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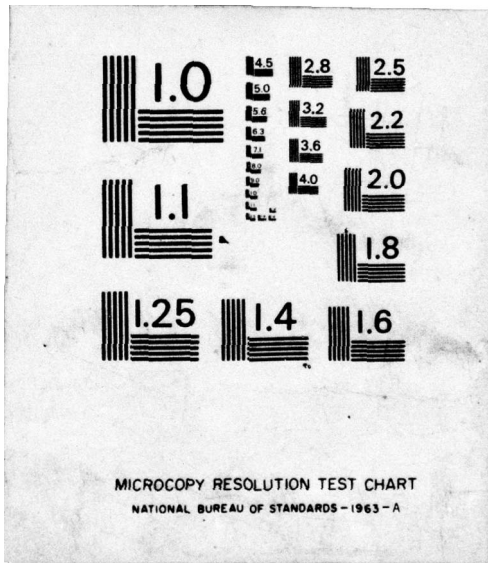
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A DETERMINATION OF THE PRIMARY  
FACTORS AFFECTING DEFENSE  
CONTRACTORS' PROFIT

Donald E. Leedle, Major, USAF  
Ronald K. Coslett, Captain, USAF

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This research has identified the fundamental factors that influence profit by utilizing a rather new technique in behavioral research for data collection known as content analysis. Specifically, a semantic differential content analysis model was developed to gather data from published Government and commercial sources. The data analysis provided weighted strengths of the fundamental factors of profit which allowed the development of a capital base profit objective model. Basically, the new profit objective model measures profit as an increase or decrease to the average prime rate. A contractor's performance history and risk assumption determines the adjustment which is then applied to the average prime rate. The adjusted prime rate is used in the model along with the company's current tax rate to establish a net (after tax) profit objective.



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A DETERMINATION OF THE PRIMARY FACTORS  
AFFECTING DEFENSE CONTRACTORS' PROFIT

A Thesis

Presented to the Faculty of the School of Systems and Logistics  
of the Air Force Institute of Technology  
Air University

In Partial Fulfillment of the Requirements for the  
Degree of Master of Science in Logistics Management

By

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September 1976

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fulfillment of the requirements for the degree of

MASTER OF SCIENCE IN LOGISTICS MANAGEMENT (PROCUREMENT MAJOR)

DATE: 7 September 1976

  
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## Chapter 1

### INTRODUCTION

An investigation of the Department of Defense (DoD) profit policy indicates that profit is the motivating force driving business activities (27:3:139). The DoD, through the procurement process, must provide firms with an adequate profit if the Government hopes to draw the inventive and productive capabilities of private industry to the support of defense programs (3:3). It is recognized that in some instances a contractor, in the short run, may consider other factors more important than profit. However, for a firm to continue as a going concern, in the long run, it must earn a profit (16:77-78).

The Government's objective of maintaining a competitive market for the highly technical and complex weapon systems requires an understanding of the market situation.

There are several distinguishing factors between the defense and commercial markets. In the commercial market the individual firms take the initiative to enter or exit the market. Once a firm enters the market, it provides its own resources for investment in development and production of its product. In the defense market the DoD (monopsonist) determines the requirement for a product and induces one or

more firms to develop and produce the desired item. Often this situation results in the Government assuming development costs and project risk (4:15). The degree of uncertainty and high dollar amounts needed to develop and offer weapon systems to the Government are incongruent with normal business analyses of the market (4:13-15).

There are other differences between the competitive commercial and DoD markets. The commercial market is usually characterized by many buyers and sellers, homogeneity of products, relatively easy market entry and exit and substitution of one good for another. The defense market, in contrast, is characterized by a single buyer in a monopolistic to oligopolistic supplier market for unique or highly specialized products, where substitution is impracticable and high financial barriers prevent easy market entry and exit (4:15-17).

A major consideration in all markets is profit. However, in order to motivate contractors through profit, the contractors' perception of the network of factors comprising profit must be understood.

#### Problem Statement

The present Government profit model (see Appendix A) does not consider all the relevant factors which influence a contractor's actual profit. The model tends to reward a contractor for labor intensive efforts (26:12-5) while providing no positive incentive for invested capital (8:86). Furthermore, this profit model fails to recognize the cost

of dealing in the money markets. Specifically, the use of borrowed capital to improve facilities and equipment may reduce overall costs and cause less reliance on Government furnished facilities or existing contractor facilities (4:95). The present Government model does not recognize interest on borrowed capital as an allowable expense (27:15:16) and, of course, is not concerned with profit after income taxes (27:15:42). The Government assumes contractors to be profit maximizers (27:3:139). This purely theoretical economic perception by Government of a contractor's profit policy is rather naive at this point. Evidence shows that contractors, in the short run, will trade off a portion of profit to maximize sales, "buy in" for follow-on programs, provide company growth and gain prestige and goodwill (16:77-78). It is important for the DoD and the defense industry to have a common base of factors establishing profit objectives.

### Definitions

The following terms and phrases are defined as they apply and are used in this research:

1. Adequate profit--must at least equal opportunity costs. As a minimum this sum must equal or exceed the average prime rate for the past six months.
2. Blasphemy--relates to the concept used in early Government contracting of paying a percentage of profit on cost without a cost ceiling.

3. Central tendency analysis--refers to the inspection and analysis of the mean and dispersion of the data for each specific determinant of profit.

4. Data hits, finds and cases--these synonyms refer to the actual datum extracted from the population sample using the semantic differential content analysis model.<sup>1</sup>

5. Formal advertising--a strict and rigid form of selecting a contractor for contract award. Contractors respond to the Government's invitation for bids with sealed bids which are publicly opened and recorded at a specific time and place. Award is then made to the responsive and responsible low bidder without negotiation (27:3:140).

6. Monopsonist--in the economic context, is the only buyer in the market and, therefore, determines the demand.

7. Opportunity cost--is used synonymously with normal profit. Either term will be used to indicate the profit necessary to allow the contractor access to the capital markets.

8. Profit gaming strategy--is a plan or policy used to determine profit goals in such a manner as to mask the real business objectives (i.e., sales maximization, firm perpetuation, follow-on business, etc.).

9. Profit pyramiding--the situation where a vertical network of subcontractors under a prime contractor

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<sup>1</sup>See page 24.

charge profits in their subcontracts. These latent profits are charged as costs by the prime contractors to the Government.

10. R&D work--refers to research and development work conducted and funded under DoD contracts.

11. Reprocurement data--this term refers to the engineering drawings, process specifications and any other data required to allow purchase of a system or component from an alternate source.

12. Types of contracts--refers to the following particular contracts:

FFP is a firm-fixed price contract.

FPI is a fixed-price incentive contract and places incentives on cost, performance and schedule individually or any combination.

CPIF is a cost plus incentive fee contract and places incentives on cost, performance and schedule individually or any combination.

CPFF is a cost plus fixed-fee contract.

### Background

Changing market structure. In the 1967 Logistics Management Institute (LMI) study (20:64) covering a nine-year period (1958 to 1966), a significant shift in mix of business (military to commercial) performed by defense contractors was noticed. In 1958 approximately 60 percent of these companies' business was concentrated in defense work. However, by 1966 less than 50 percent of their work

involved defense contracts. This study further showed that in 1966 40 percent of these companies' profits resulted from defense work while in 1958 the percentage was 60 percent. This LMI study, as well as subsequent research in 1969 and 1970 (21;22), revealed that the profit trend in defense contracting was decreasing while commercial profits were increasing. Additionally, research on market concentration by Belden indicated that the defense supplier market was becoming less competitive from an economic standpoint (3:11-13). This did not mean that competition was lacking. In fact, some contractors asserted that the employment of competition in new areas of work and increased size and scope of contracts on major programs had created an environment where survival rather than profit was the goal (21:19). These major competitions created their counterpart--monopoly. As a result of proprietary rights, technical expertise, high start-up costs and the high cost of procurement data, sole source and noncompetitive production follow-on contracts became commonplace, thus further limiting competition.

Profit defined. At first glance, the definition of profit seems obvious. However, after reviewing the available literature, a universal definition is quite difficult to find. Drucker recently stated that ". . . the essential fact about profit is that there is no such thing. There are only costs [10:10]." Drucker further subdivides the term profit into the cost of capital, risks, and the jobs and pensions of tomorrow (10:10). Ferguson, the noted

economist, defines profit in terms of opportunity costs and "pure profit" (11:165).

Profit in economic literature refers to the expected reward for the contributions of entrepreneurship (12:2). Simply stated, a business must show a return on invested capital over the long run in order to draw future capital and retain present capital. The lowest rate at which capital can be obtained for reinvestment at some higher attractive rate is commonly referred to as the "cost of capital" (17:29). The cost of capital is equated with opportunity cost and included in the total costs of doing business. In economic theory all profits in excess of opportunity costs are considered "pure profits" (11:165).

Even with a complete understanding and acceptance of economic normal profits (i.e., opportunity costs) a difficulty remains in defining "normal," recognizing that the definition is subjective, and that the definition changes over time. In contrast to economic profit, Anthony defines accounting profit as the difference between revenues and expenses (2:56). Accounting profits, however, include not only economic profits, but returns such as rents, interest, wages and the results of chance factors such as wars, strikes, unusual weather conditions and other unforeseen events.

This research considers profit from the economic perspective. The profit model developed and tested in

Chapter 3 attempts to establish profit objectives which are adequate to provide a contractor his opportunity costs.

Profit models. Historically, Government contracting officers awarded profit on precedence (the first model) since there was no standard other than past procurements for similar items (4:16). The Armed Services Procurement Act of 1947 set specific policies and procedures for procurement by providing detailed guidance on formal advertising, negotiation and contract type. However, little guidance was given on the determination of profit objectives other than overall percentage limitations on profit by type of contract (17:9). Ensuing events required a change in the Government's model of profit by precedence.

During the 1950's our national threat assessment determined by the DoD called for the immediate development and deployment of a network of Intercontinental Ballistic Missile (ICBM) systems. The required time compression for these systems acquisitions necessitated multiple tiers of subcontracting. The subcontractor profits were quite high, which led to Senate subcommittee inquiries into profit pyramiding (8:4).

During the same time frame, Robert S. McNamara (then Secretary of Defense) acted as the driving force toward development of a profit standard that would produce normal profits at a level high enough to attract and commit a substantial industrial base to the defense market (8:4). The requirement was to develop a profit analysis paradigm which promoted the DoD profit policy of:

1. Rewarding contractors who take on the more difficult tasks that require higher skills,
2. Motivating contractors to accept greater cost responsibilities with real differences in profit levels among the different contract types and cost risk situations,
3. Motivating contractors to achieve and sustain a high level of performance, and
4. Encouraging use of non-Governmental resources (26:12-2).

As a result, DoD tasked the LMI to develop a method of determining a contractor's profit objectives (4:1). The LMI studies resulted in the Weighted Guidelines (WGL) method for determining contractor's profit objectives in negotiated procurements (25:129).

The WGL method of determining profit is the second Government model and is notable in that it gives a standard method to arrive at a profit objective. To be effective it requires judgment by the contracting officer in assigning the weights to each category. A more detailed examination of the WGL factors provides the basis for a better understanding of the method and its application to determine the profit objective.

First, the contractor's input to total performance encompasses the material and labor skills which the contractor proposes to provide to accomplish the effort (26:12-5). In effect, if the contractor contributes most or all of this

input rather than subcontracting a major portion, then his share of the project risk is much greater, and consequently he should be rewarded. Of course, in subcontracting the Government's concern is pyramiding of excessive profits. It is also logical that the prime contractor must be evaluated on his level of effort in providing technical or administrative assistance to the subcontractors (26:12-5). It appears that greater direct effort (hence cost) expended by the prime contractor results in greater weighting to the contractor's input to total performance. This is not "blasphemy" since the Government cost analysis procedure should eliminate any reward for contractor inefficiency (26:12-6).

Second, contract cost risk determines the weighting for the amount of cost risk the contractor is willing to assume. There are several aspects of this factor:

1. The reliability of the cost estimate as it relates to the assumed task (27:2:147),
2. The responsibility for cost overruns, and
3. The risk of a cost overrun (26:12-13).

This responsibility is determined by the type of contract and the share ratio of cost and profit (26:12-13). The DoD policy is to shift contract cost risk as much as possible to the contractor with appropriate rewards for the amount of risk assumed (27:3:150).

Third, the record of contract performance is the contractor's "track record"--how well he has performed on past contracts. The purpose of this weighting factor is to

reward the contractor for overall outstanding performance (positive percentage) and penalize him for overall poor performance (negative percentage) (26:3:150).

Fourth, selected factors which include:

1. The source of resources mainly involving Government or contractor facilities and equipment (26:12-17) (except special tooling and special test equipment),

2. Special achievement that may be required by the contract, and

3. Other (which is a "catch all" when not using factors one or two of this paragraph) (27:3:151-152).

The objective of the source of resources category is to penalize the contractor for reliance on Government facilities and resources. Special achievement relates to some extraordinary accomplishment or remarkable breakthrough (26:12-17).

Last, special profit consideration rewards a contractor who develops military items without Government assistance or develops foreign markets for military items (27:3:152). Of course, this factor is weighted only if it meets either one or both of the above conditions and is of direct benefit and need to the Government.

A significant change to the WGL method is the Contractor Capital Employed Policy which is the DoD's method to determine profit objectives by return on investment (ROI) (28:8). This third profit model does not replace the WGL method but rather complements it by rewarding a contractor

for invested capital on DoD contracts (28:9). This ROI method, instituted on a trial bases in the early 1970's, is an optional approach in conjunction with WGL (28:8). The intent is to increase the emphasis on the amount and allocation of contractor invested capital, produce efficiency and reduce cost (5:31-32). The main objective of contractor capital employed is

. . . to correct inequities and disincentives that occur where a weighted guidelines profit objective based solely on cost is used in negotiating contracts for which the ratio of required contractor investment to contract cost varies over a wide range [28:9].

The Contractor Capital Employed Policy is applicable to contracts which meet the following requirements:

1. WGL method is applicable,
2. Contract purpose is production of hardware,
3. Proposed engineering costs are 25 percent or less of the total proposed in-house costs, and
4. The total cost of the contract is \$3 million or more (28:9).

This ROI portion of the profit objective is used in place of the last two categories of WGL, i.e., selected factors and special profit consideration and is derived through an extensive set of criteria to determine the amount of capital a contractor will use to perform on a proposed contract (28:9-18). Essentially, the WGL method is used to compute a profit objective, which is divided by two, and the result added to the ROI method computations to determine the total profit objective (5:31). No extensive explanation will be made of

the intricacies of this method since a literature review has not uncovered acceptance of this method by the defense industry. A prominent pricing manager of a very large aerospace firm criticizes the DoD when it formulates the Contractor Capital Employed Policy as a

. . . concept of additional fee percentage for invested capital within the Weighted Guidelines, I can say in absolute candor that 90 percent of the Procurement Agencies, Procurement Officers, and their industrial counterparts find Weighted Guidelines Techniques questionable and manipulative, and many just don't believe in the concept. Therefore, refinements to these questionable techniques can be likened to putting new taillights on an Edsel [9:65].

This is but one criticism of the present Government profit objective models.

#### Previous Research Critique

Numerous studies have evaluated the deficiencies of WGL. An LMI study conducted in 1967 (20:66) concluded that some inequities existed in the WGL approach to profit objectives. In particular, the established DoD method (WGL) for constructing profit objectives did not give adequate consideration to differences in contractors' investment opportunities or changes in investment requirements over a period of time. In the sample reviewed, nearly equal profit rates were applied to costs of all contractors even though there was wide disparity among their capital turnover rates.

In 1967 another study by LMI (19:5-1) recommended that a new Government model was required which would include:

1. labor, material and overhead,

2. the net book value of facilities, and
3. operating capital.

A separation between plant and facilities was suggested because the risk factor in plant facilities investment was higher than in the normal inventory and receivables investment (19:5-1).

The 1969 and 1970 LMI profit studies (21:21;22:17) concluded that the method used by DoD for determining profit objectives contained inequities. The 1971 General Accounting Office (GAO) report (29:53-55), after reviewing and comparing defense contractor profits, also concluded that the existing system of developing profit objectives created inequities. The main reason was again the lack of consideration given to the amount of capital investment required from a contractor for contract performance.

A recent DoD thesis effort from the Naval Postgraduate School concluded that profit was positively correlated with cost (1:60). Therefore, to maximize total profit in the long run, a prudent contractor would maintain a large cost base in Government contracting (1:63). The study revealed that contractors recognized any investment to reduce total cost tended to reduce profit (1:64). Ames, Coady and Maxon further characterized WGL as having a negative marginal revenue product and stated no rational businessman would increase investment to reduce cost if the net result was a lower level of profit (1:64).

Bell and Garr drew the following conclusions about the motivational effects of WGL:

Weighted guidelines have not motivated contractors to employ more of their facilities and financing rather than relying on the Government to furnish new facilities and increase financing.

The motivational aspects of weighted guidelines are limited due to the widespread belief on the part of the Air Force's major contractors that weighted guidelines are not being properly used, or are being used to justify a historical or predetermined profit rate.

A misunderstanding of the function of profit . . . has severely limited the successful application of weighted guidelines.

