION
ORIGINAL	\$8,399,000	615
FINAL	\$8,553,003	701
% CHANGE	1.83%	13.98%
	CHANGE ORDERS	CLAIMS
COST	\$154,003	\$0
% PROJECT	1.83%	0.00%
	VALUE ENGINEERING	PROJECT #
COST	\$0	16
% PROJECT	0.00%	

EFD/EFA	PROJECT NAME	CONTRACT #
WESTDIV	PROCUREMENT TRAINING BUILDING	89-6777
	PROJECT COST	DURATION
ORIGINAL	\$7,568,500	527
FINAL	\$7,680,011	542
% CHANGE	1.47%	2.84%
	CHANGE ORDERS	CLAIMS
COST	\$111,511	\$0
% PROJECT	1.47%	0.00%
	VALUE ENGINEERING	PROJECT #
COST	\$0	17
% PROJECT	0.00%	

EFD/EFA	PROJECT NAME	CONTRACT #
NORTHWEST	SUBMARINE WEAPONS SYSTEM SHOP	87-7810
	PROJECT COST	DURATION
ORIGINAL	\$7,164,000	495
FINAL	\$8,569,576	735
% CHANGE	19.62%	48.48%
	CHANGE ORDERS	CLAIMS
COST	\$1,405,576	\$25,000 ^A
% PROJECT	19.62%	0.35%
	VALUE ENGINEERING	PROJECT #
COST	\$0	18
% PROJECT	0.00%	

EFD/EFA	PROJECT NAME	CONTRACT #
WESTDIV	ELECTRICAL SYSTEM IMPROVEMENTS	85-5799
	PROJECT COST	DURATION
ORIGINAL	\$6,898,620	375
FINAL	\$7,111,840	447
% CHANGE	3.09%	19.20%
	CHANGE ORDERS	CLAIMS
COST	\$213,220	\$0
% PROJECT	3.09%	0.00%
	VALUE ENGINEERING	PROJECT #
COST	\$0	19
% PROJECT	0.00%	

EFD/EFA	PROJECT NAME	CONTRACT #
LANTDIV	LCAC PHASE II	85-5224
	PROJECT COST	DURATION
ORIGINAL	\$6,853,122	796
FINAL	\$7,412,974	778
% CHANGE	8.17%	-2.26%
	CHANGE ORDERS	CLAIMS
COST	\$573,425	\$0
% PROJECT	8.37%	0.00%
	VALUE ENGINEERING	PROJECT #
COST	\$13,573	20
% PROJECT	0.20%	

EFD/EFA	PROJECT NAME	CONTRACT #
SO.WESTDIV	TACTICAL VEHICLE MAINTENANCE FAC	88-4256
	PROJECT COST	DURATION
ORIGINAL	\$6,525,000	592
FINAL	\$6,743,680	708
% CHANGE	3.35%	19.59%
	CHANGE ORDERS	CLAIMS
COST	\$218,680	\$0
% PROJECT	3.35%	0.00%
	VALUE ENGINEERING	PROJECT #
COST	\$0	21
% PROJECT	0.00%	

EFD/EFA	PROJECT NAME	CONTRACT #
NORTHDIV	ELECTRICAL DISTRIBUTION IMPROVEMENTS	83-0303
	PROJECT COST	DURATION
ORIGINAL	\$6,484,900	915
FINAL	\$6,728,176	726
% CHANGE	3.75%	-20.66%
	CHANGE ORDERS	CLAIMS
COST	\$243,276	\$0
% PROJECT	3.75%	0.00%
	VALUE ENGINEERING	PROJECT #
COST	\$0	22
% PROJECT	0.00%	

EFD/EFA	PROJECT NAME	CONTRACT #
CHESAPEAKE	ELECTRONIC OPTICS LABORATORY	88-0220
	PROJECT COST	DURATION
ORIGINAL	\$6,460,000	562
FINAL	\$8,600,000	570
% CHANGE	33.12%	1.42%
	CHANGE ORDERS	CLAIMS
COST	\$2,140,000	\$0
% PROJECT	33.12%	0.00%
	VALUE ENGINEERING	PROJECT #
COST	\$0	23
% PROJECT	0.00%	

EFD/EFA	PROJECT NAME	CONTRACT #
LANTDIV	ELECTRICAL DISTRIBUTION SYSTEM	88-8125
	PROJECT COST	DURATION
ORIGINAL	\$6,446,000	735
FINAL	\$7,450,031	947
% CHANGE	15.58%	28.84%
	CHANGE ORDERS	CLAIMS
COST	\$1,004,031	\$0
% PROJECT	15.58%	0.00%
	VALUE ENGINEERING	PROJECT #
COST	\$0	24
% PROJECT	0.00%	

EFD/EFA	PROJECT NAME	CONTRACT #
LANTDIV	SPECIAL BOAT SQUADRON II	87-7123
	PROJECT COST	DURATION
ORIGINAL	\$6,433,781	535
FINAL	\$6,761,463	755
% CHANGE	5.09%	41.12%
	CHANGE ORDERS	CLAIMS
COST	\$268,672	\$59,010
% PROJECT	4.18%	0.92%
	VALUE ENGINEERING	PROJECT #
COST	\$0	25
% PROJECT	0.00%	

EFD/EFA	PROJECT NAME	CONTRACT #
SO.WESTDIV	AIR DEFENSE SUPPORT COMPLEX	87-7701
	PROJECT COST	DURATION
ORIGINAL	\$6,325,499	435
FINAL	\$6,612,140	400
% CHANGE	4.53%	-8.04%
	CHANGE ORDERS	CLAIMS
COST	\$286,641	\$0
% PROJECT	4.53	0.00%
	VALUE ENGINEERING	PROJECT #
COST	\$0	26
% PROJECT	0.00%	