The profit provided under the Selected Factors of weighted guidelines is unrealistic, and provides no motivation for contractors to invest capital funds in facilities or use their own funds for financing [4:95].

Another critical analysis of WGL concluded in part that:

The evaluation of risk under the weighted guidelines method is an exclusive interpretation, limited to cost risk only, which ignores the other types of risk inherent in a normal business situation.

The weighted guidelines method is a cost-oriented profit concept.

Under the selected factors section of the weighted guidelines method, source of resources is to be evaluated. However, this is a negative assessment for reliance on Government assistance rather than a positive reward for the contractor's contribution of resources.

The weighted guidelines method gives no consideration to the return on investment concept of profit determination.

Return on investment criteria of profitability are regarded as important determinants of internal corporate financial decisions.

Return on investment is concerned with the profitability of assets to the stockholders, its interest in individual contract costs is secondary [8:85-86].

Benefield recognized the shortcomings of WGL and stated that it represented:

. . . the first halting step in the direction of considering contractor investment when determining profit. The token emphasis placed on the contractors' investment in the weighted guidelines has proven to be a very ineffective method of recognizing capital [5:26].

A RAND report on the impact of WGL on profits criticized WGL and listed three drawbacks:

1. Subjective ratings by the contracting officer for target fees,
2. Fees based on cost, and
3. No explicit positive incentive for capital investment (15:12).

WGL did not consider other factors such as Federal income taxes on profit (27:15:42), interest payments for borrowed capital (27:15:26) and bad debts as related to the defense effort (27:15:26).

Numerous criticisms of the present Government profit models has led to the initiation of a study under the direction of Brigadier General J. W. Stansberry, USAF, OASD (I&L). This study, "Profit 76," will try to determine contractors' profitability in defense and nondefense business. Analysis of DD Form 1499<sup>2</sup> data collected for this study revealed several interesting facts. In a regression analysis with profit as the dependent variable and the factors of WGL--i.e., cost input to total performance

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<sup>2</sup>Report of Individual Contract Profit Plan.

(CITP), cost risk, performance, selected factors and special factors--as the independent variables, CITP explained 77 percent of the variation in profits. A further analysis discovered that addition of any one or all of the other factors did not improve the explanatory power of the model. One could infer from this information that profit is indeed dependent on contract sales. Other results showed that (1) type of contract had no effect in explaining profit, (2) CITP was negatively correlated with cost risk, performance, special profit and (3) the percent of time that the factors "past performance," "selected factors," "special profit" were used was 74 percent, 59 percent and 13 percent respectively (7). These results tend to confirm, once again, the previously documented deficiencies of the WGL profit model.

The "Profit 76" study will give specific attention to the relationships of earnings to capital investment (24:41). The goal of the study is to develop a profit model which induces contractors to invest in assets which increase efficiency and productivity and lower costs (24:42). In view of the present rapidly changing economy, the Government's current profit objective model cannot cope with this dynamic environment.

#### Justification

The importance of profits in defense contracting centers on the negotiated type of contract. In defense procurement there are two possible ways in which profit objectives are determined. First, in formally advertised

contracts the price is set by the market. The price so established includes an allowance for profit. This allowance is seldom investigated, because the theory of our economic system indicates that in a competitive supplier market, when the individual firms and the industry are in long-run equilibrium, production takes place at minimum cost. The firms earn no pure economic profits; they receive full costs and nothing more (which includes a normal return on the factors of production) (30:301). The alternate method used to establish profit objectives is negotiation and application of the WGL model (27:3:143).

Contracts are negotiated because one or several factors involved in the purchase do not fit the competitive market model. In defense contracting this may be a result of complex, highly technical requirements which only a few producers are capable of accomplishing. Also, the size of Government purchases are such that only a few companies may have the physical resources to attempt the requirement. Another competitive restricting factor in large dollar research and development contracts is the vagueness of the initial specifications. The above mentioned factors have led to a large proportion of the defense procurement budget being spent on negotiated contracts.

Only 10.3 percent of fiscal year 1972 DoD procurements were made by formal advertising--leaving some [\$] 32.1 billions to be obtained through negotiations [3:112].

These negotiated contracts, therefore, represent purchases made in an imperfect market structure.

In the study of profits in this imperfect market structure, the concern is often centered on the social appropriateness of earnings. This normative concept of profit evaluation requires that profits be adjusted for comparability in all relevant dimensions and some norm be defined as the reference point. Establishing a universally acceptable norm is a difficult if not impossible task. Socially appropriate profits must also be adequate or the contractor will not be interested in doing business. Therefore the norm selected must provide adequate profits while still meeting the social goals.

In contrast to the normative evaluation, profits are frequently investigated from the standpoint of profit comparability. This concept requires that profits be adjusted for inter-firm or inter-industry differences so that the adjusted profit rates reflect equal conditions with respect to one dimension of profit (e.g., sales, ROI) (12:7).

In the literature reviewed, no attempt has been made to identify all the relevant determinants of profit and explain their interrelationships. The proposed research envisions such a comprehensive analysis. The background search into aerospace profits clearly shows the need for a new Government profit objective model.

#### Scope

The analysis and development of a profit model in the proposed research effort will be limited to DoD

applications. Data collection and analysis of contractual data will be limited to Air Force negotiated procurements. Specific model development and procurement analysis will be limited to research and development and systems procurements.

### Objectives

The primary objective of the proposed research is to identify the primary factors affecting profit. Once these factors have been identified, a secondary objective is to develop a practical model incorporating those factors which lend themselves to quantitative evaluation and analysis.

### Research Questions

1. What are the primary factors which affect the profit of defense contractors?
2. If these factors can be identified, can a new profit objective model be developed?

## Chapter 2

### RESEARCH METHODOLOGY

#### Overview

In order to answer the two research questions presented in Chapter 1, a methodology was developed to logically and rationally provide the foundation of this research effort. After a determination of the population of interest a sampling plan was developed to provide sources in which the data was collected. The data collection model was chosen to be a semantic differential content analysis model specifically designed for this research effort. A pilot study was conducted to validate the content analysis model and provide input in determining reasonable decision rules for the criteria test. Therefore, the first task was to develop a sample from the universe of profits and the population of interest.

#### Assumptions

1. Adequate data exists to determine the primary factors of profit.
2. The relevant market of this research is noncompetitive.
3. The primary factors affecting profit have not changed significantly over the last 15 years.

4. The demand curve for the relevant market of this research is highly inelastic.

5. Some primary factors affecting profit may not be measurably consistent with the new profit objective model development requirements.

6. All defense contractors are entitled to adequate profits.

### Universe

The universe is composed of all profits from the defense and nondefense industries both foreign and domestic. As with most subject areas the universe is enormous; therefore, there must be a method to narrow this broad subject to a manageable sample from which the primary factors of defense contractors' profit may be derived. Figure 1 on page 23 provides the logical progression to this sample.

### Population

Of the universe of profits there are several distinct populations of DoD profits. Two such populations are profits resulting from formally advertised and negotiated procurements. The profit population of formally advertised procurements is not of concern.<sup>1</sup> Therefore, the population of interest in this study is profit determined by negotiation between commercial firms and the DoD. Since a census of this population is considered impracticable due

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<sup>1</sup>See page 17.

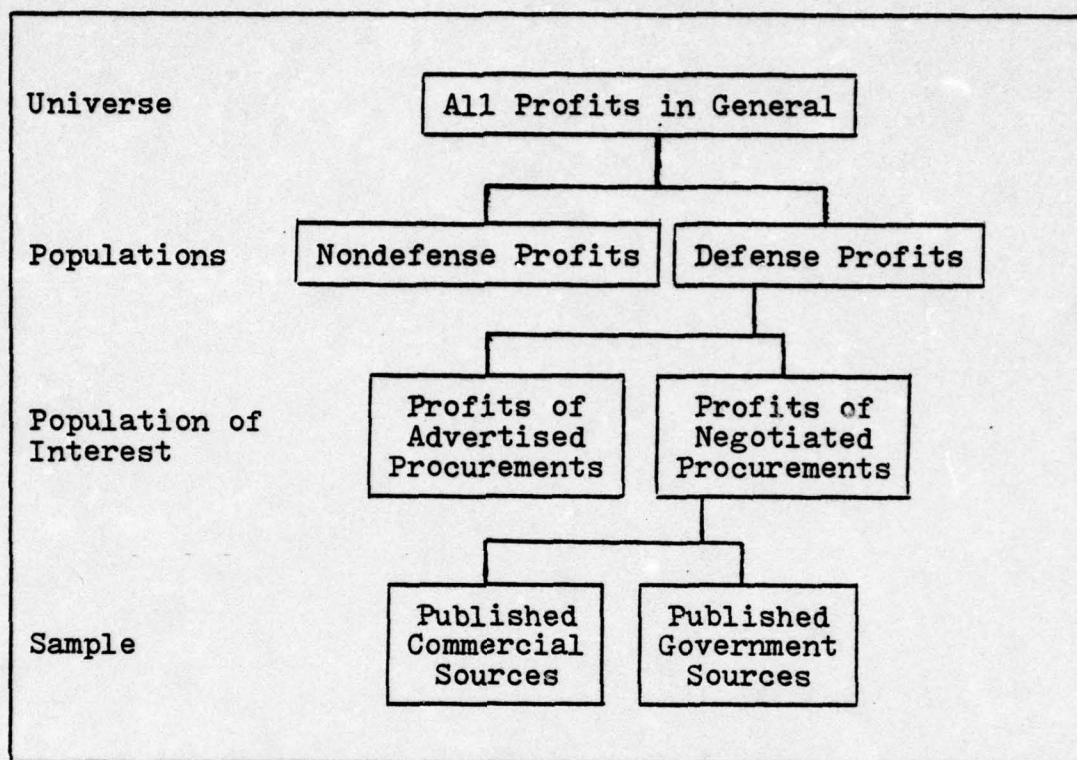


Figure 1. Sample Determination

to the vast amount and nonavailability of literature, the population was sampled.

#### Sample and Sampling Plan

The data was selected from a sample of convenience from literature listed under "Profits" and recommended associated key words from the Business Periodicals Index, the Reader's Guide to Periodical Literature, the Air University Periodical Index, the Defense Documentation Center (DDC), and the Defense Logistics Studies Information Exchange (DLSIE) for the period of January 1958 through December 1975. This time period as revealed in the literature review was the best indicator of determining factors which

influence profit.<sup>2</sup> The sample was not statistically representative or unbiased due to the fewer number of commercially published data sources on DoD profits. Therefore, a concerted effort was made to reduce bias by equally representing commercial and Government data sources. A total sample of 60 data sources (articles, theses, technical reports, books, etc.) were selected as shown by the sampling plan in Appendix E.

Review of the literature presented a natural division of Government profit policy into three time segments of pre-WGL (1958 through 1962), early WGL (1963 through 1969) and present profit policies including WGL (1970 through 1975). An investigation of the commercial periodical guides and Government bibliographies indicated that less than 100 data sources were available for each category (commercial and Government) in each time period of the sampling plan. In the pre-WGL time period only three Government sources were discovered and therefore the sample of commercial articles was limited to three (the data sources are shown in Appendix F). The data was collected by use of content analysis as described below.

#### Data Collection Plan

The methodology selected for determining the relevant factors of profit was content analysis. Content analysis was first used as a technique for analyzing and

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<sup>2</sup>See page 5.

quantifying communication material such as newspapers, magazines and radio broadcasts (13:646). In recent years it has gained increasing popularity as a method of analysis in a wide variety of behavioral settings. In the proposed research background review, many articles and commentaries described the deficiencies of the WGL profit model. Much of this data included suggestions and recommendations of the proper factors for inclusion in a Government profit model, but the variation of relative importance and the method of using those factors was undetermined. The method of content analysis has provided the technique for grouping, summarizing and weighting of the factors.

The first step in using content analysis was to resolve the specific analytic approach to the data. A choice was made between the manifest and latent level approaches. In the manifest level approach the datum is analyzed for what it says without reading anything into or assuming anything about it. In the latent level approach attempts are made to go beyond what is said and make inferences about underlying motivations or implied meanings. There was evidence to indicate that content analysis at the manifest level can be accomplished reliably and validly, but not at the latent level (15:647-8). This research used the manifest level approach to content analysis. The next important decision involved allowing the researcher to move onto the definition and analysis of the individual units of content analysis.

The next step in developing the content analysis plan is to establish definitions for the recording unit and the context unit. The recording unit is the smallest body of content in which a specific reference characteristic is counted (the occurrence of a single content element). The context unit is the largest content unit examined in characterizing a recording unit (6:135). The recording unit can be a word, phrase, sentence, paragraph, article or book. This research uses the phrase as the recording unit and the sentence as the context unit. The phrase that is measured links some factor or attribute to profit. The sentence is analyzed to determine the relationship of the factor or attribute to profit. With the data approach level established and the recording and context units determined, the next and most important step is to develop the code.

The key to success or failure in using the content analysis technique is establishing a set of categories and the method of coding. There are no specific rules for selecting the categories to be used, but there should be a clear rationale for each facet of the code. In classifying the relevant categories, this research used the broader semantic content analysis coding technique. In addition to reliability and validity, the categories and code established should have the attributes of homogeneity, inclusiveness, usefulness and mutual exclusiveness (13:675). The categories and code developed for this research are discussed later in relation to the above referenced attributes.

The code established involved one digit to record the relative strength of relationships between the specific categories and profit, one digit to record the direction of strength (positive or negative), one digit to identify major categories, and two digits to record specific subcategories. The coding plan and categories established for this research are shown below.

CODE FOR SEMANTIC CONTENT OF PROFIT FACTORS

FIRST DIGIT = Strength of statement relating factor/attribute to profit

1 = no strength

2 = weak

3 = strong

SECOND DIGIT = valence of strength

+ for increase in profit

- for decrease in profit

0 for ambiguous

THIRD DIGIT

FOURTH AND FIFTH DIGITS

Area

Specifics

(1) LABOR

00 no specifics  
01 engineering  
02 manufacturing  
03 management  
04 overhead  
05 technical skills  
06 output/man  
07 other

(2) CAPITAL

00 no specifics  
01 quick assets  
02 inventory  
03 fixed assets  
04 debt capital

THIRD DIGIT	FOURTH AND FIFTH DIGITS
<u>Area</u>	<u>Specifics</u>
(2) CAPITAL (Continued)	05 equity capital 06 return on capital invested (ROI) 07 operating capital 08 net book value 09 total capital turnover 10 other assets 11 other
(3) SUBCONTRACTS	00 no specifics 01 unique item/component 02 standard item
(4) RISK	00 no specifics 01 fixed-price-type contracts 02 cost-type contracts 03 type of contract (general) 04 inventory 05 technological 06 financial 07 other
(5) GOVERNMENT SUPPORT	00 no specifics 01 facilities 02 GFP 03 financial 04 other
(6) SPECIAL FACTORS	01 taxes 02 costs (including overrun and underrun) 03 capital/man 04 renegotiation 05 quality 06 performance 07 type of contract 08 overhead (general) 09 volume of production or sales 10 legal and contractual constraints 11 interest payments
(7) MISCELLANEOUS	

Definitions and rationale for coding scheme. The first digit recorded the strength of the statement relating

the factor/attribute to profit. It was an a priori assumption that not all factors/attributes affect profit equally. The use of this code allowed measurement on a scale of the relative importance of the factor/attribute in the statement being analyzed. This digit plus the valence described below established a positive or negative weighting on any particular attribute. This weighting allowed algebraic summation and consequently established an ordinal ranking of the categories. The categories of coding within this first digit were ranked from one to three in ascending order of strength. What differentiated a strong from a weak relationship was, of course, subject to the judgment and perception of the coder, but in general strong coding was derived from statements containing adjectives and phrases such as strong, very important, critical and others showing a strong relationship (see Appendix B). Weak relationships were characterized by words and phrases such as should, could, positive relationship and others as evidenced by the unit of context (see Appendix C).

The second digit measured the valence of the strength identified in digit one. The second digit has three possible codes: +, -, 0. The "+" sign was used to denote a positive relationship, i.e., an increase in profit. The "-" sign was used to denote a negative relationship, i.e., a decrease in profit. The "0" was used when neither the "+" nor the "-" sign was used. The valence of the

factors was summarized to establish which factors/attributes increased profits or decreased profits.

The third, fourth and fifth digits were used to identify the area categories and their specific subcategories. The rationale for establishing these particular area categories listed are homogeneous, inclusive, useful and mutually exclusive. The area categories were all related to one another as various attributes which affect profit. The area categories were broad enough to cover several subcategories but not so broad that significant relationships were hidden. A "00" in the fourth and fifth digits was used if the observation had no specific subcategory. The inclusiveness attribute of the area categories was not degraded by the inclusion of "miscellaneous." This area category was expected to contain very few observations, but under no circumstances was it allowed to contain more than five percent of the total number of observations. At the completion of coding this category was reevaluated in an attempt to extract some of the observations for placement into other or new categories which provided more information. If the content analysis substantiated the validity of the categories, they were considered in establishing the new model. The area and specific subcategories are now analyzed in more detail.