EFD/EFA	PROJECT NAME	CONTRACT #
LANTDIV	NAVY EXCHANGE MALL	88-8196
	PROJECT COST	DURATION
ORIGINAL	\$6,321,837	435
FINAL	\$6,941,147	316
% CHANGE	9.80%	-27.36%
	CHANGE ORDERS	CLAIMS
COST	\$619,310	\$0
% PROJECT	9.80%	0.00%
	VALUE ENGINEERING	PROJECT #
COST	\$0	27
% PROJECT	0.00%	

EFD/EFA	PROJECT NAME	CONTRACT #
SO.WESTDIV	FIRE FIGHTING TRAINING FACILITY	86-0222
	PROJECT COST	DURATION
ORIGINAL	\$6,062,426	674
FINAL	\$6,784,233	715
% CHANGE	11.91%	6.08%
	CHANGE ORDERS	CLAIMS
COST	\$721,807	\$0
% PROJECT	11.91%	0.00%
	VALUE ENGINEERING	PROJECT #
COST	\$0	28
% PROJECT	0.00%	

EFD/EFA	PROJECT NAME	CONTRACT #
NORTHWEST	ICCB	88-3344
	PROJECT COST	DURATION
ORIGINAL	\$5,977,000	442
FINAL	\$6,371,524	494
% CHANGE	6.60%	11.76%
	CHANGE ORDERS	CLAIMS
COST	\$394,524	\$0
% PROJECT	6.60%	0.00%
	VALUE ENGINEERING	PROJECT #
COST	\$0	29
% PROJECT	0.00%	

EFD/EFA	PROJECT NAME	CONTRACT #
NORTHWEST	UTILITIES/SITE IMPROVEMENTS	91-9528
	PROJECT COST	DURATION
ORIGINAL	\$5,962,033	375
FINAL	\$6,303,287	419
% CHANGE	5.72%	11.73%
	CHANGE ORDERS	CLAIMS
COST	\$341,254	\$0
% PROJECT	5.72%	0.00%
	VALUE ENGINEERING	PROJECT #
COST	\$0	30
% PROJECT	0.00%	

EFD/EFA	PROJECT NAME	CONTRACT #
NORTHWEST	UTILITIES/SITE IMPROVEMENTS	88-3318
	PROJECT COST	DURATION
ORIGINAL	\$5,840,000	375
FINAL	\$6,587,983	487
% CHANGE	12.81%	29.87%
	CHANGE ORDERS	CLAIMS
COST	\$747,983	\$0
% PROJECT	12.81%	0.00%
	VALUE ENGINEERING	PROJECT #
COST	\$0	31
% PROJECT	0.00%	

EFD/EFA	PROJECT NAME	CONTRACT #
WESTDIV	SEWAGE/INDUSTRIAL WASTE IMPROV	87-7713
	PROJECT COST	DURATION
ORIGINAL	\$5,759,800	657
FINAL	\$5,908,687	657
% CHANGE	2.58%	0.00%
	CHANGE ORDERS	CLAIMS
COST	\$148,887	\$0
% PROJECT	2.58%	0.00%
	VALUE ENGINEERING	PROJECT #
COST	\$0	32
% PROJECT	0.00%	

EFD/EFA	PROJECT NAME	CONTRACT #
SO.WESTDIV	BACHELOR ENLISTED QUARTERS	91-0176
	PROJECT COST	DURATION
ORIGINAL	\$5,541,242	380
FINAL	\$5,729,688	427
% CHANGE	3.40%	12.37%
	CHANGE ORDERS	CLAIMS
COST	\$188,446	\$0
% PROJECT	3.40%	0.00%
	VALUE ENGINEERING	PROJECT #
COST	\$0	33
% PROJECT	0.00%	

EFD/EFA	PROJECT NAME	CONTRACT #
CHESAPEAKE	MUNITIONS DISASSEMBLY	86-0319
	PROJECT COST	DURATION
ORIGINAL	\$5,529,000	345
FINAL	\$5,998,036	1056
% CHANGE	8.47%	206.09%
	CHANGE ORDERS	CLAIMS
COST	\$468,236	\$0
% PROJECT	8.47%	0.00%
	VALUE ENGINEERING	PROJECT #
COST	\$0	34
% PROJECT	0.00%	

EFD/EFA	PROJECT NAME	CONTRACT #
WESTDIV	AIRCRAFT MAINTENANCE HANGAR	86-0532
	PROJECT COST	DURATION
ORIGINAL	\$5,234,826	435
FINAL	\$5,833,842	827
% CHANGE	11.44%	90.11%
	CHANGE ORDERS	CLAIMS
COST	\$536,935	\$62,081
% PROJECT	10.26%	1.18%
	VALUE ENGINEERING	PROJECT #
COST	\$0	35
% PROJECT	0.00%	

EFD/EFA	PROJECT NAME	CONTRACT #
SO.WESTDIV	COLD STORAGE WAREHOUSE	89-1038
	PROJECT COST	DURATION
ORIGINAL	\$5,158,550	532
FINAL	\$5,478,514	528
% CHANGE	6.20%	-0.75%
	CHANGE ORDERS	CLAIMS
COST	\$319,964	\$0
% PROJECT	6.20%	0.00%
	VALUE ENGINEERING	PROJECT #
COST	\$0	36
% PROJECT	0.00%	

EFD/EFA	PROJECT NAME	CONTRACT #
CHESAPEAKE	FIRING RANGE COMPLEX	89-0268
	PROJECT COST	DURATION
ORIGINAL	\$5,131,700	825
FINAL	\$6,973,404	1132
% CHANGE	35.89%	37.21%
	CHANGE ORDERS	CLAIMS
COST	\$1,841,704	\$0
% PROJECT	35.81%	0.00%
	VALUE ENGINEERING	PROJECT #
COST	\$0	37
% PROJECT	0.00%	