First, the labor category is defined as all labor employed by a contractor excluding labor secured under a

subcontract. The following subcategories are described as follows:

01. Engineering--was coded whenever the word "profit" was directly linked with the word "engineering" (in terms of specific types, i.e., electrical engineers, mechanical engineers, etc.).

02. Manufacturing--was coded whenever the labor reference was clearly associated with physically performing the work or service. This subcategory did not include engineering, management or overhead labor.

03. Management--was coded whenever management personnel were referenced as affecting profit.

04. Overhead--was coded to include all staff personnel and other support personnel involved in the daily operation of the business.

05. Technical skills--was coded when a reference was made to technically skilled labor that did not fit categories 01 or 02 above.

06. Output/Man--was coded when a reference was made to the productive capabilities of manpower or the amount of product produced by a worker.

07. Other--was coded when one of the above defined subcategories did not apply.

The second area category is that of "capital." For the purpose of this analysis capital is defined as all assets, liabilities and equities. The individual subcategories are described as follows:

01. Quick assets--was coded when reference was made to cash, temporary investments held in lieu of cash and current accounts and notes receivable.

02. Inventory--was coded when reference was made to those items of tangible personal property which (a) were held for sale, (b) were in process of production for sales or (c) were to be consumed in the production of goods and services.

03. Fixed assets--was coded when reference was made to land, building, equipment and depreciation on these assets.

04. Debt capital--was coded when reference was made to all liabilities (current and long term).

05. Equity capital--was coded when reference was made to capital received from stockholders.

06. Return on capital invested (ROI)--was coded when reference was made to any form of invested capital.

07. Operating capital--was coded when reference was made to the balance of current assets less current liabilities (working capital included).

08. Net book value--was coded when reference was made to the net book value of the company. Reference to net book value of plant and equipment, however, were coded under 03 above.

09. Total capital turnover--was coded when reference was made to the capital turnover rate as an attribute affecting profit.

10. Other assets--was coded when reference was made to assets not already described.

11. Other--was coded when reference was made to capital that did not fit into subcategories 01 through 10 above.

The third area category was that of "subcontracts" and was defined as any agreement or contract to produce an item or provide a service required on a Government prime contract. The literature review indicated that subcontracts played a major role in most negotiated systems procurements. This category was established to test the relationship subcontracts might have on profit. Since most subcontracts are firm-fixed-price with the prime contractor and are subsequently elements of reimbursable costs between the prime and the Government, little subcontract cost risk is experienced by the prime. However, from the standpoint of quality, performance and delivery requirements, the subcontractor could seriously affect the prime's profit structure. The subcategories were established as follows:

01. Unique item/component subcontract--was defined as any contract or agreement with a Government prime contractor to (a) perform work requiring a unique ability or (b) produce an item that was nonstandard and no available substitute existed.

02. Standard item subcontract--was defined as any contract or agreement with a Government prime contractor to provide a standard item or common service.

The fourth area category "risk" was defined as the making of decisions in the face of uncertainty on the basis of probabilistic expectations about the outcomes of future events. Again, this subject has appeared in much of the literature. In Government contracting this attribute is considered as a profit factor strictly in relation with the type of contract used. Therefore, the first three subcategories addressed the most frequently used type of contracts. In addition to type of contract, three other subcategories were considered--inventory, technological and financial. The specific definition and explanation of the subcategories are as follows:

01. Fixed-price-type contracts--were coded whenever the term "risk," fixed-price contract and profit were associated.

02. Cost-type contracts--were coded whenever the term "risk," cost-type contract and profit were associated within the recording unit or context unit.

03. Type of contract--was coded whenever the term "risk," a general reference to contract type and profit were associated within the recording unit or context unit.

04. Inventory--was coded whenever the term "risk," inventory and profit were associated.

05. Technological--was coded whenever the term "risk" was associated with technical complexity or processing difficulties and profit.

06. Financial--was coded whenever the term "risk" is associated with funds or investment and profit.

07. Other--was coded whenever the term "risk" was encountered and associated with profit in situations not described in 01 through 06 above.

The fifth area category "Government support" was defined as all forms of assistance provided to a contractor by the Government such as facilities, property and special financing arrangements. In the literature this category had apparently influenced Government policy changes such as progress payment regulations, facilities reduction policies and others. This category was assumed to have a significant influence on a contractor's profit and, therefore, was included in the coding. The specific subcategories are representative of the three major forms of Government support:

01. Facilities--was coded whenever the use of Government-owned facilities was associated with profit.

02. Government furnished property (GFP)--was coded whenever the use of Government-furnished equipment, special test equipment or special tooling were associated with profit.

03. Financial--was coded whenever progress payments, guaranteed loans or advanced payments were associated with profit.

04. Other--was coded whenever a Government support not fitting in categories 01 through 03 above was associated with profit.

The sixth area category was "special factors." The attributes listed under specifics in this area category tended to be heterogeneous (unlike the specifics listed in the area categories described above). This area category includes attributes which were important to the determination of profit according to the literature reviewed. The specific subcategories are described as follows:

01. Taxes--was coded whenever any form of tax was linked with profit determination.

02. Costs (including overrun and underrun)--was coded whenever contract cost was described as a determinant of profit. Any references to overruns and underruns on Government contracts was coded in this subcategory.

03. Capital/man--was coded whenever the ratio of capital/labor employed was discussed as a profit determinant.

04. Renegotiation--was coded whenever the Renegotiation Board or the statutes relating thereto were discussed as determinants of profit.

05. Quality--was coded whenever the quality of a contractor's product was referenced as a determinant of profit.

06. Performance--was coded whenever the performance of a contractor was discussed as a factor of profit.

07. Type of contract--was coded when the contractual instrument was discussed as influencing profit (discussed outside of the area of risk).

08. Overhead--was coded whenever overhead was referenced in general as influencing profit.

09. Volume of production or sales--was coded whenever volume of production or sales was discussed as a determinant of profit.

10. Legal and contractual constraints--was coded whenever laws and requirements of a contract were referenced as profit determinants.

11. Interest payments--was coded whenever the payment of interest was discussed as a profit determinant.

The seventh area category was "miscellaneous." The miscellaneous category was not subdivided. This code was used whenever a factor/attribute associated with profit was discovered that did not fit into one of the first six area categories. A list of factors/attributes coded into this category was compiled. At the completion of coding, a close examination of the factors/attributes in this category was made to determine possible new categories. To insure the usefulness of the information extracted, new categories were established until less than 5 percent of the total data hits were accumulated in the miscellaneous category. The validity and usefulness of the code was demonstrated by a pilot study.

#### Pilot Study

Satisfactory reliability cannot always be achieved in content analysis; therefore, a pilot study is almost always necessary. The pilot study for the proposed research used a judgmental sample extracted from the defined population. Several samples and revisions of the code were

required before the pilot study could be completed. A trial and error period covering three weeks was needed to perfect the categories and develop coder skills.

Reliability of the code. Coder skills are essential in determining the reliability of the content analysis code. In a one-digit code 90 percent is considered good, and in a three-digit code 85 percent is considered good (13:670). The code reliability in a study of 30 experiments revealed the range of 66 percent to 96 percent (6:172).

The reliability of this semantic differential content analysis code was determined by computing the percent of time two independent coders agreed when they each coded the same material. The formula for computation was

$$\text{PERCENT AGREEMENT} = \frac{100 \times \text{NUMBER OF UNITS CODED IDENTICALLY}}{\text{TOTAL NUMBER OF UNITS CODED}}$$

After three weeks of coding practice and several modifications of the original code, a reliability of 92 percent was established.

In validating the code and conducting the pilot study two lists of key words and phrases were compiled to assist the coders in determining the strength classification. These lists can be found in Appendices B and C. The first sample of 50 sentences provided several insights into problems with the code. The strength category had a classification of "ambiguous" which fell between strong and weak. It was discovered that the coders could not evaluate the sentences consistently in this area. Deletion of "ambiguous"

provided a wider conceptual difference between "strong" and "weak" and, therefore, provided a much better correlation in this category. Another problem encountered was the need to carefully analyze the sentence to insure that the attribute was affecting profit and not vice versa. For example, a hypothetical sentence like--Low profits were the reason for a substantial decrease in the engineering labor employed--would not be coded since profit is the attribute determining the decrease in labor employed. At first, there was a tendency to code measures of profit such as profit/cost, profit/sales, profit/ROI and others. In many cases cost, sales and ROI were described as determinants or profit. In many other instances the ratio was merely being used as a measure of profit and not a determinant. For example, "Profits on defense sales declined in 1968 to equal the lowest year in the study period [22:17]." This sentence would not be coded because profit on defense sales was used as a measurement tool. In the following sentence, sales were coded as an attribute of profit:

Profits can be closely related to sales because virtually all accounting systems provide for either direct or indirect costing methods which tie cost and, hence, profits to the appropriate sales [22:40].

The following typical sentences were coded to provide insight into the use of the code:

This factor indicates the need for extra profit allowance when outstanding performance is requested [24:76]. (3, +, 6, 06)

Our observations indicate that in practice the type of contract is related to the degree of risk aspect in the determination of profit or fee and that after the contract type is selected, the question of risk may be mentioned or discussed in a general way, but it is not considered as being the most important factor [24:17]. (3, 0, 4, 03)

It states that in an initial contract, the profit may be higher to persuade the supplier to undertake the risk and problems in a new kind of production [24:19]. (2, +, 4, 05)

The results of the pilot study were incorporated in Appendix D. The actual thesis data was handled by computer as described below.

#### Criteria Test

The proposed research was essentially divided into two phases:

1. Identification of the primary factors of profit, and
2. Development of a new profit objective model.

The first phase of the research concentrated on answering the first research question. Any area category with more than five percent of the data finds was considered significant. Any area specific containing more than five percent of the data finds was considered significant. Such an area specific, if found, was evaluated with other specifics within the same area category to determine if a new area category would be created. If the specific accounted for more than 25 percent of the area category data finds, a new category was established as appropriate.

In this event, the depleted area category was again evaluated under the five percent criterion.

The second phase of the research was directed at answering the second research question. The intent of this phase was to develop a Government profit objective model which was not based entirely on cost. The ideal goal would be to develop a profit objective model not dependent on estimated costs. However, since estimated costs are linked to estimated labor, the profit objective will continue to be tied to these costs. The effect of these costs was minimized by incorporating estimated labor costs into the capital base.

The model developed made the assumption that every contractor dealing with the Government is entitled to an adequate profit if certain standards are met. These standards are defined as:

1. Satisfactory cost,
2. Satisfactory performance, and
3. Normal risks assumption.

The criteria for meeting the standards are defined as follows:

1. Satisfactory costs are evidenced in competitive procurements by the source selection procedures. In sole-source procurements the negotiated cost is considered satisfactory.

2. Satisfactory performance is evidenced by the contractor's past performance record. If the contractor is

new to DoD, then an Administrative Contracting Officer's (ACO) certification of capabilities will be used.

3. Normal risks assumed will be evidenced by the type of contract, technical difficulty and financial management.

The significant area categories identified by content analysis were analyzed for inclusion in the research model. These area categories were considered profit factors with relative weightings established by the strength codes and frequency of data finds. If the factor could be quantified or measured from available data for negotiation purposes, it was included in the research model. The contractor could earn more or less than the adequate profit depending on the existence and weighting of the identified profit factors. For example, cost, schedule and performance incentives could be applied in the same manner as they are applied today. Assumption of higher risks could result in higher percentages or profit depending on the risk weighting and the attributes involved.

#### Limitations

1. Conclusions of this research effort were limited to the essence of the research questions.

2. The content analysis model was limited in identifying the primary factors of profit by the data sources and the random sample selected.

3. The quantity and content of data hits may be biased by the length of the different data sources.

Summary

The research methodology is highly dependent on the proper sample from Government and commercial sources and the perception of the researchers when using the semantic differential content analysis model. The pilot study brought to light the importance of being able to adjust and "fine tune" the content analysis model in order to provide adequate data for analysis and accurate identification of the factors that influence a defense contractor's profit. The specific technique used to analyze the collected data to develop a new profit objective model is described in Chapter 3.

## Chapter 3

### DATA ANALYSIS AND FINDINGS

#### Overview

The initial effort of this research was to answer the first research question--what are the primary factors affecting profit of defense contractors. Using the data collected through the semantic differential content analysis and the criteria test developed in Chapter 2, the factors that influence a defense contractor's profit were determined. The first data analysis consisted of relative and cumulative frequency distributions of the area categories. The second analysis identified the relative influence of the area categories and area specifics<sup>1</sup> as an increase, no effect or decrease to profit. The final analysis and best potential to identify the factors of profit for the new profit objective model was that of the relative strengths associated with each area category and specific.

Upon completion of the data coding and categorization, the coded observations or cases were entered into a computer data file. A computer program was designed to produce relative and cumulative frequency distributions in addition to other useful tabulations. For instance, the sum

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<sup>1</sup>See pages 27 and 28.

of first digit codes for all area categories and subcategories provided a measure of relative importance. A comparability test of the first and second digits with area categories and subcategories established the importance and direction of the categories (i.e., profit is increasing or decreasing). A matrix structure of categories and subcategories by strength and valence provided significance of relationships among the central tendencies of the classifications. However, several assumptions were made in order to conduct the analysis.

#### Assumptions

The following assumptions were made in conducting the data analysis and findings:

1. The data level will not support parametric testing.
2. Defense contractors are unwilling to publish material concerning their profit policy because of apathy, contractor policy, proprietary information concerning contractor profit structure, or their actual satisfaction with the present Government profit policy.

Considering these assumptions the following analysis was made.

#### Analysis

Prior to coding the total 832 cases for input into the computer program, the raw data was analyzed concerning the area category of miscellaneous comprising 127 cases.

These cases were then compared to determine if there were any obvious relationships to other area categories or specifics. Of the 127 cases, 117 were grouped into nine additional area specifics under the area category of special factors. For example, miscellaneous cases dealing with depreciation were aggregated into an area specific labeled depreciation and cases dealing with negotiation, negotiation process, negotiation position, crash procurement, were aggregated into an area specific category of profit policy (Government). Table 1 gives the expanded area category of special factors.<sup>2</sup>

Table 1  
Expansion of Area Category Special Factors

AREA SPECIFIC	FREQUENCY OF CASES
01 Taxes	7
02 Costs (including overrun and underrun)	116
03 Capital/man	1
04 Renegotiation	23
05 Quality	2
06 Performance	55
07 Type of contract	31
08 Overhead (general)	9
09 Volume of production or sales	27
10 Legal and contractual constraints	8
11 Interest payments	6
12 Cost contracts	8
13 Fixed-price contracts	19
14 Profit policy (Government)	30
15 Profit policy (Contractor)	26
16 Contract termination	20
17 Depreciation	8
18 R&D work	6
19 Production/manufacturing work	5
20 Market structure	22

<sup>2</sup>See page 36.

In accordance with the sampling plan the 832 data hits or cases were obtained using the semantic differential content analysis developed previously.<sup>3</sup> The result of the computer program developed to determine the relative and cumulative frequency distributions of the area categories is shown in Table 2.

Table 2  
Area Category Relative and Cumulative  
Frequency Distribution

AREA CATEGORY	CASE FREQUENCY	RELATIVE FREQUENCY (PERCENT)	CUMULATIVE FREQUENCY (PERCENT)
Labor	63	7.6	7.6
Capital	198	23.8	31.4
Subcontracts	9	1.1	32.5
Risk	100	12.0	44.5
Government Support	23	2.7	47.2
Special Factors	429	51.6	98.8
Miscellaneous	<u>10</u>	<u>1.2</u>	<u>100.0</u>
TOTALS	832	100.0	100.0

The area specific cases are arrayed to reflect the relative and cumulative frequency distributions of each respective area category given by Table 3. Tables 2 and 3 are the initial distributions of the collected data to which the criteria test developed in Chapter 2 must now be applied.

<sup>3</sup>See page 24.

Table 3

Area Specific Relative and Cumulative  
Frequency Distribution

AREA CATEGORY	AREA SPECIFIC	CASE FREQUENCY	RELATIVE FREQUENCY (PERCENT)	CUMULATIVE FREQUENCY (PERCENT)
Labor	No specifics	13	20.6	20.6
	Engineering	11	17.5	38.1
	Manufacturing	2	3.2	41.3
	Management	17	27.0	68.3
	Overhead	9	14.3	82.6
	Technical skills	6	9.5	92.0
	Output/man	3	4.8	96.8
	Other	<u>2</u>	<u>3.2</u>	<u>100.0</u>
	TOTALS	63	100.0	100.0
Capital	No specifics	27	13.6	13.6
	Quick assets	2	1.0	14.6
	Inventory	14	7.1	21.7
	Fixed assets	58	29.4	51.1
	Debt capital	4	2.0	53.1
	Equity capital	6	3.0	56.1
	Return on capital invested (ROI)	44	22.3	78.4
	Operating capital	28	14.1	92.5
	Net book value	8	4.0	96.5
	Total capital turnover	3	1.5	98.0
	Other assets	2	1.0	99.0
	Other	<u>2</u>	<u>1.0</u>	<u>100.0</u>
		TOTALS	198	100.0
Sub- contracts	No specifics	9	100.0	100.0
	Unique item/ component	0	0.0	0.0
	Standard item	<u>0</u>	<u>0.0</u>	<u>0.0</u>
	TOTALS	9	100.0	100.0
Risk	No specifics	52	52.0	52.0
	Fixed-price contracts	8	8.0	60.0
	Cost contracts	5	5.0	65.0
	Type contract (general)	6	6.0	71.0
	Inventory	0	0.0	71.0
	Technological	8	8.0	79.0

Continued

Table 3 (Continued)

AREA CATEGORY	AREA SPECIFIC	CASE FREQUENCY	RELATIVE FREQUENCY (PERCENT)	CUMULATIVE FREQUENCY (PERCENT)
Risk (Cont)	Financial	19	19.0	98.0
	Other	<u>2</u>	<u>2.0</u>	<u>100.0</u>
	TOTALS	100	100.0	100.0
Government Support	No specifics	2	8.7	8.7
	Facilities	11	47.9	56.6
	GFP	1	4.3	60.9
	Financial	8	34.8	95.7
	Other	<u>1</u>	<u>4.3</u>	<u>100.0</u>
	TOTALS	23	100.0	100.0
Special Factors	Taxes	7	1.6	1.6
	Costs	116	27.0	28.6
	Capital/man	1	.2	28.8
	Renegotiation	23	5.4	34.2
	Quality	2	.5	34.7
	Performance	55	12.8	47.5
	Type of contract	31	7.2	54.7
	Overhead (general)	9	2.1	56.8
	Volume of Produc- tion or sales	27	6.3	63.1
	Legal and contrac- tual constraints	8	1.9	65.0
	Interest payments	6	1.4	66.4
	Cost contracts	8	1.9	68.3
	Fixed-price con- tracts	19	4.4	72.7
	Profit policy (Government)	30	7.0	79.7
	Profit policy (Contractor)	26	6.1	85.8
	Contract Termina- tion	20	4.7	90.5
	Depreciation	8	1.9	92.4
	R&D work	6	1.4	93.8
	Production/Manu- facturing work	5	1.2	95.0
	Market structure	<u>22</u>	<u>5.0</u>	<u>100.0</u>
	TOTALS	429	100.0	100.0
Miscellan- eous		<u>10</u>	<u>100.0</u>	<u>100.0</u>
	GRAND TOTAL	832	100.0	100.0

Continued

Table 3 (Continued)

NOTE: The area specifics breakout of the frequency distributions also gives the area category distributions shown in Table 2.

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Of the seven area categories, three were insignificant, i.e., the area categories of subcontracts, Government support and miscellaneous did not meet the established five percent criteria. Several of the area specifics within each category were found to be insignificant (i.e., not meeting the five percent criteria within each area category). Also, several area specifics were found to make up more than 25 percent of their respective area categories.

Major consideration was given to the three area categories that did not meet the five percent criteria of the total cases. Since the area categories of subcontracts and Government support were established a priori to be potential significant factors of profit but were not supported by actual data collected, these categories were eliminated from the data base.<sup>4</sup> Both groups are major categories and due to the mutual exclusiveness of the area categories cannot be combined with other area categories. For the same reasoning, these area categories (subcontracts and Government support) were not combined with the area category miscellaneous since one of the main purposes of the research was to determine separate and identifiable factors of profit. This determination thus brings the number of cases in the

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<sup>4</sup>See page 70.

total data base to 800. Table 4 reflects the change in the frequency distributions for the area categories; the area specifics did not change within the remaining area categories.

Table 4  
Revised Area Category Relative and Cumulative  
Frequency Distributions

AREA CATEGORY	CASE FREQUENCY	RELATIVE FREQUENCY ( PERCENT )	CUMULATIVE FREQUENCY ( PERCENT )
Labor	63	7.9	7.9
Capital	198	24.8	32.7
Risk	100	12.5	45.2
Special Factors	429	53.5	98.7
Miscellaneous	<u>10</u>	<u>1.3</u>	<u>100.0</u>
TOTALS	800	100.0	100.0

The next step in the data analysis was to break out the area specifics that could be separately identified and composed 25 percent or more of the cases within any area category, i.e., labor "management," capital "fixed assets" and special factors "costs" as shown in Tables 5 and 6. These tabulations reflect the frequency distributions of the revised area categories and specifics.

The "no specifics" subcategory of area categories was not considered a separately identifiable factor from its respective area category; therefore, these area specifics were not considered candidates for a separate breakout. Labor "management," capital "fixed assets" and special

Table 5

Revised Area Category and Specific Relative and  
Cumulative Frequency Distributions

AREA CATEGORY	AREA SPECIFIC	CASE FREQUENCY	RELATIVE FREQUENCY (PERCENT)	CUMULATIVE FREQUENCY (PERCENT)
Labor	No specifics	13	28.3	28.3
	Engineering	11	23.9	52.2
	Manufacturing	2	4.3	56.5
	Overhead	9	19.6	76.1
	Technical skills	6	13.0	89.1
	Output/man	3	6.5	95.6
	Other	<u>2</u>	<u>4.4</u>	<u>100.0</u>
	TOTALS	46	100.0	100.0
Labor Man- agement		<u>17</u>	<u>100.0</u>	<u>100.0</u>
	TOTALS	17	100.0	100.0
Capital	No specifics	27	19.3	19.3
	Quick assets	2	1.4	20.7
	Inventory	14	10.0	30.7
	Debt capital	4	2.9	33.6
	Equity capital	6	4.3	37.9
	ROI	44	31.4	69.3
	Operating capital	28	20.0	89.3
	Net book value	8	5.7	95.0
	Total capital turnover	3	2.2	97.2
	Other assets	2	1.4	98.6
	Other	<u>2</u>	<u>1.4</u>	<u>100.0</u>
	TOTALS	140	100.0	100.0
	Capital Fixed Assets		<u>58</u>	<u>100.0</u>
TOTALS	58	100.0	100.0	
Risk	No specifics	52	52.0	52.0
	Fixed-price contracts	8	8.0	60.0
	Cost contracts	5	5.0	65.0
	Type contract (general)	6	6.0	71.0
	Inventory	0	0.0	71.0
	Technological	8	8.0	79.0

Continued

Table 5 (Continued)

AREA CATEGORY	AREA SPECIFIC	CASE FREQUENCY	RELATIVE FREQUENCY (PERCENT)	CUMULATIVE FREQUENCY (PERCENT)
Risk (Cont)	Financial	19	19.0	98.0
	Other	<u>2</u>	<u>2.0</u>	<u>100.0</u>
	TOTALS	100	100.0	100.0
Costs (including overrun and underrun)	TOTALS	<u>116</u>	<u>100.0</u>	<u>100.0</u>
		116	100.0	100.0
Special Factors	Taxes	7	2.2	2.2
	Capital/man	1	0.3	2.5
	Renegotiation	23	7.3	9.8
	Quality	2	0.6	10.4
	Performance	55	17.6	28.0
	Type of contract	31	9.9	37.9
	Overhead (general)	9	2.9	40.8
	Volume of Produc- tion or sales	27	8.6	49.4
	Legal and contrac- tual constraints	8	2.6	52.0
	Interest payments	6	1.9	53.9
	Cost contracts	8	2.6	56.5
	Fixed-price con- tracts	19	6.1	62.6
	Profit policy (Government)	30	9.6	72.2
	Profit policy (Contractor)	26	8.3	80.5
	Contract termina- tion	20	6.4	86.9
	Depreciation	8	2.6	89.5
	R&D work	6	1.9	91.4
	Production/manu- facturing work	5	1.6	93.0
	Market structure	<u>22</u>	<u>7.0</u>	<u>100.0</u>
		TOTALS	313	100.0
Miscellan- eous		<u>10</u>	<u>100.0</u>	<u>100.0</u>
	TOTALS	<u>10</u>	<u>100.0</u>	<u>100.0</u>
GRAND TOTALS		800	100.0	100.0

Table 6  
Revised Area Category Relative and Cumulative  
Frequency Distributions

AREA CATEGORY	CASE FREQUENCY	RELATIVE FREQUENCY ( PERCENT )	CUMULATIVE FREQUENCY ( PERCENT )
Labor	46	5.8	5.8
Labor Management	17	2.1	7.9
Capital	140	17.5	25.4
Capital Fixed Assets	58	7.3	32.7
Risk	100	12.5	45.2
Costs	116	14.5	59.7
Special Factors	313	39.0	98.7
Miscellaneous	<u>10</u>	<u>1.3</u>	<u>100.0</u>
TOTALS	800	100.0	100.0

factors "costs" were identified as candidates for separate area categories. However, since labor "management" did not meet the area category criteria of being at least five percent of the aggregate cases but only contributed 2.1 percent to the total, this area specific was placed back into the labor category. This reasoning is consistent with the earlier established research methodology. The final frequency distribution of the area categories is shown in Table 7 on page 55.

The final step in categorizing the remaining area specifics and identifying the factors of profit was simply to investigate the relative frequencies of the area

Table 7  
Area Category Final Relative and Cumulative  
Frequency Distributions

AREA CATEGORY	CASE FREQUENCY	RELATIVE FREQUENCY (PERCENT)	CUMULATIVE FREQUENCY (PERCENT)
Labor	63	7.9	7.9
Capital	140	17.5	25.4
Capital Fixed Assets	58	7.3	32.7
Risks	100	12.5	45.2
Costs (including overrun and underrun)	116	14.5	59.7
Special Factors	313	39.0	98.7
Miscellaneous	<u>10</u>	<u>1.3</u>	<u>100.0</u>
TOTALS	800	100.0	100.0

specifics. Any area specific that was insignificant--did not meet the five percent criteria--was grouped into other related area specifics or into the "no specifics" classification. In the labor area category "engineering," "manufacturing" and "technical skills" were grouped into an area specific entitled "direct labor" while "output per man" and "others" were grouped into the "no specifics" classification. The area specifics of "quick assets," "debt capital," "equity capital," "total capital turnover," "other assets" and "others" were grouped into "no specifics" under the capital area category. The area specific "fixed assets" was reclassified as an area category by passing the five percent significance test. Within the area category "risk," the area

specific "other" was grouped with "no specifics," and area specific "inventory" was eliminated since there were no cases coded for that classification. Within the area category special factors the insignificant categories of "taxes," "capital per man," "quality," "overhead (general)," "legal and contractual constraints," "interest payments," "cost-type contracts," "depreciation," "R&D work" and "production/manufacturing work" were regrouped into the area category "miscellaneous" since there was no classification for "no specifics" in the special factors area category and these area specifics are still considered a part of the aggregate factors. The area specific "costs (including overrun and underrun)" met the significance criteria and was reclassified as an area category. Table 8 on page 57 shows the list of factors that influence profit and associated frequency distributions with Table 9 showing the relative frequencies by area category.

No statistical tests, parametric or nonparametric, appear to be relevant in analyzing the data collected; therefore, a rigorous central tendency analysis follows to support the grouping of the area categories and specifics within the criteria established in Chapter 2.

Each case has an associated strength and valence which identified the relative weighting of each initial profit factor. An analysis of each area specific within area categories and area categories within the aggregate of cases was made to determine the relative importance of

Table 8  
Factors Determined to Influence Profit

AREA CATEGORY	AREA SPECIFIC	CASE FREQUENCY	RELATIVE FREQUENCY (PERCENT)	CUMULATIVE FREQUENCY (PERCENT)
Labor	No specifics	18	28.6	28.6
	Direct labor	19	30.2	58.8
	Management	17	26.9	85.7
	Overhead	<u>9</u>	<u>14.3</u>	<u>100.0</u>
	TOTALS	63	100.0	100.0
Capital	No specifics	46	32.9	32.9
	Inventory	14	10.0	42.9
	Return on capital invested (ROI)	44	31.4	74.3
	Operating capital	28	20.0	94.3
	Net book value	<u>8</u>	<u>5.7</u>	<u>100.0</u>
	TOTALS	140	100.0	100.0
Capital Fixed Assets		<u>58</u>	<u>100.0</u>	<u>100.0</u>
	TOTALS	58	100.0	100.0
Risk	No specifics	54	54.0	54.0
	Fixed-price contracts	8	8.0	62.0
	Cost contracts	5	5.0	67.0
	Type contract (general)	6	6.0	73.0
	Technological	8	8.0	81.0
	Financial	<u>19</u>	<u>19.0</u>	<u>100.0</u>
	TOTALS	100	100.0	100.0
	Special Factors	Renegotiation	23	9.1
Performance		55	21.7	30.8
Type of contract		31	12.2	43.0
Volume of produc- tion or sales		27	10.7	53.7
Fixed-price con- tracts		19	7.5	61.2
Profit policy (Government)		30	11.9	73.1
Profit policy (Contractor)		26	10.3	83.4

Continued

Table 8 (Continued)

AREA CATEGORY	AREA SPECIFIC	CASE FREQUENCY	RELATIVE FREQUENCY (PERCENT)	CUMULATIVE FREQUENCY (PERCENT)
Special Factors (Cont)	Termination	20	7.9	91.3
	Market Struc- ture	<u>22</u>	<u>8.7</u>	<u>100.0</u>
	TOTALS	253	100.0	100.0
Costs (in- cluding overruns and underruns)	TOTALS	<u>116</u>	<u>100.0</u>	<u>100.0</u>
		116	100.0	100.0
Miscellaneous	TOTALS	<u>70</u>	<u>100.0</u>	<u>100.0</u>
		<u>70</u>	<u>100.0</u>	<u>100.0</u>
GRAND TOTALS		800	100.0	100.0

Table 9

Category Relative and Cumulative Frequency  
Distribution of Factors Determined to  
Influence Profit

AREA CATEGORY	CASE FREQUENCY	RELATIVE FREQUENCY (PERCENT)	CUMULATIVE FREQUENCY (PERCENT)
Labor	63	7.9	7.9
Capital	140	17.5	25.4
Capital Fixed Assets	58	7.3	32.7
Risk	100	12.5	45.2
Special Factors	253	31.6	76.8
Costs (including over- runs and underruns)	116	14.5	91.3
Miscellaneous	<u>70</u>	<u>8.7</u>	<u>100.0</u>
TOTALS	800	100.0	100.0

each initial factor. For example, area specific "labor management" had a total of 17 cases composed of 13 cases under strength indicator weak with a value of two (2), four cases under strength indicator strong with a value of three (3) and no cases under strength indicator no strength with a value of one (1). These cases are also associated with the valence of positive one (+1), zero ( $\emptyset$ ) and negative one (-1).<sup>5</sup> Further analysis was conducted to investigate the direction of profit influence by associating the strength times the valence with the area categories and area specifics to determine the dispersion or variability of central tendencies of the area categories and specifics. Using numerical as well as subjective analysis in grouping area specifics within and to other area categories, i.e., an area specific under an area category may logically, through such analysis as this, be grouped with another area category. For example, area category risk with a weighted mean of 0.580 and area specific "type of contract" under area category "special factors" with a weighted mean of 0.323 are closely related analytically since the range of weighted means are from -2.714 to 3.000 and subjectively since type of contract is closely aligned to the risk of the procurement.<sup>6</sup> This superficial analysis is significant only if the second order information concerning the central tendencies is credible.

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<sup>5</sup>See page 29.

<sup>6</sup>See page 34.

Therefore, Table 10 shows how the means were computed and the dispersion of the relative composition of the area categories and specifics.