EFD/EFA	PROJECT NAME	CONTRACT #
SO.WESTDIV	PARKING STRUCTURE	89-1027
	PROJECT COST	DURATION
ORIGINAL	\$5,060,000	435
FINAL	\$5,741,111	884
% CHANGE	13.46%	103.22%
	CHANGE ORDERS	CLAIMS
COST	\$681,111	\$0
% PROJECT	13.46%	0.00%
	VALUE ENGINEERING	PROJECT #
COST	\$0	38
% PROJECT	0.00%	

EFD/EFA	PROJECT NAME	CONTRACT #
WESTDIV	SEALIFT SUPPORT FACILITY	86-0176
	PROJECT COST	DURATION
ORIGINAL	\$4,933,425	515
FINAL	\$5,816,938	559
% CHANGE	17.91%	8.54%
	CHANGE ORDERS	CLAIMS
COST	\$883,513	\$0
% PROJECT	17.91%	0.00%
	VALUE ENGINEERING	PROJECT #
COST	\$0	39
% PROJECT	0.00%	

EFD/EFA	PROJECT NAME	CONTRACT #
SO.WESTDIV	OPERATIONS MAINTENANCE FACILITY	86-0568
	PROJECT COST	DURATION
ORIGINAL	\$4,776,061	440
FINAL	\$4,897,929	521
% CHANGE	2.56%	18.41%
	CHANGE ORDERS	CLAIMS
COST	\$121,868	\$0
% PROJECT	2.56%	0.00%
	VALUE ENGINEERING	PROJECT #
COST	\$0	40
% PROJECT	0.00%	

EFD/EFA	PROJECT NAME	CONTRACT #
NORTHWEST	BULK STORAGE WAREHOUSE	88-3310
	PROJECT COST	DURATION
ORIGINAL	\$4,633,750	920
FINAL	\$5,926,386	969
% CHANGE	27.90%	5.33%
	CHANGE ORDERS	CLAIMS
COST	\$1,292,636	\$0
% PROJECT	27.90%	0.00%
	VALUE ENGINEERING	PROJECT #
COST	\$0	41
% PROJECT	0.00%	

EFD/EFA	PROJECT NAME	CONTRACT #
LANTDIV	SURTASS SUPPORT ADDITION	88-8279
	PROJECT COST	DURATION
ORIGINAL	\$4,621,669	615
FINAL	\$4,930,403	760
% CHANGE	6.68%	23.58%
	CHANGE ORDERS	CLAIMS
COST	\$308,734	\$0
% PROJECT	6.68%	0.00%
	VALUE ENGINEERING	PROJECT #
COST	\$0	42
% PROJECT	0.00%	

EFD/EFA	PROJECT NAME	CONTRACT #
SO.WESTDIV	PIER ELECTRICAL POWER	89-1003
	PROJECT COST	DURATION
ORIGINAL	\$4,456,071	615
FINAL	\$4,876,538	761
% CHANGE	9.44%	23.74%
	CHANGE ORDERS	CLAIMS
COST	\$420,467	\$0
% PROJECT	9.44%	0.00%
	VALUE ENGINEERING	PROJECT #
COST	\$0	43
% PROJECT	0.00%	

EFD/EFA	PROJECT NAME	CONTRACT #
NORTHDIV	COMBAT SYSTEMS TRAINING BUILDING	86-0058
	PROJECT COST	DURATION
ORIGINAL	\$4,291,596	585
FINAL	\$4,530,023	619
% CHANGE	5.56%	5.81%
	CHANGE ORDERS	CLAIMS
COST	\$238,429	\$0
% PROJECT	5.56%	0.00%
	VALUE ENGINEERING	PROJECT #
COST	\$0	44
% PROJECT	0.00%	

EFD/EFA	PROJECT NAME	CONTRACT #
SOUTH DIV	SIMA	86-0845
	PROJECT COST	DURATION
ORIGINAL	\$4,256,958	563
FINAL	\$4,484,483	679
% CHANGE	5.34%	4.60%
	CHANGE ORDERS	CLAIMS
COST	\$227,525	\$0
% PROJECT	5.34%	0.00%
	VALUE ENGINEERING	PROJECT #
COST	\$0	45
% PROJECT	0.00%	

EFD/EFA	PROJECT NAME	CONTRACT #
NORTH DIV	STEAM DISTRIBUTION SYSTEM	87-0054
	PROJECT COST	DURATION
ORIGINAL	\$4,223,484	374
FINAL	\$6,388,050	462
% CHANGE	51.25%	23.53%
	CHANGE ORDERS	CLAIMS
COST	\$2,164,566	\$0
% PROJECT	51.25%	0.00%
	VALUE ENGINEERING	PROJECT #
COST	\$0	46
% PROJECT	0.00%	

EFD/EFA	PROJECT NAME	CONTRACT #
SO. WEST DIV	IMA/OMA COMPLEX	86-0609
	PROJECT COST	DURATION
ORIGINAL	\$4,103,147	1058
FINAL	\$5,166,703	1058
% CHANGE	25.92%	0.00%
	CHANGE ORDERS	CLAIMS
COST	\$1,063,656	\$0
% PROJECT	25.92%	0.00%
	VALUE ENGINEERING	PROJECT #
COST	\$0	47
% PROJECT	0.00%	