Table 10  
Central Tendency Analysis

The computation for the weighted means of the area categories and specifics:

$$\bar{X} = \frac{\sum_{i=1}^5 (VxS)_i x f_i}{N}, \text{ where}$$

$\bar{X}$  = the weighted mean of the area category or specific

V = the valence (+1, 0, -1) of the case

S = the strength (1, 2, 3) of the case

$(VxS)_i$  = the relative strength of the case on the continuum -3, -2, -1, 0, 1, 2, 3 (NOTE: there were no cases with -1 or 1)

$f_i$  = the frequency of the relative strengths

N = the total number of cases for each area category or specific

$\sum_{j=1}^m \sum_{i=1}^5 f_{ij}$ , where m is the number of area specifics within each area category

i = the column position

j = the row position

Continued

Table 10 (Continued)

AREA CATEGORY	AREA SPECIFIC	$(V \times S)_i$					$\bar{X}$
		-3	-2	0	2	3	
Labor	No specific		1	11		1	0.077
	Management	1		7	7	2	1.000
	Output/man			2		1	1.000
	Overhead			5	1	3	1.222
	Manufacturing			1		1	1.500
	Engineering			4	1	6	1.818
	Tech. skills			2	1	3	1.833
	Other					2	3.000
	TOTAL		1	1	32	10	19
Capital	Capital Turnover	1		2			-1.000
	Debt capital		1	3			-0.500
	Net book value		1	7			-0.250
	Other assets			2			0.0
	Operating capital	2		24		2	0.0
	Inventory			14			0.0
	ROI		2	38	2	2	0.136
	No specifics	1	2	15		9	0.741
	Equity capital			4	1	1	0.833
	Other			1	1		1.000
	Quick assets					2	3.000
	TOTAL		4	6	110	4	16
Risk	Other	1		1			-1.500
	Cost contracts		1	4			-0.400
	No specifics	3	2	35	5	7	0.346
	Type contract (General)			5		1	0.500
	Technological	1	1	2	2	2	0.625

Continued

Table 10 (Continued)

AREA CATEGORY	AREA SPECIFIC	$(V_{xS})_i$					$\bar{x}$	
		-3	-2	0	2	3		
Risk (Cont)	Financial		1	9	7	2	0.947	
	Fixed-price Contracts			1	2	5	2.375	
	TOTAL	5	5	57	16	17	0.580	
Capital Fixed Assets		4	17	26	9	2	-0.379	
	TOTAL	4	17	26	9	2	-0.379	
Miscellaneous		1	1	3	4	1	0.600	
	TOTAL	1	1	3	4	1	0.600	
Costs		6	8	80	11	11	0.181	
	TOTAL	6	8	80	11	11	0.181	
Special Factors	Taxes	5	2				-2.714	
	Legal & con- tractual con- straints	4	3			1	-1.875	
	*Termination	9	4	7			-1.750	
	*Renegotiation	9	2	11		1	-1.217	
	Interest pymts.	1	2	3			-1.167	
	Cost contracts	5		1		2	-1.125	
	*Profit policy (contractor)	8		12	3	3	-0.346	
	*Market struc- ture	5	1	12	1	3	-0.273	
	R&D work	1	1	2	2		-0.167	
	Quality			2			0.0	
	Overhead (general)			9			0.0	
	*FP contract	3	7		3	6	0.053	
	*Type contract	2	1	21	3	4	0.323	
	Production/Mfg. work			1	2	1	1	0.600
	*Profit policy (Government)	2	3	11	8	6	0.733	

Continued

Table 10 (Continued)

AREA CATEGORY	AREA SPECIFIC	$(V \times S)_i$					$\bar{X}$
		-3	-2	0	2	3	
Special Factors (Cont)	*Performance	6		26	6	17	0.818
	*Vol. of prod. or sales	3	1	9	5	9	0.963
	Depreciation		1	3	1	3	1.125
	Capital/man				1		2.000
Labor		1	1	32	10	19	1.143
Risk		5	5	57	16	17	0.580
Capital		4	6	110	4	16	0.229
Costs		6	8	80	11	11	0.181
Capital Fixed Assets		4	17	26	9	2	-0.379

\*NOTE: Indicates those area specifics that meet the significant criteria under the area category of special factors.<sup>7</sup>

The comparability of the area specifics with the labor area category are indicative of the overall weighted mean, i.e., the variability of each specific is not unlike the variability or dispersion of the weighted mean of the area category, specifically area specifics "manufacturing," "technical skills" and "engineering" are clustered very much in the same manner that empirically provides a natural grouping into one classification.

The area category capital shows strong clustering about zero which indicates the cases were mainly undecided about the particular influence of capital on profit except that the area specifics "return on capital invested,"

<sup>7</sup>See page 40.

"equity capital," "no specifics" and "quick assets" tend to cause the aggregate weighted mean to lean to the positive side of zero.

The area category risk has a positive tendency with a little better than a three-to-one ratio accounting for 45 percent of the cases where 55 percent were neutral. Area specifics "fixed-price contracts," "technological" and "financial" are clustered on the positive side where "cost-type contracts" and "other" are negative but insignificant as far as accounting for only seven percent of the total cases under risk. The "no specifics" subcategory accounts for 52 percent of the total cases under risk and has a positive weighted mean with a two-to-one ratio (positive cases to negative cases) while 67 percent of the cases in this area subcategory remain neutral.

The newly created area category of capital fixed assets shows the sample literature is relatively undecided about this area specific's influence on profit since the majority (55 percent) tends to be slightly negative.

Under area category special factors, the area specifics "renegotiation" and "termination" (see Table 10) are the only definitive subcategories showing a negative influence on profit. Also, "profit policy (contractor)" and "market structure" have similar dispersions and weighted means. The subcategories of "type of contract," "profit policy (Government)," "performance" and "volume of production or sales" are similarly dispersed with their weighted means

being comparable and relatively close with a positive tendency. The area specific "fixed-price contracts" is interesting in that the dispersion shows definitely there is disagreement as to the effect of this determinant on profit; the standoff settles on neutrality.

Table 10 also displays the area categories' weighted means and dispersion (except "miscellaneous" and "special factors" for obvious reasons) to give an indication of the aggregate variability of the cases within the major categories. The labor category is clearly considered an increasing influence on profit. The other four major categories are not so obvious since there is a wide dispersion. The weighted means of "capital," "costs" and capital "fixed assets" tend to be relatively close to zero while "risk" is mid-range when comparing the weighted averages.

Table 11 shows the number of cases for each strength classification, the relative strength of each area specific, frequency distributions of area specifics and the aggregates. For example, under area category "labor" area specific "engineering" has 11 cases broken out into three cases with a strength of two and eight cases with a strength of three for a total relative strength of 30 which is 19.0 percent of the area category labor which composes 8.0 percent of the total. This analysis in conjunction with the previous analyses is the basis for selection of the primary factors that influence profit for the proposed Government profit objective model.

Table 11  
Strength Relationship

AREA CATEGORY	AREA SPECIFIC	STRENGTH FREQUENCY			RELATIVE STRENGTH	RELATIVE FREQUENCY (PERCENT)	CUMULATIVE FREQUENCY (PERCENT)	
		1	2	3				
Labor	No specif- ics	9	4	30	19.0	19.0		
	Engineer- ing	3	8	30	19.0	38.0		
	Manufac- turing		2	6	3.8	41.8		
	Management	13	4	38	24.1	65.9		
	Overhead	4	5	23	14.6	80.5		
	Tech skills	2	4	16	10.0	90.5		
	Output/man		3	9	5.7	96.2		
	Other		2	6	3.8	100.0		
*TOTALS		0	31	32	158	8.0	8.0	
Capital	No specif- ics	10	17	71	21.0	21.0		
	Quick assts		2	6	1.8	22.8		
	Inventory	9	5	33	9.8	32.6		
	Debt captl.	2	2	10	3.0	35.6		
	Equity capital	2	4	16	4.7	40.3		
	ROI	29	15	103	30.5	70.8		
	Operating Capital	19	9	65	19.2	90.0		
	Net book value	7	1	17	5.0	95.0		
	Capital turnover	1	2	8	2.4	97.4		
	Other Assts	2		4	1.2	98.6		
	Other	1	1	5	1.4	100.0		
	TOTALS		0	82	58	338	17.2	25.2

Continued

Table 11 (Continued)

AREA CATEGORY	AREA SPECIFIC	STRENGTH FREQUENCY			RELATIVE STRENGTH	RELATIVE FREQUENCY (PERCENT)	CUMULATIVE FREQUENCY (PERCENT)	
		1	2	3				
Risk	No specif- ics	1	36	15	118	50.2	50.2	
	FP con- tracts		3	5	21	8.9	59.1	
	Cost con- tracts		2	3	13	5.5	64.6	
	Type con- tract (general)		4	2	14	6.0	70.6	
	Technolog- ical		3	5	21	8.9	79.5	
	Financial		15	4	42	17.9	97.4	
	Other				2	6	2.6	100.0
	TOTALS		1	63	36	235	11.9	37.1
Capital Fixed Assets			46	12	128	100.0	100.0	
TOTALS			46	12	128	6.5	43.6	
Costs			60	56	288	100.0	100.0	
TOTALS			60	56	288	14.6	58.2	
Special Factors	Taxes		2	5	19	2.4	2.4	
	Capital/ man		1		2	0.3	2.7	
	Renegotia- tion		8	15	61	7.6	10.3	
	Quality		2		4	0.5	10.8	
	Performance		18	37	147	18.4	29.2	
	Type con- tract	1	15	15	76	9.5	38.7	
	Overhead (general)		6	3	21	2.6	41.3	
	Vol. of prod. or sales		12	15	69	8.6	49.9	

Continued

Table 11 (Continued)

AREA CATEGORY	AREA SPECIFIC	STRENGTH FREQUENCY			RELATIVE STRENGTH	RELATIVE FREQUENCY (PERCENT)	CUMULATIVE FREQUENCY (PERCENT)		
		1	2	3					
Special Factors (Cont)	Legal & contractual constraints	3	5		21	2.6	52.5		
	Interest payments	4	2		14	1.8	54.3		
	Cost con- tracts	1	7		23	2.9	57.2		
	FP con- tracts	10	9		47	5.9	63.1		
	Profit policy (Gov't)	15	15		75	9.4	72.5		
	Profit policy (Contra- ctor)	10	16		68	8.5	81.0		
	Termination 1	7	12		51	6.4	87.4		
	Deprecia- tion	5	3		19	2.4	89.8		
	R&D work	5	1		13	1.6	91.4		
	Production/ Mfg. work	4	1		11	1.4	92.8		
	Market structure	9	13		57	7.2	100.0		
	TOTALS		2 137	174		798	40.6	98.8	
	Miscel- laneous					8	2	22	100.0
TOTALS					8	2	22	1.2	100.0
GRAND TOTAL		3 427	370		1967		100.0		100.0

\*NOTE: The totals are relative to the entire data base.

In analyzing the various frequency distributions, the central tendencies and the strength relationships of the

cases, several findings were made. Also the sources and level of the data contributed to significant findings.

### Findings

The data gathered in accordance with the sampling plan outlined in Appendix E reflected a preponderance of cases from the Government sources which comprised 85.9 percent of the total. The commercial sources did not provide as much information nor deal with Government profit in depth. Most of the articles were one or two pages long while the Government sources usually dealt at length with the subject for some 150 to 200 pages. This finding is significant considering the factors identified to develop a new profit model came from predominantly Government data sources.

In the initial data analysis the miscellaneous area category had 127 cases. However, due to similarities of the attributes 117 of these cases were classified into nine more area specifics under area category special factors as shown in Table 3, page 48. These attributes were easily grouped since the differences among them were only semantic in nature and not mutually exclusive factors as in the case with the area categories. However, once these new factors had been classified they represented area specifics as developed in the content analysis model.<sup>8</sup>

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<sup>8</sup>See page 24.

In the initial analysis of the frequency distributions, two a priori developed area categories of subcontracts and Government support did not meet the criteria test (established in Chapter 2) of composing at least five percent of the total cases.<sup>9</sup> In keeping with the criteria test these area categories were classified as insignificant and were not considered in developing the new profit objective model. Since the area categories were mutually exclusive, they could not be grouped into the area category of miscellaneous which provides no distinguishing factors for the new model development. Also under area category risk, the area specific "inventory" did not meet the significance criteria established for the content analysis model and was therefore eliminated. The elimination of these factors is discussed further in the corollary findings section of Chapter 5.

In contrast, two area specifics--capital "fixed assets" and special factors "cost (including overrun and underrun)"--passed the 25 percent criteria test for area specifics and the five percent test for area categories and were designated as additional area categories.<sup>10</sup> These findings give credibility to the content analysis model and the criteria test in their ability to identify primary factors of profit since the cost basis of profits have been

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<sup>9</sup>See Table 2 on page 47.

<sup>10</sup>See Table 6 on page 54.

discussed widely in the literature reviewed and some form of fixed assets consideration in profit objectives has been recommended frequently.

The final grouping of the area specifics within area categories and the central tendency analysis determined the factors that influence profit (see Tables 8, 9 and 10). These factors were derived from the pilot study, the actual data gathering using the content analysis model, initial analysis, the frequency distribution analysis in conjunction with the criteria test, the central tendency analysis and most important the strength relationship analysis.<sup>11</sup>

The strength relationships shown in Table 11 have the greatest potential to identify significant factors of profit since the semantic differential portion of the content analysis model set apart the factors which the literature has determined to influence profit the most. The primary finding from Table 11 is that the area category of capital has the strongest influence on profit with 17.2 percent of the strength weightings while costs was second with 14.6 percent of the strength weightings; the remaining rankings were risk with 11.9 percent, labor with 8.0 percent and capital fixed assets with 6.5 percent. Also, the central tendency analysis for capital "fixed assets" shows a dispersion that tends to give credibility to the arguments set forth in Chapter 1 that the present Government profit model does not attend the

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<sup>11</sup>See Figure 2 on page 74.

needs of a contractor's invested capital or fixed capital (i.e., land, equipment and facilities). Likewise, using this same analysis technique for the special factors "profit policy (contractor)" and "market structure," the dispersion and weighted means are similar (see Table 10) and may indicate a relationship between a contractor's profit gaming strategy and the idiosyncrasies of the defense market.

Before any conclusions can be made about the data analysis and findings, the limitations must be considered.

#### Limitations

There are, of course, many limiting factors associated with any research data analysis section; the most significant limitations in this research effort are listed below.

1. Of the data collected, 85.9 percent came from Government sources.
2. The data collected through the content analysis technique was predominantly sophisticated nominal data, i.e., the strength and valence combination only allowed the nominal data to be put on a continuum from minus three (-3) to plus three (+3). However, the strength relationships gave ordinal level data (i.e., the factors can be ranked) with interval characteristics which allowed weighted rankings.
3. The data was discrete as opposed to continuous thus limiting the use of many statistical tests.

4. The data collected did not support two major categories of the content analysis model (i.e., subcontracts and Government support).

5. Subjective interpretation of the frequency distributions, central tendency analysis and strength relationships were required to group the primary factors that influence profit.

### Conclusions

Research question number one was answered. The data analysis and findings identified the significant factors which affect defense contractors' profit as displayed in Table 8 and Figure 2. These factors are again analyzed in Chapter 4 in consonance with the analysis of the strength relationships to develop the new profit objective model.

<u>MAJOR CATEGORY</u>	<u>SUBCATEGORY</u>
Labor	Direct Labor Management Overhead
Capital	Inventory ROI Operating Capital Net Book Value
Capital Fixed Assets	
Risk	Fixed-Price Contracts Cost Contracts Type Contract (general) Technological Financial
Costs (including overrun and underrun)	
Special Factors	Renegotiation Performance Type of Contract Volume of Production or Sales Fixed-Price Contracts Profit Policy (Government) Profit Policy (Contractor) Termination Market Structure

Figure 2. Fundamental Factors That Affect Profit

## Chapter 4

### THE NEW MODEL DEVELOPMENT

#### Overview

The purpose of this chapter is to investigate the second research question. The significant factors determining profit are described in the preceding chapter. In answering the second research question the significant factors established in the data analysis are used in developing a new profit objective model. The factors and weightings used in the new model are described and explained, and a rationale for incorporation of the factors is provided.

#### Assumptions

In developing the new profit objective model the following assumptions were made:

1. The major factors of production, labor and capital, were necessary elements.
2. A model less dependent on costs was desirable.
3. A model developed on the strength ratings of the significant profit factors determined in the data analysis was the most logical approach. The content analysis not only determined the frequency with which various profit factors were mentioned but also measured the strength of the relationship between the factor and profit. The sum of the

strength rating for each factor was then used to establish the relative importance among the various factors.

4. The standard for adequacy--the prime rate--is readily available from the Federal Reserve Bulletin, and represents the minimum rate of return for investment decisions (18:201).

5. Inputs for the model are readily available from existing contractor accounting systems.

6. Government forms developed for the "Capital Employed Method," DPC 74-1, can be used by contractors to submit data in a usable format.

7. The new profit objective model will be applicable to contracts which require contractor cost data (i.e., contracts \$100,000 and over).

8. The frequency times strength of the various area specifics and aggregates for the area categories provides data with interval characteristics. For the purpose of developing weightings to be used on the new model the factor strengths were aggregated and divided to provide relative weightings. In so doing, each factor in the new model has a relative weighting that maintains the strength ratings developed by the content analysis model.

#### The Model

The new model is essentially a return on investment model which incorporates a methodology for capitalizing labor resources. The model is based on providing a fair return on the contractor resources employed in Government

contracting. The model is dependent on costs to the extent of the labor capitalizations. The standard selected to represent an "adequate" return was the average prime interest rate for the previous six months. The prime rate was selected because this rate is recognized in the business world as the minimum return necessary to allow a business access to the capital markets (18:196-7). To have access to these capital markets the profits must be "net profits" and for this reason, the profits calculated are adjusted for the current tax rate.

The model established a capital base from the labor and capital categories analyzed as significant in the data analysis. In terms of weighting based on strength rating, the factors of capital were three times stronger than the factors of labor and this relative weighting was maintained in development of the model. In the content analysis model both "return on investment" (ROI) and "net book value" were coded whenever they were used in the literature as having a direct effect on profit. For purposes of the new profit model, these terms were considered synonymous, and ROI was considered as return on total capital invested (TCI). The other significant factors established by the data analysis under the capital area category (i.e., "inventory," "operating capital" and "fixed assets") were incorporated as capital factors in the capital base structure. It might be noted from the data analysis that "fixed assets" met the criteria for a separate category, but in building the model

it represented a natural part of TCI and for this reason "fixed assets" was grouped with the other capital factors under the title "facilities capital." "Facilities capital" was identified in the model as land, buildings and equipment.

The other part of the capital base involves the factors of "direct labor," "management" and "overhead." The "engineering," "manufacturing" and "technical skills" were grouped together to form the direct labor pool. Although "technical skills" was a significant subcategory and "engineering" and "manufacturing" labor were not, the term "technical skills" was encountered in a general context where it could apply to either "engineering" or "manufacturing" labor. To create a simple model and circumvent this definitional problem the subcategory of "direct labor" was established to cover all labor categories. The other significant subcategories of "management" and "overhead" were incorporated as labor factors in the capital base.