EFD/EFA	PROJECT NAME	CONTRACT #
CHESAPEAKE	PARKING FACILITY EXPANSION	86-0276
	PROJECT COST	DURATION
ORIGINAL	\$4,090,000	351
FINAL	\$4,175,272	379
% CHANGE	2.08%	7.98%
	CHANGE ORDERS	CLAIMS
COST	\$85,272	\$0
% PROJECT	2.08%	0.00%
	VALUE ENGINEERING	PROJECT #
COST	\$0	48
% PROJECT	0.00%	

EFD/EFA	PROJECT NAME	CONTRACT #
SO. WESTDIV	ENGINEERING TRAINING FACILITY	85-5779
	PROJECT COST	DURATION
ORIGINAL	\$4,077,516	375
FINAL	\$4,461,977	495
% CHANGE	9.43%	32.00%
	CHANGE ORDERS	CLAIMS
COST	\$384,461	\$0
% PROJECT	9.43%	0.00%
	VALUE ENGINEERING	PROJECT #
COST	\$0	49
% PROJECT	0.00%	

EFD/EFA	PROJECT NAME	CONTRACT #
NORTHDIV	NAVY LODGE	85-0085
	PROJECT COST	DURATION
ORIGINAL	\$3,888,000	374
FINAL	\$3,958,017	519
% CHANGE	1.80%	38.77%
	CHANGE ORDERS	CLAIMS
COST	\$70,017	\$209,284 ^a
% PROJECT	1.80%	5.38%
	VALUE ENGINEERING	PROJECT #
COST	\$0	50
% PROJECT	0.00%	

EFD/EFA	PROJECT NAME	CONTRACT #
WESTDIV	DATA PROCESSING FACILITY	86-0086
	PROJECT COST	DURATION
ORIGINAL	\$3,563,000	464
FINAL	\$3,851,359	503
% CHANGE	8.09%	8.40%
	CHANGE ORDERS	CLAIMS
COST	\$288,359	\$0
% PROJECT	8.09%	0.00%
	VALUE ENGINEERING	PROJECT #
COST	\$0	51
% PROJECT	0.00%	

EFD/EFA	PROJECT NAME	CONTRACT #
NORTHWEST	NAVY EXCHANGE MINI-MART	88-3283
	PROJECT COST	DURATION
ORIGINAL	\$3,736,000	500
FINAL	\$3,806,207	500
% CHANGE	1.88%	0.00%
	CHANGE ORDERS	CLAIMS
COST	\$59,646	\$10,561
% PROJECT	1.60%	0.28%
	VALUE ENGINEERING	PROJECT #
COST	\$0	52
% PROJECT	0.00%	

EFD/EFA	PROJECT NAME	CONTRACT #
SO.WESTDIV	AUTOMOTIVE MAINTENANCE FACILITY	90-1378
	PROJECT COST	DURATION
ORIGINAL	\$3,675,000	379
FINAL	\$4,144,292	558
% CHANGE	12.77%	47.23%
	CHANGE ORDERS	CLAIMS
COST	\$408,792	\$60,500
% PROJECT	11.12%	1.65%
	VALUE ENGINEERING	PROJECT #
COST	\$0	53
% PROJECT	0.00%	

EFD/EFA	PROJECT NAME	CONTRACT #
WESTDIV	FIRE STATION	83-2648
	PROJECT COST	DURATION
ORIGINAL	\$3,450,387	387
FINAL	\$3,534,977	473
% CHANGE	2.45%	22.22%
	CHANGE ORDERS	CLAIMS
COST	\$84,590	\$0
% PROJECT	2.45%	0.00%
	VALUE ENGINEERING	PROJECT #
COST	\$0	54
% PROJECT	0.00%	

EFD/EFA	PROJECT NAME	CONTRACT #
WESTDIV	PUBLIC WORKS COMPLEX	86-0496
	PROJECT COST	DURATION
ORIGINAL	\$3,410,000	430
FINAL	\$3,773,128	795
% CHANGE	10.65%	84.88%
	CHANGE ORDERS	CLAIMS
COST	\$363,128	\$0
% PROJECT	10.65%	0.00%
	VALUE ENGINEERING	PROJECT #
COST	\$0	55
% PROJECT	0.00%	

EFD/EFA	PROJECT NAME	CONTRACT #
SO.WESTDIV	DEL VALLE ROAD IMPROVEMENTS	86-0522
	PROJECT COST	DURATION
ORIGINAL	\$3,389,000	380
FINAL	\$3,659,288	518
% CHANGE	7.98%	36.32%
	CHANGE ORDERS	CLAIMS
COST	\$237,912	\$32,376
% PROJECT	7.02%	0.96%
	VALUE ENGINEERING	PROJECT #
COST	\$0	56
% PROJECT	0.00%	

EFD/EFA	PROJECT NAME	CONTRACT #
NORTHDIV	VEHICLE MAINTENANCE FACILITY	87-0075
	PROJECT COST	DURATION
ORIGINAL	\$3,344,608	495
FINAL	\$3,550,969	514
% CHANGE	6.17%	3.84%
	CHANGE ORDERS	CLAIMS
COST	\$206,361	\$0
% PROJECT	6.17%	0.00%
	VALUE ENGINEERING	PROJECT #
COST	\$0	57
% PROJECT	0.00%	

EFD/EFA	PROJECT NAME	CONTRACT #
LANTDIV	HELIPAD/STORAGE/ADMIN FACILITY	88-8187
	PROJECT COST	DURATION
ORIGINAL	\$3,309,429	469
FINAL	\$3,448,293	448
% CHANGE	4.20%	-4.48%
	CHANGE ORDERS	CLAIMS
COST	\$138,864	\$0
% PROJECT	4.20%	0.00%
	VALUE ENGINEERING	PROJECT #
COST	\$0	58
% PROJECT	0.00%	

EFD/EFA	PROJECT NAME	CONTRACT #
PACDIV	CONFORMING STORAGE FACILITY	83-1526
	PROJECT COST	DURATION
ORIGINAL	\$3,276,313	289
FINAL	\$3,534,660	470
% CHANGE	7.88%	62.63%
	CHANGE ORDERS	CLAIMS
COST	\$258,347	\$0
% PROJECT	7.88%	0.00%
	VALUE ENGINEERING	PROJECT #
COST	\$0	59
% PROJECT	0.00%	

EFD/EFA	PROJECT NAME	CONTRACT #
SO.WESTDIV	TACTICAL SYSTEM TEST/SUPPORT	89-1032
	PROJECT COST	DURATION
ORIGINAL	\$3,221,388	544
FINAL	\$4,134,809	529
% CHANGE	28.35%	-2.76%
	CHANGE ORDERS	CLAIMS
COST	\$913,421	\$0
% PROJECT	28.35%	0.00%
	VALUE ENGINEERING	PROJECT #
COST	\$0	60
% PROJECT	0.00%	

EFD/EFA	PROJECT NAME	CONTRACT #
SOUTH DIV	REPLACE MARINA	90-0540
	PROJECT COST	DURATION
ORIGINAL	\$3,220,307	285
FINAL	\$3,248,834	409
% CHANGE	1.18%	43.51%
	CHANGE ORDERS	CLAIMS
COST	\$37,895	\$0
% PROJECT	1.18%	0.00%
	VALUE ENGINEERING	PROJECT #
COST	\$9368	61
% PROJECT	0.29%	

EFD/EFA	PROJECT NAME	CONTRACT #
WEST DIV	DISASTER RECOVERY	85-5192
	PROJECT COST	DURATION
ORIGINAL	\$3,167,000	380
FINAL	\$3,208,370	369
% CHANGE	1.31	-2.89%
	CHANGE ORDERS	CLAIMS
COST	\$41,370	\$0
% PROJECT	1.31%	0.00%
	VALUE ENGINEERING	PROJECT #
COST	\$0	62
% PROJECT	0.00%	

EFD/EFA	PROJECT NAME	CONTRACT #
SO. WEST DIV	ADCAP TORPEDO SHOP	88-0464
	PROJECT COST	DURATION
ORIGINAL	\$3,008,500	440
FINAL	\$3,358,128	588
% CHANGE	11.62%	33.64%
	CHANGE ORDERS	CLAIMS
COST	\$338,628	\$11,000
% PROJECT	11.26%	0.36%
	VALUE ENGINEERING	PROJECT #
COST	\$0	63
% PROJECT	0.00%	

EFD/EFA	PROJECT NAME	CONTRACT #
SO. WEST DIV	RECREATION FACILITY	88-2617
	PROJECT COST	DURATION
ORIGINAL	\$2,934,700	325
FINAL	\$3,380,186	542
% CHANGE	15.18%	66.77%
	CHANGE ORDERS	CLAIMS
COST	\$445,486	\$0
% PROJECT	15.18%	0.00%
	VALUE ENGINEERING	PROJECT #
COST	\$0	64
% PROJECT	0.00%	

EFD/EFA	PROJECT NAME	CONTRACT #
WESTDIV	COMMISSARY	87-7669
	PROJECT COST	DURATION
ORIGINAL	\$2,893,000	315
FINAL	\$2,916,021	357
% CHANGE	0.80%	13.33%
	CHANGE ORDERS	CLAIMS
COST	\$23,021	\$0
% PROJECT	0.80%	0.00%
	VALUE ENGINEERING	PROJECT #
COST	\$0	65
% PROJECT	0.00%	

EFD/EFA	PROJECT NAME	CONTRACT #
SO.WESTDIV	OPERATIONS STORAGE WAREHOUSE	91-0121
	PROJECT COST	DURATION
ORIGINAL	\$2,881,661	385
FINAL	\$3,172,101	380
% CHANGE	10.08%	-1.30%
	CHANGE ORDERS	CLAIMS
COST	\$290,440	\$0
% PROJECT	10.08%	0.00%
	VALUE ENGINEERING	PROJECT #
COST	\$0	66
% PROJECT	0.00%	

EFD/EFA	PROJECT NAME	CONTRACT #
NORTHDIV	BOILER PLANT MODIFICATIONS	87-0033
	PROJECT COST	DURATION
ORIGINAL	\$2,866,693	435
FINAL	\$3,312,788	663
% CHANGE	15.56%	52.41%
	CHANGE ORDERS	CLAIMS
COST	\$446,095	\$179,000 ^a
% PROJECT	15.56%	6.24%
	VALUE ENGINEERING	PROJECT #
COST	\$0	67
% PROJECT	0.00%	

EFD/EFA	PROJECT NAME	CONTRACT #
WESTDIV	DREDGING IMPROVEMENTS	89-6334
	PROJECT COST	DURATION
ORIGINAL	\$2,698,000	295
FINAL	\$2,743,139	351
% CHANGE	1.67%	18.98%
	CHANGE ORDERS	CLAIMS
COST	\$45,139	\$0
% PROJECT	1.67%	0.00%
	VALUE ENGINEERING	PROJECT #
COST	\$0	68
% PROJECT	0.00%	

EFD/EFA	PROJECT NAME	CONTRACT #
SO.WESTDIV	SERVMART	89-6687
	PROJECT COST	DURATION
ORIGINAL	\$2,624,479	340
FINAL	\$2,782,545	623
% CHANGE	6.02%	83.24%
	CHANGE ORDERS	CLAIMS
COST	\$158,066	\$0
% PROJECT	6.02%	0.00%
	VALUE ENGINEERING	PROJECT #
COST	\$0	69
% PROJECT	0.00%	