## PROFIT MODEL

A. LABOR CAPITAL FACTORS	COST	WEIGHT	ADJUSTED CAPITAL BASE
1. Direct labor	_____	X .57	_____
2. Management	_____	X .43	_____
3. Overhead	_____	X .24	_____
B. OTHER CAPITAL FACTORS			
4. Inventory/purchased parts	_____	X .52	_____
5. Operating capital requirements	_____	X 1.0	_____
6. Facilities capital			
a. Land	_____		
b. Buildings	_____		
c. Equipment	_____		
Total Facilities Capital	_____	X 2.0	_____
Total Adjusted Capital Base			_____
Adjustments to average prime rate			
Risk	-2.4% to + 2.4%		_____
Performance	-1.0% to + 1.0%		_____
Net adjustments to prime rate			_____

Average Prime Rate + Net Adjustments = Adjusted Profit Rate

$$\frac{(\text{Total Adjusted Capital Base})(\text{Adjusted Profit Rate})}{(1 - \text{Tax Rate})} = \text{Target Profit}$$

Explanation of the Model

The model is designed to provide a contractor doing business with the Government a "fair" or "adequate" return on his investment. In order to determine adequacy of profits, a standard must be developed by which the profit objectives can be measured. To receive the adequate profit, a contractor must meet certain minimum criteria. This model will use the average prime rate for the six-month period

prior to negotiations as the profit standard for reasons described earlier.<sup>1</sup> The prime rate data will be obtained from the most current Federal Reserve Bulletin. The criteria for determining award of the average prime rate are incorporated into the "risk" and "performance" adjustment factors. The adjustment factors act as standards against which decisions are made concerning the application of the prime rate.

The investment base for this model consists of "labor" and "other" capital factors. The factors included in the model represent significant categories established in the data analysis. Not all significant categories were incorporated into the model and this fact is discussed later in the chapter.

The weightings, established for the various factors of capital, were derived from the relative importance calculated in the data analysis and Government objectives in contractor motivation. The six weighted factors of capital were first analyzed to determine the relative strength among themselves within their area category based on the strength relationships. For example, in the labor category, "direct labor," "management" and "overhead" had strength ratings of 52, 38, and 23 respectively (see Table 12). The relative strength of these ratings to each other was 46 percent, 33.6 percent and 20.4 percent respectively. The total

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<sup>1</sup>See page 76.

Table 12  
Consolidated Strength Relationships

AREA CATEGORY	AREA SPECIFIC	STRENGTH
Labor	Direct Labor	52
	Management	38
	Overhead	23
	Other	<u>45</u>
	TOTALS	158
Capital	Inventory	33
	Operating Capital	65
	Fixed Assets	128
	Other	<u>240</u>
	TOTALS	466
Risk	Type Contract	171
	Financial	42
	Technological	21
	Other	<u>123</u>
	TOTALS	357
Performance		<u>147</u>
AGGREGATE TOTAL		1128

strength rating for all labor cases was 158. The relative strength of the three labor factors was applied to the total labor strength base (158) to provide an adjusted weighted strength rating for each factor "direct labor," "management" and "overhead." Similar calculations were performed on "other capital factors" (see Table 13). All of the six adjusted weighted strength factors were summed and each factor was divided by the sum to determine the overall relative strengths as follows:

Table 13

## Adjusted Strength Relationships of Model Factors

AREA CATEGORY	MODEL FACTOR	RELATIVE FREQUENCY	X CATEGORY BASE	= ADJUSTED STRENGTH WEIGHTING
Labor	Direct Labor	46 %	158	73
	Management	33.6%	158	53
	Overhead	20.4%	158	32
Capital	Inventory	14.6%	466	68
	Operating Cap.	28.8%	466	134
	Fixed Assets	56.6%	466	264

## Adjusted Strength Relationships of Model Adjustment Factors

ADJUSTMENT FACTOR		RELATIVE FREQUENCY	X CATEGORY BASE	= ADJUSTED STRENGTH WEIGHTING
Risk	Type of			
	Contract	73%	357	261
	Financial	18%	357	64
	Technological	9%	357	32
Performance	(No Subcate- gory)	100%	147	147

Direct Labor	12%
Management	9%
Overhead	5%
Inventory	11%
Operating Capital	21%
Facilities Capital	42%

From the above grouping, "operating capital," was selected as the standard for receiving a 1.0 rating. This factor was selected because it represents the funds and current assets to carry on the business and in the short run is composed of large amounts of borrowed capital (18:784-8). The Government does not encourage use of borrowed funds as

evidenced by the disallowance of interest expense and, therefore, no premium was placed on this factor. Weightings for the other factors were computed relative to "operating capital" and are evidenced in the model (see Table 14).

Table 14  
Relative Strength Relationships of Capital Factors

CAPITAL FACTORS	ADJUSTED STRENGTH WEIGHTINGS	RELATIVE STRENGTH	WEIGHTING
Direct Labor	73	12% ÷ 21%	.57
Management	53	9% ÷ 21%	.43
Overhead	32	5% ÷ 21%	.24
Inventory	68	11% ÷ 21%	.52
*Operating Capital	134	21% ÷ 21%	1.00
Facilities Capital	264	42% ÷ 21%	2.00

\*STANDARD--All other factors weighted relative to the standard.

The sum of risk and performance at their extreme adjustment levels can cause a variation of  $\pm 3.4$  percent to the average prime rate. When the strength ratings of capital, risk and performance are summed the total is 1128. Risk and performance represent 45 percent of this total. The variation of  $\pm 3.4$  percent should represent approximately 40 to 50 percent of the average prime rate. An investigation of prime rates by month from January 1971 through May 1976, a period of 65 months, indicated an overall average prime rate of 7.44 percent. A variance of 3.4 percent from the average represents 45 percent of the rate. For this

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A DETERMINATION OF THE PRIMARY FACTORS AFFECTING DEFENSE CONTRA--ETC(U)  
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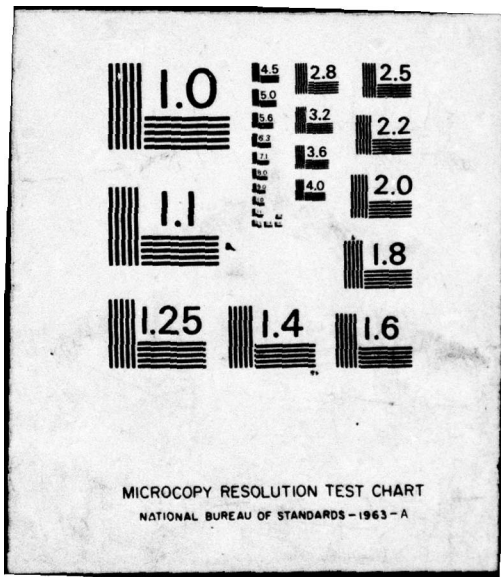
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reason the total effect of risk and performance was established at 3.4 percent. Risk factors and performance factors had a total strength rating of 504. The relative strength of risk factors to performance factors was 2.4:1 (357/147, see Table 12). This relationship was maintained in the adjustment factors. Within the risk factors, type of contract, financial, and technological represented 73 percent, 18 percent and 9 percent respectively (see Table 13). These relationships were maintained in the weighting factors assigned. The rates on risk and performance could have been tied to the average prime rate on a percentage basis but this would complicate the model unnecessarily.

In the present WGL model, direct labor factors engineering and manufacturing are weighted at 12 percent and 7.5 percent respectively with an average rating. Overhead for these two factors are weighted at 7.5 percent and 5.5 percent respectively. Management labor is not specifically identified and, of course, no capital factors are included. Each factor of cost is given a weighting, and these weightings are summed and divided by the total cost base. The contractor's greatest prospect for profit lies in high labor costs (see Appendix A). The average for CITP is approximately seven percent as determined by the "Profit 76" studies. The average cost risk and performance factors are 3.5 percent and .89 percent respectively (7). The relationship of the CITP, cost risk and performance factors to each other as a percent is 61 percent, 30 percent and

eight percent respectively. Selected Factors and Special Profit Considerations make up another one percent of the WGL total.

In the new profit objective model, elements of cost (direct labor, management and overhead) account for only 26 percent of the capital base.<sup>2</sup> Capital factors (inventory, operating capital and facilities capital) make up 74 percent of the capital base. The factors "risk" and "performance" can have a maximum influence of 32 percent and 13 percent respectively. In the new model, however, "risk" and "performance" are used as standards for determining adjustments to the prime rate. If adequate risk is assumed and past performance is satisfactory, these factors have no effect on the prime rate applied to the profit objective.

In analyzing the data from the content analysis the special factors area category was expanded from 11 subcategories to 20. Of the twenty subcategories, nine were evaluated as significant according to the established criteria. Each of the nine significant subcategories was evaluated for possible inclusion in a practical model with the following results:

1. Renegotiation--was considered too broad an area with many factors influencing the need for renegotiation. These influencing factors are determined after contract completion and, therefore, provide little help in establishing

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<sup>2</sup>See page 82.

profit objectives. This factor was not considered practicable for inclusion in the model.

2. Performance--was incorporated into the model as an adjustment factor to the average prime rate.

3. Volume of Production/Sales--there was no apparent application for this factor in the model.

4. Profit Policy (Government)--this factor represented Government policy changes and their effect on profit. These changes may be initiated by the executive or legislative branches of the Government. The changes are unpredictable and generally outside the control of the procuring agency or the contract and, therefore, this factor was not used.

5. Profit Policy (Contractor)--this factor included certain contractor motivations such as company growth, firm perpetuation, sales maximization, socio/political goals which tend to override profit maximization in certain short-run situations. Since these factors are invoked by business managers in light of the specific business environments, the Government is not in a position to know or incorporate such motivations into a profit objective model. Therefore, this factor was not used.

6. Termination--another factor that is unpredictable and subject to a myriad of political, economic and technical considerations. This factor was not considered practicable for incorporation into the model.

7. Market Structure--was a factor that referred to several different structures and the effect on resulting

profits. Many contractors operate simultaneously in different market structures. Additionally, the problem of identifying the specific boundaries between different market structures, if possible, would be a complex and uncomprehensible task for most procurement personnel. For these reasons the topic was considered too diffused for inclusion into the model.

8. Type of Contract/Fixed Price--this factor was mentioned, without reference to risk, frequently enough to result in a significant subcategory. Since the only treatment of contract type was established under risk it was considered logical to incorporate this factor with the fixed-price risk factor, and this was accomplished.

9. Type of Contract/General--as in Number 8 above, this factor was incorporated with the type of contract (general) under risk.

10. Costs--this factor was identified as having major category significance. It was not unexpected that this factor was identified as affecting profit since cost was discussed earlier in this research as a major criticism of the present profit policy. Since one of the objectives of the research was to develop a profit model less dependent on cost, this factor was not directly incorporated into the model.

Application of the Model

The Government objective for total direct labor cost shall be used in Item 1.<sup>3</sup> The individual mix of labor skills need not be specifically discussed or negotiated. The total number of hours within the labor mix need not be specifically agreed upon. The cost used for Item 1 will simply reflect the agreed upon lump sum cost for the expected direct labor effort.

The management cost (Item 2) shall include all identified direct charging management costs and the appropriate amount of allocated indirect management to be determined through Administrative Contracting Officer (ACO) review, Defense Contract Audit Agency (DCAA) review, and negotiation.

The overhead cost (Item 3) shall include the appropriate allocated charges, excluding all management personnel, to be determined by the ACO, DCAA and negotiation.

The inventory requirements for the contract shall be extracted from the DD Form 1858 or DD Form 1859. The forms were developed for the capital employed method and are incorporated and described in DPC 74-1.

The procedures developed in the Capital Employed Method, DPC 74-1, for reporting and estimating elements of capital are extracted for use in this model where

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<sup>3</sup>See page 79.

appropriate. The following paragraphs describe the operating capital and fixed assets factors of the model.

The amount entered under operating capital (Item 5) shall include the net current assets necessary for financing the performance of Federal Government contracts, less those assets identified for inventory and purchased parts.

. . . The Operating Capital estimate for a proposed contract action shall be derived from the historical accounting data of a Profit Center unless one of the following conditions exist:

- (i) the Profit Center has no negotiated contract experience for the last completed contractor fiscal year, for the contract type (either cost type or fixed price type) to be used; or
- (ii) the average annual estimated cost of the contract is greater than 50% of the Profit Center's annual cost incurred for that contract type (cost or fixed price) in the last completed fiscal year; or
- (iii) the Profit Center was during the last completed fiscal year, transferred from one DoD component to another for contract administration cognizance and/or payment action.

When any of the above conditions exists, the contractor shall be required to project operating capital requirements.

a. Historical Data Method.

1. DD Form 1858 "Profit Center Historical Operating Capital" shall be utilized by contractors to report the required account average balances recorded in the Profit Center's historical accounting records separately for cost type and fixed price type contracts for both prime and subcontract Federal Government business. This financial data shall include transactions attributable to all Government subcontracts being performed by the Profit Center.

2. Section I of DD Form 1858 will normally be completed by a contractor annually, within 60 days following the close of the contractor's last completed fiscal year, and shall be used by all DoD procurement activities to estimate operating capital requirements for the entire performance period of a contemplated contract action. Section II of DD [Form] 1858 shall be completed by the Contracting Officer using his own cost objectives at the time of the pre-negotiation profit evaluation. For

definitization of a letter contract, the latest complete contractor fiscal year available at the time the definitive contract is negotiated shall be used to estimate the Operating Capital requirements for the entire performance period of the contract.

3. Annual costs incurred are to be reported separately for cost and fixed price type contracts. Annual costs incurred are the total costs allowed or allowable under ASPR Section XV, Part 2.

4. All Federal Government work shall be included in calculating the amounts reported on DD Form 1858.

b. Projected Method. When it is necessary that Operating Capital requirements be estimated on an individual contract projection basis . . . the contractor shall complete DD Form 1859 "Contract Average Operating Capital Projection" in lieu of DD Form 1858. This method estimates the Operating Capital requirements on the basis of the cost incurrence, delivery, and payment schedules anticipated for an individual contract action. Consequently, contract Operating Capital estimates on DD Form 1859 shall be consistent with other related proposal data for that contract and, to a large degree, should be a by-product of this data. Justification for using this alternative method of estimating a contract's Operating Capital requirements shall be furnished with the DD Form 1859 as part of the proposal package [28:10-11].

The section of DPC 74-1, Capital Employed Method, dealing with facilities capital, is with minor adjustments, completely adequate for use with the new model. The following is a replication of the DPC 74-1 Capital Employed Method, Facilities capital section, with the minor modifications incorporated:

[Facilities capital shall include] . . . land, buildings, machinery, equipment, vehicles, tools, patterns and dies, furniture and fixtures, and similar capitalized property having a physical or bodily substance. All reported Facilities Capital shall be classified into one of the categories as described below:

- (i) Land - Includes non-depreciable real estate and related non-depreciable improvements and property rights, including

land leasehold improvements that are subject to amortization.