EFD/EFA	PROJECT NAME	CONTRACT #
SO.WESTDIV	SMALL ARMS RANGE	88-2643
	PROJECT COST	DURATION
ORIGINAL	\$2,552,850	585
FINAL	\$2,578,418	874
% CHANGE	1.00%	49.40%
	CHANGE ORDERS	CLAIMS
COST	\$20,568	\$5,000
% PROJECT	0.80%	0.20%
	VALUE ENGINEERING	PROJECT #
COST	\$0	70
% PROJECT	0.00%	

EFD/EFA	PROJECT NAME	CONTRACT #
PACDIV	ELECTRICAL DISTRIBUTION LINES	86-1361
	PROJECT COST	DURATION
ORIGINAL	\$2,344,000	465
FINAL	\$2,716,257	943
% CHANGE	15.88%	102.80%
	CHANGE ORDERS	CLAIMS
COST	\$372,257	\$0
% PROJECT	15.88%	0.00%
	VALUE ENGINEERING	PROJECT #
COST	\$0	71
% PROJECT	0.00%	

EFD/EFA	PROJECT NAME	CONTRACT #
SO.WESTDIV	ADMINISTRATION FACILITY	89-1010
	PROJECT COST	DURATION
ORIGINAL	\$2,330,500	445
FINAL	\$2,785,681	1019
% CHANGE	19.53%	128.99%
	CHANGE ORDERS	CLAIMS
COST	\$455,181	\$0
% PROJECT	19.53%	0.00%
	VALUE ENGINEERING	PROJECT #
COST	\$0	72
% PROJECT	0.00%	

EFD/EFA	PROJECT NAME	CONTRACT #
WESTDIV	NAVY EXCHANGE	89-6945
	PROJECT COST	DURATION
ORIGINAL	\$2,265,802	275
FINAL	\$2,363,166	310
% CHANGE	4.30%	12.73%
	CHANGE ORDERS	CLAIMS
COST	\$97,364	\$0
% PROJECT	4.30%	0.00%
	VALUE ENGINEERING	PROJECT #
COST	\$0	73
% PROJECT	0.00%	

EFD/EFA	PROJECT NAME	CONTRACT #
SO.WESTDIV	TWIN LAKES PLANT	89-6823
	PROJECT COST	DURATION
ORIGINAL	\$2,238,950	440
FINAL	\$3,007,008	749
% CHANGE	34.30%	70.22%
	CHANGE ORDERS	CLAIMS
COST	\$768,058	\$0
% PROJECT	34.30%	0.00%
	VALUE ENGINEERING	PROJECT #
COST	\$0	74
% PROJECT	0.00%	

EFD/EFA	PROJECT NAME	CONTRACT #
CHESAPEAKE	RENOVATE BUILDINGS 143/157	86-0031
	PROJECT COST	DURATION
ORIGINAL	\$2,142,850	555
FINAL	\$2,511,669	733
% CHANGE	17.21%	32.07%
	CHANGE ORDERS	CLAIMS
COST	\$368,819	\$0
% PROJECT	17.21%	0.00%
	VALUE ENGINEERING	PROJECT #
COST	\$0	75
% PROJECT	0.00%	

EFD/EFA	PROJECT NAME	CONTRACT #
WESTDIV	AVIATION PHYSIOLOGY TRAINING FAC	86-0434
	PROJECT COST	DURATION
ORIGINAL	\$2,041,974	396
FINAL	\$2,062,639	392
% CHANGE	1.01%	-1.01%
	CHANGE ORDERS	CLAIMS
COST	\$20,665	\$0
% PROJECT	1.01%	0.00%
	VALUE ENGINEERING	PROJECT #
COST	\$0	76
% PROJECT	0.00%	

EFD/EFA	PROJECT NAME	CONTRACT #
SO.WESTDIV	TARGET MAINTENANCE FACILITY	89-6869
	PROJECT COST	DURATION
ORIGINAL	\$1,965,300	380
FINAL	\$2,088,120	432
% CHANGE	6.25%	13.68%
	CHANGE ORDERS	CLAIMS
COST	\$122,820	\$0
% PROJECT	6.25%	0.00%
	VALUE ENGINEERING	PROJECT #
COST	\$0	77
% PROJECT	0.00%	

EFD/EFA	PROJECT NAME	CONTRACT #
SO.WESTDIV	RANGE SITE PREPARATION	90-1003
	PROJECT COST	DURATION
ORIGINAL	\$1,931,919	273
FINAL	\$2,739,905	273
% CHANGE	41.82%	0.00%
	CHANGE ORDERS	CLAIMS
COST	\$807,986	\$0
% PROJECT	41.82%	0.00%
	VALUE ENGINEERING	PROJECT #
COST	\$0	78
% PROJECT	0.00%	

EFD/EFA	PROJECT NAME	CONTRACT #
SO.WESTDIV	CHILD CARE CENTER	87-8829
	PROJECT COST	DURATION
ORIGINAL	\$1,920,000	465
FINAL	\$2,073,106	462
% CHANGE	7.97%	-0.64%
	CHANGE ORDERS	CLAIMS
COST	\$144,191	\$8,915
% PROJECT	7.51%	0.46%
	VALUE ENGINEERING	PROJECT #
COST	\$0	79
% PROJECT	0.00%	

EFD/EFA	PROJECT NAME	CONTRACT #
NORTHWEST	NAVY EXCHANGE	87-7569
	PROJECT COST	DURATION
ORIGINAL	\$1,913,900	315
FINAL	\$1,994,877	349
% CHANGE	4.23%	10.79%
	CHANGE ORDERS	CLAIMS
COST	\$80,977	\$0
% PROJECT	4.23%	0.00%
	VALUE ENGINEERING	PROJECT #
COST	\$0	80
% PROJECT	0.00%	