- (ii) Buildings - Includes depreciable real estate and related depreciable improvements, including building leasehold improvements that are subject to amortization.
- (iii) Equipment - Includes all reported Facilities Capital other than that classified as Land or Buildings, including all improvements not included in (i) or (ii) above that are subject to amortization.

b. The estimate of Facilities Capital to be employed in the performance of a proposed contract action is derived from "Overall Profit Center" facilities capital data projected by the contractor.

c. DD Form 1860 "Profit Center Facilities Capital Projection" shall be used by the contractor to project estimated book values of fixed assets to be employed by a Profit Center in the conduct of all its business, including non-Federal Government work. A separate Form 1860 shall be prepared for each contractor fiscal year during which Government contract performance is anticipated. Regardless of whether a contractor submits operating capital data on DD Form 1858 or 1859, DD Form 1860 shall be used for Facilities Capital projections. Submission of Forms 1858 and 1860 will be initiated under the same circumstances as Forward Pricing Rate Agreements (see [ASPR] 3-807.12(b)), and will normally be submitted and evaluated as complementary documents and procedures. If this procedure is not applicable, submissions may be made annually or with individual contract pricing proposals, as agreed to by the contractor and the cognizant ACO.

d. Facilities Capital to be reported for this purpose shall include only those tangible fixed assets (i) used in the regular business activities of a Profit Center, (ii) not intended for sale, (iii) capitalized on the books in accordance with the contractor's accepted accounting system, and (iv) that, except for land, are subject to an allowable depreciation or amortization expense in accordance with the contractor's accepted accounting system. Leasehold improvements (as distinguished from the lessor's real or personal property) and ADP [Automated Data Processing] system software that meet the criteria of (i) through (iv) above shall be reported as Facilities Capital. All other recorded intangible fixed assets, either subject to amortization (e.g., patents, copyrights,

franchises), or not subject to amortization (e.g., goodwill, trademarks) shall not be reported as Facilities Capital.

e. Facilities Capital is the total net book values of: (i) all contractor-owned fixed assets recorded on the books of the Profit Center, (ii) all leased fixed assets, under control of the Profit Center, when constructive costs of ownership of such fixed assets have been allowed in lieu of rental costs, and (iii) an allocable share of general purpose assets of the nature of (i) and (ii) above which are held, or controlled by the corporation outside the Profit Center. Net book values reported for each year are after amortization and depreciation allowable under Section XV, Part 2, and are the average of the beginning and ending final year balances. The reported net book values of facilities available to a contractor for less than a full fiscal year's depreciation, or amortization should be reported on an annualized basis.

f. The projection of facilities (land, buildings, and equipment) book values and overhead allocation bases is an integral part of a contractor's overhead rate forecasting process. Therefore, projections of Facilities Capital data and allocation bases on DD Form 1860 shall be consistent with the data base used by a contractor for overhead rate forecasting. For example, net book values of fixed assets reported on DD Form 1860 shall be the same values that generate related depreciation expenses in projected overhead pools, and the Facilities Capital allocation bases shall be reconcilable with the bases projected for overhead rate pricing purposes.

g. If a Forward Pricing Rate Agreement for overhead rates has been negotiated, the inclusion or exclusion of net book value for . . . [the profit model] determinations shall be consistent with the allowability or unallowability of costs generated by those facilities, for overhead and pricing purposes. For example, if costs of excess facilities have been disallowed in forward pricing rates, the value of those same facilities shall be excluded from the capital base. The file shall contain similar information relative to the overhead and Facilities Capital allocation bases. When audited overhead data are used for contract pricing, both the audit report recommendations and subsequent contract pricing negotiations shall treat the facilities values and allocation bases reported on DD Form 1860, and the related facilities expenses and bases contained in the overhead rate(s) proposal on a consistent basis.

h. In either of the above methods for allocating indirect expenses to individual contracts, overhead rates often are arrived at on an "overall" basis, i.e., without settlement of individual elements of the overhead cost proposal. Under such circumstances it will be necessary, when establishing a contract profit objective, for the Government negotiators to estimate any adjustments to the proposed Facilities Capital data considered appropriate. Also, when an advance agreement covering the cost of idle facilities or idle capacity exists for a contractor Profit Center, the fixed asset values reported on DD Form 1860 shall be consistent with the provisions of such agreement.

i. Leased property is a special case. If full rental costs have been accepted in overhead pools, no capitalized value shall be recognized. If rental costs have been limited to the constructive cost of ownership, the constructive value of the leased property shall be recognized. When contractors enter into a long-term lease of property whereby the conditions of such lease require the advance payment by the tenant to the lessor of the total rental amount for the cumulative term of the lease, such prepaid rental payments made by the contractor under a long-term lease shall be treated similarly to contractor-owned fixed assets and a capitalized value of the prepayment shall be included in the category of "Leased Property" on the DD Form 1860, provided that the lease payments are otherwise considered allowable under [ASPR] Section XV. The capitalized value reported for each year shall be the average of the prepaid lease account for the year, except when such leased facilities were available for only a portion of the year; in those circumstances, an annualized (see e. above) prepayment amount shall be reported. In the event any leased fixed assets are included as Facilities Capital, a separate attachment to DD Form 1860 shall show the following information:

- (i) Description of the asset
- (ii) Initial valuation of leased property and basis for value
- (iii) Amortization Schedule
- (iv) Net book value included on DD Form 1860
- (v) Identification of Government authority and date when determination was made to allow only the constructive cost of ownership for the asset, in lieu of full lease or rental costs. (Not applicable in case of prepaid leases.)

j. A Profit Center is defined for this purpose as the lowest accounting level (e.g., division, plant, product line) for which the balance sheet

items of accounts receivable, inventory, accounts payable, and tangible fixed assets (land, buildings and equipment) are available.

k. A Productive Burden Center is the accounting level within a Profit Center for which overhead rates are calculated for distribution of indirect costs. The Productive Burden Center structure listed on DD Form 1860 shall be compatible with that used for pricing purposes on the contractor's cost proposal (DD Form 633). DD Form 1860 shall include all Productive Burden Centers in the Profit Center, without regard to the proportions of Government and commercial business involved. Contractors utilize various methods of overhead pooling and distribution bases, sometimes with multiple allocations between pools. When an elaborate overhead allocation system is utilized, or when there are a large number of Productive Burden Centers within a Profit Center, contractors are encouraged to consolidate and simplify allocation of Facilities Capital to a limited number of allocation bases. However, any consolidated structure used shall be compatible with the contractor's cost breakdown, so that consolidated Facilities Factors can be equitably applied to appropriate contract allocation bases (see DD Form 1861).

l. Service or support centers are cost centers for the collection of costs for performing specific functional services, e.g., data processing center, plant services, administrative services, or wind tunnel facility. The fixed asset values of service or support centers whose costs are allocated to contracts through a G&A expense rate may be treated similarly to a Productive Burden Center or handled in accordance with the "undistributed" definition below. When service or support center costs are occasionally charged direct to customers on a use charge basis, e.g., computer direct charge, the fixed asset values shall be handled similarly to a Productive Burden Center as defined above.

m. Distributed Facilities is the net book value of all fixed assets that are identified in the plant records as wholly assigned to a Productive Burden Center. Such identification usually results in related charges (e.g., depreciation of taxes) direct to the using burden center. When some costs of a service or support center are charged direct to customers on a "use charge" basis (e.g., computer center), the assets of such center shall be allocated between "distributed" and "undistributed" assets in the ratio that the service or support center direct charges bear to the indirect charges.

n. Undistributed Facilities is the net book value of all fixed assets which are not specifically assigned to a Productive Burden Center (e.g., housekeeping and general service equipment, land, or general plant buildings), and that portion of corporate fixed assets that are allocable to the Profit Center (e.g., general office equipment, corporate headquarters, and land). Undistributed assets are allocated to Productive Burden Centers on any reasonable basis that approximates the actual absorption of the related costs of such assets.

o. Allocation Bases are the direct input bases (e.g., direct labor dollars, direct labor hours, direct material dollars or machine hours) projected to be incurred in or by each Productive Burden Center (including service or support centers) for the purpose of allocating overhead costs or use charges. As stated in paragraph f. above, the estimated allocation base projected for the . . . [profit model] computation shall be consistent with the base projected for estimating overhead expense rates of each burden center. In addition, when a Productive Burden Center allocation base estimated for overhead rate purposes normally includes the efforts to be expended in the accomplishment of IR&D [Independent Research & Development] and B&P [Bid & Proposal] tasks, the allocation base for this profit on capital computation shall exclude such efforts. Such allocation base exclusions (e.g., engineering direct labor dollars, model shop direct labor hours) shall be consistent with the estimated amounts of these bases used in establishing the allowable costs under either an advance agreement or a formula computation [28:11-15].

Line seven (7) through ten (10) of the DD Form 1861 need not be completed. The individual totals from line six (6) (DD Form 1861), land, buildings, equipment, shall be entered on lines six a (6a), six b (6b) and six c (6c) of the model.

After the total adjusted capital base has been established, the next consideration is adjustments to the average prime rate. Of the two adjusting factors, risk shall be determined first. The total adjustment attributed to risk factors ranges from -2.4 percent to +2.4 percent.

Of this total the type of contract would account for 1.8 percent in either direction, plus or minus. The following contracts and weightings are suggested as a guide but the PCO may consider other factors in selecting the final weight:

FFP . . . . .	+1.4 to 1.8%
FPI---Cost + Performance + Schedule Incentives . . . . .	+1.0 to 1.4%
FPI---Cost + Performance or Schedule Incentives . . . . .	+ .5 to 1.0%
FPI---Cost Only . . . . .	0 to .5%
CPIF--Cost + Performance + Schedule Incentives . . . . .	- .5 to +.5%
CPIF--Cost + Performance or Schedule Incentives . . . . .	-1.0 to -.5%
CPIF--Cost Incentives Only . . . . .	-1.4 to -1.0%
CPFF . . . . .	-1.8 to -1.4%

Financial risk could account for .4 percent in either direction, plus or minus. Factors affecting a negative rating would include amount of Government equipment and facilities provided, progress payments, and other Government financial assistance. Factors affecting a positive rating would be lack of progress payments, lack of borrowing and reasonableness of cost estimates.

Technological risk could account for .2 percent in either direction, plus or minus. Factors affecting this rating would be evaluated in a continuum of technological requirements. At the end of the continuum receiving a +.2 percent would be the situation where the contract involves or requires a breakthrough in the state-of-the-art. At the other end of the continuum would be the contract for "off-the-shelf" items.

The second adjusting factor is performance. This factor has a range of -1.0 to +1.0 percent and is based on the historical performance of the contractor on Government contracts. If the contractor is new to Government contracting a rating of zero (0) would be used. The contractor's past performance would be evaluated on the basis of

1. Compliance with contract clauses,
2. Cost efficiency,
3. Timely deliveries, and
4. Quality of product.

The rating to be applied is based on judgment and should reward a contractor for exceptional performance and penalize for poor performance.

At this time the net adjustment factor is either added to or subtracted from the average prime rate resulting in the adjusted profit rate. The contractor's current tax rate is determined after which all necessary components are available for determining the target profit rate.

#### Benefits

The new model attempts to provide profits on a basis understood and used by the commercial market. Return on investment (ROI) is used in many businesses as a measure of profit performance. In the commercial approach, ROI does not consider the various elements of labor and management in the specific calculations. In the commercial application of ROI, the elements of labor and management are considered as

expense factors necessary to utilize the productive capacity of capital. The WGL model covers the other extreme by providing profit based primarily on the elements of labor and management. The new model expands the capital base to include the two most important and fundamental factors of production, capital and labor.

In past years the number of firms competing for Government contracts has been decreasing. The profits of those firms doing business with the Government has also been on the decline.<sup>4</sup> The Government has stated in ASPR that the prime motivation of contractors is profit (27:3:139). Therefore, one might conclude that at least part of the reason for the decline in the number of Government contractors is the perception that better profit opportunities lie outside Government contracting.

The new model should provide the contractor with a fair return on his investment. With a capital base consisting of labor and capital, the return provided should generally exceed the commercial standards. As industries perceive better profit opportunities in Government work an increase in competition should evolve. With an increase in competition, the laws of economics indicate a more equitable price will be approached. This profit model may provide a contractor with greater returns than the WGL model but if it increases competition, studies have shown that up to 25

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<sup>4</sup>See page 3.

percent reduction in costs may be possible. For example, in 1971, a GAO report concluded that on a sample of 54 contracts awarded noncompetitively, nearly eight million dollars could have been saved by using competitive procedures (14:256).

#### Limitations of Application

To use this model several changes would be required to existing procedures for proposing and negotiating contracts. First, the contractor would have to break his management personnel out of the overhead base and propose both direct and allocated management as a separate item. The overhead pool would have to exclude all such identified management personnel. Second, the contractor should be required to submit a risk assessment with his proposal to include financial and technical risk considerations. Third, it will be necessary to negotiate the total adjusted capital base and the adjustment factors. Fourth, the appropriate DD Forms 1858, 1859, 1860 and 1861 would have to be submitted for operating capital and facilities capital considerations.<sup>5</sup>

With the variations in the prime rate it is entirely possible that on cost-type contracts the profit objective determined by the model may exceed statutory limits. In such cases the law, of course, must be adhered to but the model would then provide the contractor with the maximum profit allowed by law.

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<sup>5</sup>See Appendices G through J.

The costs of implementing this model would be minimal from an administrative standpoint. The forms for reporting operating capital and fixed assets are already in existence. The contractor's cost proposal submitted on DD Form 633<sup>6</sup> would not have to be altered. The backup for the DD Form 633, however, would have to identify the direct management personnel and the indirect management personnel separated from the general overhead pool. This information should be readily available from the contractor's accounting records. The Government costs would only involve printing up the new model format. Any significant increased costs resulting from this model would be attributable to the expected increased profits provided.

This model is applicable for use in contracts of \$100,000 and over.<sup>7</sup> Contracts of this dollar value require that the contractor submit cost or pricing data and certify that the data submitted was accurate, complete and current (27:3:124). For proper application of the model it is necessary to have detailed information on contractor capital factors. The amount of information required would not be justified for contracts below \$100,000.

### Conclusions

In answering the second research question, a new profit model was developed. This new model incorporated

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<sup>6</sup>See Appendix K.

<sup>7</sup>See Assumption 7 on page 76.

many of the significant factors of profit determined in the data analysis. The new model has been developed using a variation of the return-on-investment technique. The investment base consists of labor and capital, and the standard set for normal profits is the average prime interest rate. This rate is adjusted up or down in accordance with a risk and performance criteria. The intent of the model is to provide an "adequate" net profit, and for this reason the final target profit rate is adjusted for the company's tax rate. The new model is expected to provide more adequate profits than the existing WGL model and thereby stimulate and promote a highly competitive defense market.

## Chapter 5

### SUMMARIES, CONCLUSIONS AND RECOMMENDATIONS

#### Summary of Assumptions

The following assumptions were made throughout the conduct of this research:

1. Adequate data exists to determine the primary factors of profit.
2. The relevant market (defense industry) of this research is noncompetitive.
3. The primary factors affecting profit have not changed significantly over the last 15 years.
4. The demand curve for the relevant market of this research is highly inelastic.
5. Some primary factors affecting profit may not be measurably consistent with a new profit objective model development requirements.
6. All defense contractors are entitled to adequate profit.
7. The data level will not support parametric testing.
8. Defense contractors are unwilling to publish material concerning their profit policy because of apathy, contractor policy, proprietary information concerning profit

structure or the contractors' actual satisfaction with the present Government profit policy.

9. The major factors of production--labor and capital--were necessary elements in the development of the new profit objective model.

10. A major consideration and desirable characteristic given to the development of the new profit objective model was less dependence on cost.

11. The most logical approach in developing the new profit objective model was to use the strength relationships of the factors identified during the data analysis phase of this research.

12. The standard for adequacy--the prime rate--is readily available from the Federal Reserve Bulletin, and represents the minimum rate of return for investment decisions (18:201).

13. Inputs for the model are readily available from existing contractor accounting systems.

14. Government forms developed for the "Capital Employed Method," DPC 74-1, can be used by contractors to submit data in a usable format.

15. The new profit objective model will be applicable to contracts which require contractor cost data (i.e., contracts \$100,000 and over).

16. The frequency times strength of the various area specifics and aggregates for the area categories provides data with interval characteristics. For the purpose of

developing weightings to be used in the new model the factor strengths were aggregated and divided to provide relative weightings. In so doing, each factor in the new model has a relative weighting that maintains the strength ratings developed by the content analysis model.

#### Summary of Limitations

During the course of this research it was evident that certain limitations were inherent beginning with the research methodology through the new model development as follows:

1. The new profit objective model may be limited in application.
2. Conclusions of this research effort were limited to the essence of the research questions.
3. Interpretation and analysis of the data was limited by the data sources and the random sample selected.
4. The new profit objective model requires additional contractor cost information as explained in Chapter 4.
5. Of the data collected, 85.9 percent came from Government sources, since there was a lack of commercial literature.
6. The data collected through the content analysis technique was nominal when strength and valence were applied and ordinal with interval characteristics when strength and frequency were applied.
7. The data was discrete as opposed to continuous thus limiting use of any statistical tests.

8. The data collected did not support two major categories of the content analysis model (i.e., subcontracts and Government support).

9. Subjective interpretations of the frequency distributions, central tendency analysis and strength relationships were required to group the primary factors that influence profit.

10. Several changes are required to existing procedures for proposing and negotiating contracts.<sup>1</sup>

11. The new profit objective model is dependent on the average prime interest rate. Under cost-type contracts profit determined by the new model is constrained, of course, by statutory limitations.

12. The model is applicable for use in contracts of \$100,000 and over. Contracts of this dollar value require that the contractor submit cost or pricing data and certify that the data submitted was accurate, complete and current.

#### Summary of Conclusions

In summary, this research effort has attempted to add to the body of knowledge of profits of defense contractors by impartially gathering data from Government and commercial sources through a relatively new behavioral technique of semantic differential content analysis to systematically identify determinants of profit. These determinants were analyzed to determine relationships, strength and influences on profit

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<sup>1</sup>See page 99.

for use in developing a new profit objective model. This rigorous data analysis and model development effort provided a new profit objective model that is based on a contractor's capital employed providing net profit after taxes, therefore, satisfying both research questions.

There are many beneficial aspects of the new profit objective model, one being the fact that the new model based on capital employed provides a basis of profit consideration commensurate with the commercial or nondefense market. With the emphasis on capital employment including labor and realization of adequate profit comparable to the commercial market, the DoD goal of increased competition can be met with actual overall cost savings.<sup>2</sup>

In retrospect, although the data gathering technique of content analysis was a worthwhile learning experience, it did not provide data on which useful nonparametric or parametric statistical analysis could be conducted. The semantic differential portion of the content analysis provided ordinal data with interval characteristics which allowed development of the profit model.

#### Corollary Conclusions

Associated conclusions of this research also provide valuable lessons learned. For example, the semantic differential content analysis produces a bias towards the data sources with the greatest length (i.e., in this research 86

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<sup>2</sup>See pages 98 and 99.

percent of the data came from Government sources although the sampling plan selected the sources on a 50/50 basis). The fact that the major categories of subcontracts and Government support were found to be insignificant in accordance with the established criteria test was due to the construction of the content analysis model. The model required the attributes to be directly related to profit within the unit of record.<sup>3</sup> Both of these major categories were discussed in the literature but only in an indirect manner to profit or usually directly in relation to financial and technical risk assessments. Since these discussions avoided a direct reference to profit there was no data hit. These lessons learned are concomitant with any assumptions and techniques used as a follow-on effort to this research for replication and validation of the new profit objective model.