EFD/EFA	PROJECT NAME	CONTRACT #
WESTDIV	PHASE II MISSILE TEST CENTER	84-4831
	PROJECT COST	DURATION
ORIGINAL	\$1,899,875	315
FINAL	\$2,560,970	443
% CHANGE	34.80%	40.63%
	CHANGE ORDERS	CLAIMS
COST	\$115,444	\$545,651
% PROJECT	6.08%	28.72%
	VALUE ENGINEERING	PROJECT #
COST	\$0	81
% PROJECT	0.00%	

EFD/EFA	PROJECT NAME	CONTRACT #
SO.WESTDIV	INTERMEDIATE MAINTENANCE FAC	89-0126
	PROJECT COST	DURATION
ORIGINAL	\$1,865,400	539
FINAL	\$2,016,154	808
% CHANGE	8.08%	49.91%
	CHANGE ORDERS	CLAIMS
COST	\$150,754	\$0
% PROJECT	8.08%	0.00%
	VALUE ENGINEERING	PROJECT #
COST	\$0	82
% PROJECT	0.00%	

EFD/EFA	PROJECT NAME	CONTRACT #
SO.WESTDIV	HAZARDOUS/FLAMMABLE MATERIAL FAC	86-0297
	PROJECT COST	DURATION
ORIGINAL	\$1,775,000	195
FINAL	\$2,042,857	373
% CHANGE	15.09%	91.28%
	CHANGE ORDERS	CLAIMS
COST	\$267,857	\$0
% PROJECT	15.09%	0.00%
	VALUE ENGINEERING	PROJECT #
COST	\$0	83
% PROJECT	0.00%	

EFD/EFA	PROJECT NAME	CONTRACT #
WESTDIV	MISSILE MAGAZINE REPROCUREMENT	90-1045
	PROJECT COST	DURATION
ORIGINAL	\$1,772,073	195
FINAL	\$1,865,955	235
% CHANGE	5.30%	20.51%
	CHANGE ORDERS	CLAIMS
COST	\$93,882	\$0
% PROJECT	5.30%	0.00%
	VALUE ENGINEERING	PROJECT #
COST	\$0	84
% PROJECT	0.00%	

EFD/EFA	PROJECT NAME	CONTRACT #
PACDIV	RENOVATE BUILDING 480	88-1349
	PROJECT COST	DURATION
ORIGINAL	\$1,677,752	375
FINAL	\$1,908,198	474
% CHANGE	13.74%	26.40%
	CHANGE ORDERS	CLAIMS
COST	\$230,446	\$0
% PROJECT	13.74%	0.00%
	VALUE ENGINEERING	PROJECT #
COST	\$0	85
% PROJECT	0.00%	

EFD/EFA	PROJECT NAME	CONTRACT #
WESTDIV	CHILD CARE CENTER	86-0490
	PROJECT COST	DURATION
ORIGINAL	\$1,615,000	380
FINAL	\$1,877,814	509
% CHANGE	16.27%	33.95%
	CHANGE ORDERS	CLAIMS
COST	\$262,814	\$0
% PROJECT	16.27%	0.00%
	VALUE ENGINEERING	PROJECT #
COST	\$0	86
% PROJECT	0.00%	

EFD/EFA	PROJECT NAME	CONTRACT #
LANTDIV	AIRCRAFT GUN RANGE	87-7114
	PROJECT COST	DURATION
ORIGINAL	\$1,583,237	440
FINAL	\$1,628,748	502
% CHANGE	2.87%	14.09%
	CHANGE ORDERS	CLAIMS
COST	\$45,511	\$0
% PROJECT	2.87%	0.00%
	VALUE ENGINEERING	PROJECT #
COST	\$0	87
% PROJECT	0.00%	

EFD/EFA	PROJECT NAME	CONTRACT #
SOUTHDIV	DYNAMOMETER TEST FACILITY	87-0013
	PROJECT COST	DURATION
ORIGINAL	\$1,538,000	466
FINAL	\$1,559,550	465
% CHANGE	1.40%	-0.21%
	CHANGE ORDERS	CLAIMS
COST	\$21,550	\$0
% PROJECT	1.40%	0.00%
	VALUE ENGINEERING	PROJECT #
COST	\$0	88
% PROJECT	0.00%	

EFD/EFA	PROJECT NAME	CONTRACT #
SO.WESTDIV	COBR	91-0105
	PROJECT COST	DURATION
ORIGINAL	\$1,478,000	319
FINAL	\$1,524,541	353
% CHANGE	3.15%	10.66%
	CHANGE ORDERS	CLAIMS
COST	\$46,541	\$0
% PROJECT	3.15%	0.00%
	VALUE ENGINEERING	PROJECT #
COST	\$0	89
% PROJECT	0.00%	

EFD/EFA	PROJECT NAME	CONTRACT #
LANTDIV	FLIGHT LINE SECURITY IMPROVEMENT	88-8087
	PROJECT COST	DURATION
ORIGINAL	\$1,470,670	535
FINAL	\$1,611,366	712
% CHANGE	9.57%	33.08%
	CHANGE ORDERS	CLAIMS
COST	\$140,696	\$0
% PROJECT	9.57%	0.00%
	VALUE ENGINEERING	PROJECT #
COST	\$0	90
% PROJECT	0.00%	

EFD/EFA	PROJECT NAME	CONTRACT #
NORTHDIV	SWOS GAS STATION	86-0066
	PROJECT COST	DURATION
ORIGINAL	\$1,455,700	315
FINAL	\$1,530,369	457
% CHANGE	5.13%	45.08%
	CHANGE ORDERS	CLAIMS
COST	\$74,669	\$0
% PROJECT	5.13%	0.00%
	VALUE ENGINEERING	PROJECT #
COST	\$0	91
% PROJECT	0.00%	

EFD/EFA	PROJECT NAME	CONTRACT #
SO.WESTDIV	COMM/ELEC MAINTENANCE FACILITY	87-7868
	PROJECT COST	DURATION
ORIGINAL	\$1,443,421	283
FINAL	\$1,477,383	270
% CHANGE	2.35%	-4.59%
	CHANGE ORDERS	CLAIMS
COST	\$33,962	\$0
% PROJECT	2.35%	0.00%
	VALUE ENGINEERING	PROJECT #
COST	\$0	92
% PROJECT	0.00%	

EFD/EFA	PROJECT NAME	CONTRACT #
SO.WESTDIV	RIFLE RANGE IMPROVEMENTS	86-0201
	PROJECT COST	DURATION
ORIGINAL	\$1,408,319	375
FINAL	\$1,642,093	455
% CHANGE	16.60%	21.33%
	CHANGE ORDERS	CLAIMS
COST	\$233,774	\$0
% PROJECT	16.60%	0.00%
	VALUE ENGINEERING	PROJECT #
COST	\$0	93
% PROJECT	0.00%	

EFD/EFA	PROJECT NAME	CONTRACT #
CHESAPEAKE	DINING FACILITY	89-0065
	PROJECT COST	DURATION
ORIGINAL	\$1,279,336	501
FINAL	\$1,412,654	450
% CHANGE	10.42%	-10.18%
	CHANGE ORDERS	CLAIMS
COST	\$133,318	\$51,905
% PROJECT	6.90%	4.06%
	VALUE ENGINEERING	PROJECT #
COST	\$6,843	94
% PROJECT	0.53%	

EFD/EFA	PROJECT NAME	CONTRACT #
SO.WESTDIV	INDUSTRIAL WASTE IMPROVEMENTS	88-4393
	PROJECT COST	DURATION
ORIGINAL	\$1,188,750	345
FINAL	\$1,215,242	287
% CHANGE	2.23%	-16.81%
	CHANGE ORDERS	CLAIMS
COST	\$26,492	\$0
% PROJECT	2.23%	0.00%
	VALUE ENGINEERING	PROJECT #
COST	\$0	95
% PROJECT	0.00%	

EFD/EFA	PROJECT NAME	CONTRACT #
CHESAPEAKE	COMPOSITE TRAINING FACILITY	89-0021
	PROJECT COST	DURATION
ORIGINAL	\$1,175,000	265
FINAL	\$1,220,267	324
% CHANGE	3.85%	22.26%
	CHANGE ORDERS	CLAIMS
COST	\$45,267	\$0
% PROJECT	3.85%	0.00%
	VALUE ENGINEERING	PROJECT #
COST	\$0	96
% PROJECT	0.00%	

EFD/EFA	PROJECT NAME	CONTRACT #
SO.WESTDIV	SITE IMPROVEMENTS	88-4432
	PROJECT COST	DURATION
ORIGINAL	\$1,116,820	290
FINAL	\$1,173,676	283
% CHANGE	5.09%	-2.41%
	CHANGE ORDERS	CLAIMS
COST	\$56,856	\$0
% PROJECT	5.09%	0.00%
	VALUE ENGINEERING	PROJECT #
COST	\$0	97
% PROJECT	0.00%	

EFD/EFA	PROJECT NAME	CONTRACT #
NORTHDIV	CBU COMPLEX	89-0023
	PROJECT COST	DURATION
ORIGINAL	\$1,090,415	375
FINAL	\$1,121,280	408
% CHANGE	2.83%	8.80%
	CHANGE ORDERS	CLAIMS
COST	\$30,865	\$0
% PROJECT	2.83%	0.00%
	VALUE ENGINEERING	PROJECT #
COST	\$0	98
% PROJECT	0.00%	

EFD/EFA	PROJECT NAME	CONTRACT #
SO.WESTDIV	NOISE HAX ABATEMENT	91-0200
	PROJECT COST	DURATION
ORIGINAL	\$1,072,665	266
FINAL	\$1,124,802	302
% CHANGE	4.86%	13.53%
	CHANGE ORDERS	CLAIMS
COST	\$52,137	\$0
% PROJECT	4.86%	0.00%
	VALUE ENGINEERING	PROJECT #
COST	\$0	99
% PROJECT	0.00%	

EFD/EFA	PROJECT NAME	CONTRACT #
SO.WESTDIV	OPERATION SUPPOT FACILITY	87-7797
	PROJECT COST	DURATION
ORIGINAL	\$1,039,658	380
FINAL	\$1,100,406	378
% CHANGE	5.84%	-0.53%
	CHANGE ORDERS	CLAIMS
COST	\$60,748	\$0
% PROJECT	5.84%	0.00%
	VALUE ENGINEERING	PROJECT #
COST	\$0	100
% PROJECT	0.00%	

^a Pending claim not included in final cost

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Vita

Kelly Joseph Schmader was born in Butler, Pennsylvania on August 24, 1961, the son of Leona Hooks Schmader and Kenneth John Schmader. After completing his work at Union High School, Rimersburg, Pennsylvania, in 1979, he entered Penn State University in State College, Pennsylvania. He received the degree of Bachelor of Science from Penn State University in May, 1983. During the following years, he was employed as an officer in the U. S. Navy. He was married to the former Miss Sheryl Lynn King on May 26, 1990, and they have one daughter, Madison. In August, 1993, he entered The Graduate School of the University of Texas.

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