#### Recommendations

It is obvious that follow-on research is required to validate the new profit objective model and perhaps compare its ability to provide adequate profit to the WGL method. The most promising immediate approach is to simulate randomly generated cost figures for proposals on major weapons systems using the new profit objective model and compare the results (1) against the present WGL model and (2) against the commercial averages on ROI. In validating the model, consideration should be given to the size of the company and the amount of

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<sup>3</sup>See page 26.

financial leverage exercised. This investigation may lead to sophistication of the financial risk area. Various formats for risk assessment should be evaluated to determine what kind of format is feasible for the contractor and meaningful to the Government. Once the model has been validated through several iterations of the simulation, a "real world" test would be appropriate.

In comparing the new model to the present Government WGL model or even the forthcoming "Profit 76" model, actual data could be obtained from several program offices of major weapon systems within the Aeronautical Systems Division of Air Force Systems Command, Wright-Patterson AFB, Ohio, and used to identify the going-in profit objectives. A measure of effectiveness could be obtained by converting the data from the WGL model for incorporation into the new profit objective model and evaluating the adequacy of profits for defense contractors between the two models. A corollary recommendation is to verify the fundamental factors of profit (see Figure 2, page 74) using the DELPHI Technique and/or questionnaires to provide an equal amount of data from Government and commercial sources at a level that can be statistically analyzed.

#### Summary

This research effort began investigating the Government's profit policy of the last several decades to the present. During this era profit was awarded on the basis of precedent and the present cost-based WGL technique. Two

objectives of this study were to determine the fundamental factors which influence profit and using as many of those factors as practicable develop a new profit objective model. A research methodology was designed to collect data using a semantic differential content analysis model to identify the primary factors affecting profit. These determinants were analyzed for incorporation into the new profit objective model that is designed to provide adequate profit, based on the primary factors of production--labor and capital--for Government contractors.

APPENDIX A  
WEIGHTED GUIDELINES MODEL

APPENDIX A

Weighted Guidelines Model

<u>Profit Factors</u>	<u>Weighted Ranges</u>
<b>CONTRACTOR'S INPUT TO TOTAL PERFORMANCE</b>	
Direct Materials	
Purchased Parts . . . . .	1 to 4%
Subcontracted Items . . . . .	1 to 5%
Other Materials . . . . .	1 to 4%
Engineering Labor . . . . .	9 to 15%
Engineering Overhead . . . . .	6 to 9%
Manufacturing Labor . . . . .	5 to 9%
Manufacturing Overhead . . . . .	4 to 7%
General and Administrative Expenses . . . . .	6 to 8%
<b>CONTRACTOR'S ASSUMPTION OF CONTRACT</b>	
COST RISK . . . . .	0 to 7%
Type of Contract	
Reasonableness of Cost Estimate	
Difficulty of Contract Task	
RECORD OF CONTRACTOR'S PERFORMANCE . . . . .	-2 to +2%
Small Business Participation	
Management	
Cost Efficiency	
Reliability of Cost Estimates	
Value Engineering Accomplishments	
Timely Deliveries	
Quality of Product	
Inventive and Development Contributions	
Labor Surplus Area Participation	
SELECTED FACTORS . . . . .	-2 to +2%
Source of Resources	
Government or Contractor Source of	
Financial and Material Resources	
Special Achievement	
Other	
<b>SPECIAL PROFIT CONSIDERATION--ASPR 3-808.6</b>	

(SOURCE: Armed Services Procurement Regulation, 3.808.4)

APPENDIX B  
STRENGTH LIST--STRONG

APPENDIX B

Strength List--Strong

The following words or phrases are examples of a strong relationship between the attribute and profit:

most common indicator  
most often used  
most meaningful  
cannot permit  
requires  
explicit percent (at least  
5%)  
direct factors  
actual equation relating  
profit and attributes  
direct or inverse relation  
excess profit taxes  
directly  
are determined  
not intended to be  
key reasons

most serious problem  
substantial inputs of  
very high  
is limited by  
entirely  
positive correlation  
between  
must earn  
it is important  
dependent upon  
is no higher than  
can (will) produce  
indicate a statistical  
significant rela-  
tionship  
is defined (determined)  
by

APPENDIX C  
STRENGTH LIST--WEAK

## APPENDIX C

### Strength List--Weak

The following words or phrases are examples of a weak relationship between the attribute and profit:

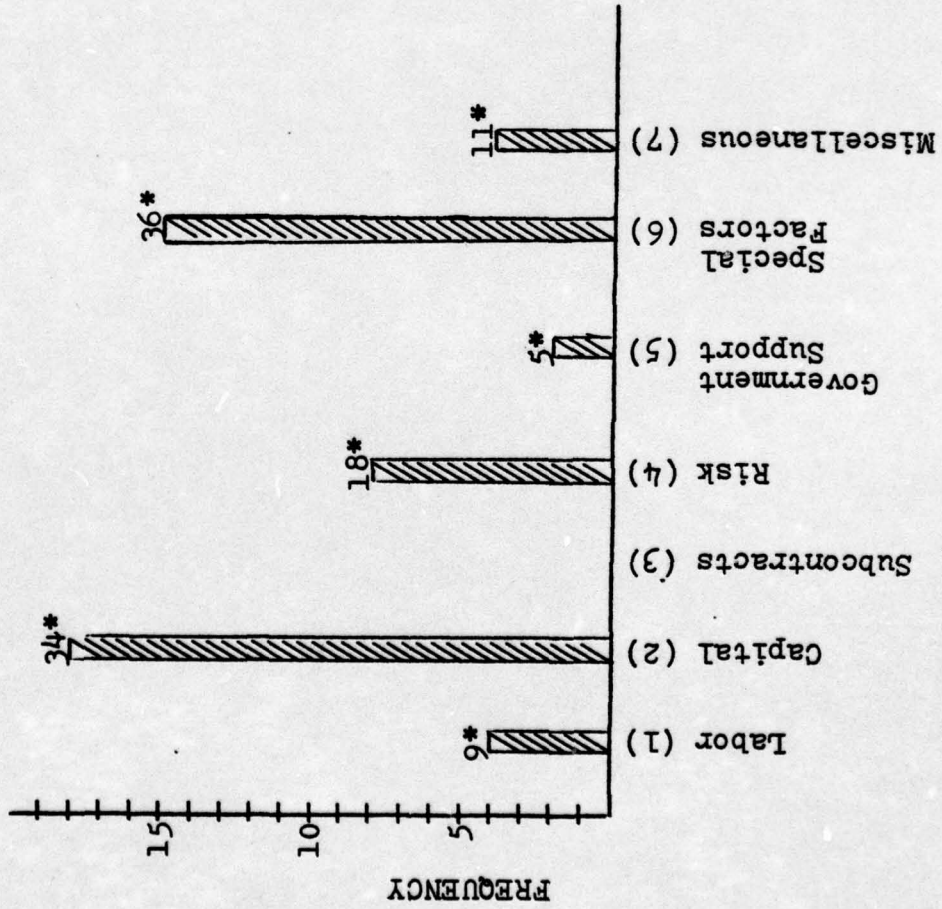
also affect  
has lost a chance  
opportunities for increasing  
should continue to be  
should be included  
should be  
monotone decreasing relation  
functional relationship--as  
in a curve or graph  
may (not) be a (measure)  
correspondence between  
special interest attaches to  
the relation between  
a difference associated with  
may be uniformly higher or  
lower  
no necessary inverse relation  
relationship between  
may provide

in general, was to be  
with particular regard  
to  
has been largely  
responsible for  
creates some  
it is possible  
would amount to  
using small amounts of  
relatively low  
spread of profits  
it is usual to expect  
based on  
likelihood of achiev-  
ing  
accomplishes  
principally in relation  
to  
implies

APPENDIX D  
ATTRIBUTE/FACTOR WEIGHT AND  
FREQUENCY DISTRIBUTION

APPENDIX D

Attribute/Factor Weight and Frequency Distribution



$$\Sigma[(S)(f)] = *W$$

Where,

S = Strength codes of each area specific within an area category

f = Frequency of each area category

\*W= Weight of the area category

ATTRIBUTES/FACTORS

APPENDIX E  
SAMPLING PLAN

APPENDIX E

Sampling Plan

NUMBER OF COMMERCIAL SOURCES

1958	3	1962	1963	14	1969	1970	13	1975
	3			14			13	

NUMBER OF GOVERNMENT SOURCES

The total number of data sources selected equals the sum of the number of data sources chosen per interval period for both the commercial and Government publishing sections [i.e.,  $(3 + 14 + 13) + (3 + 14 + 13) = 60$ ].

APPENDIX F  
DATA SOURCES

APPENDIX F

DATA SOURCES

Government Sources  
Identification

1958 through 1962

AD 663394                      LD 07634A                      LD 05447

1963 through 1969

LD 08722                      AD 863848                      AD 824828L  
AD 681118                      AD 680330                      AD 664701  
AD 661554                      AD 660388                      AD 659731  
AD 472955                      LD 33256A                      LD 10089  
LD 25105

RAND RM-6183-PR "Impact of WGL on Defense Contract Fees" Dec 1969

1970 through 1975

AD A011221                      AD 766612                      AD 741411  
AD 731764                      AD 703303                      LD 32304A  
LD 32879A                      LD 25952A                      LD 28667  
LD 34363A                      LD 34153A                      AD 738463  
LD 32352A

(NOTE: Alphanumeric codes indicate sources may be acquired from DDC and DLSIE)

Commercial Sources  
Identification

1958 through 1962

Iron Age 189:56-9 May 3, '62  
Aviation Wk 76:28 Jan 8, '62  
Time 79:81-2 Apr 27, '62

1963 through 1969

Harvard Bsns R. 41:116-27 Mar '63  
Duns R. 83:31 Apr '64  
J. Finance 19:16-31 Mar '64  
Fortune 71:304 Apr '65  
J. Finance 18:637-46 Dec '63  
Vital Speeches 32:381-4 Apr '66

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Fin. Analysts J. 22:88-95 Mar '66  
Read Digest 90:177-80 Feb '67  
Economists 220:1057 Sep 10 '66  
New Repub. 161:15-18 Dec 20 '69  
Aviation Wk 88:25 Feb 12 '68  
New Republic 159:19-21 Aug 17 '68  
Mich Bsns R. 19:1-6 Jul '67  
Nation 208:113-15 Jan 27 '69

1970 through 1975

QR Econ & Bsns 10:15-26 Summer '70  
Mgt Acctg 52:17-20 Feb '71  
J. Finance 26:1067-75 Dec '71  
Res Mgmt 15:58-63 May '72  
Conf. Bd. Rec. 9:49-58 Dec '72  
Fin. Exec. 43:44-5 Nov '75  
Duns 98:11 Nov '71  
U.S. News 71:34-6 Nov 1 '71  
Review Sat R 54:29-30 Jun 5 '71  
Harvard Bsns R. 52:137-45 Mar '74  
Harvard Bsns R. 53:97-106 Jan '75  
Aerospace Industries Association of America (AIAA)-  
"Risk Elements in Government Contracting" Oct '70  
Aerospace Industries Association of America (AIAA)-  
"Aerospace Profits vs Risks" Jan '71

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APPENDIX G  
DD FORM 1858

APPENDIX G

PROFIT CENTER HISTORICAL OPERATING CAPITAL			
CONTRACTOR: PROFIT CENTER: ADDRESS:		FISCAL YEAR ENDED	
SECTION I			
GROSS OPERATING CAPITAL REQUIRED <i>(Federal Government Contracts Only)</i>	CONTRACT TYPE		
		FIXED PRICE	COST REIMBURSEMENT
AVERAGE ACCOUNTS RECEIVABLE	A		B
AVERAGE GROSS INVENTORY	C		D
LESS PROGRESS PAYMENTS, ADVANCES, REIMBURSEMENTS AND OTHER CREDITS	E		F
AVERAGE NET INVENTORY INVESTMENT	G C-E D-F	H	I
AVERAGE CONTRACT INVESTMENT	J A+G B+H		K
ANNUAL COSTS INCURRED <i>(By Contract Type)</i>	L		M
GROSS OPERATING CAPITAL EMPLOYED FACTORS	N J+K I+L	O	P
FINANCING BY TRADE ACCOUNTS PAYABLE		TOTAL PROFIT CENTER	FEDERAL GOVERNMENT CONTRACTS
AVERAGE TRADE ACCOUNTS PAYABLE	Q		R
ANNUAL COSTS INCURRED	S R+Q K+L		T
ACCOUNTS PAYABLE FINANCING FACTOR	U Q+Q P+R	V	W
NET OPERATING CAPITAL EMPLOYED FACTORS		FIXED PRICE	COST REIMBURSEMENT
FIXED PRICE CONTRACTS	X M-T or S	Y	
COST REIMBURSABLE CONTRACTS	Z N-T or S		AA
SECTION II			
CONTRACT OPERATING CAPITAL <i>(Complete for each Procurement Action)</i>	RFP/CONTRACT PIIN NUMBER		CONTRACT TYPE
	PERFORMING PROFIT CENTERS	CONTRACT ESTIMATED COSTS	NET OPERATING CAPITAL EMPLOYED FACTORS
	W	X	Y
		Z	
		AA	
OPERATING CAPITAL - TOTALS	AB		AC

DD FORM 1 SEP 72 1858

[Source: Defense Procurement Circular 74-1]

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## APPENDIX G (Continued)

## PROFIT CENTER HISTORICAL OPERATING CAPITAL

INSTRUCTIONS  
(DD Form 1858)

**Purpose.** This form has two sections. The purpose of the first section is to determine the operating capital historically required by each Profit Center in performing the federal government contracts, in terms of a factor per dollar of costs incurred. The purpose of the second section is to determine the estimated operating capital required to perform a specific contract or procurement action, by application of the appropriate historical factor to the contract estimated or proposed costs.

**Basis.** The Profit Center operating capital data and factors should represent actual experience in the latest complete fiscal year, for federal government contracts or subcontracts and by the two principal types. Therefore the effects of commercial (non-government) production is excluded.

**Net Operating Capital.** Net Operating Capital Employed Factors represent the net investment after subtracting financing by Trade Accounts Payable.

**Heading.** Identify the contractor, Profit Center and Fiscal Year to which the historical data pertains.

## SECTION I

**Average Accounts Receivable (A & B).** Enter the average federal government contract accounts receivable balances. Normally the sum of the monthly balances divided by twelve, although unusual billing or payment patterns may require more detailed analysis to determine a representative average.

**Average Gross Inventory (C & D).** Determine average contract gross inventory balances, by a monthly or more frequent method. Include raw materials, supplies, work in process and finished goods inventories committed to federal government contracts. Pooled inventories that support both government and commercial work should be allocated on a usage or other equitable basis.

**Progress Payments, Advances, Reimbursements, Credits (E & F).** Enter any credit balances recorded separately, that offset and reduce the contractors investment in inventories.

**Average Net Inventory Investment (G & H).** This is the average net investment after offsetting the above credit balances. If the contractor's system nets credits directly in the accounts, this average may be determined directly from the accounts, i.e. omit the 'Gross' and 'Credit' steps.

**Average Contract Investment (I & J).** The sum of Average Accounts Receivable and Average Net Inventory. These totals should reflect the contractor's average operating capital investment in each type of government contract.

**Annual Cost Incurred (K & L).** Enter the total annual costs incurred by the Profit Center on each type of contract. Costs unallowable under ASFR Section 15, and uncontracted costs

(e.g. contractor's share of cost-sharing contracts) must be screened out so that these values are the same that flow through the above Accounts Receivable and Net Inventory.

## FINANCING BY TRADE ACCOUNTS PAYABLE

**Average Trade Accounts Payable (O & P).** Trade Accounts Payable are the outstanding balances of 'outside' vendor, supplier and subcontractor billings, for purchases and subcontracts covering materials, components and services. Exclude non-trade payables and accruals, e.g. payrolls, taxes, insurance, contingencies and fees. Isolate Federal Government Contract payables if possible (P). Otherwise enter the Total Profit Center payables (O).

**Annual Costs Incurred (Q & R).** Enter total annual costs that correspond to the above Trade Accounts Payable. Government costs incurred (R) is the sum of the two contract types (K + L).

**Accounts Payable Financing Factor (S & T).** The quotient of Average Trade Accounts Payable divided by Annual Costs Incurred.

**Net Operating Capital Employed Factors (U & V).** The result of the Gross O.C. Factors (M & N) less the appropriate A/P Financing Factor (T or S). This represents the contractor's net operating capital employed for each dollar of cost.

SECTION II  
CONTRACT OPERATING CAPITAL

**Timing & Identification.** This section is completed only when estimating the operating capital requirements for an individual procurement action. Identify the specific RFP/Contract PIIN number and the contract type.

**Performing Profit Centers and Contract Costs.** List all Profit Centers expected to perform the contract, and enter the Contract Estimated Costs (W) to be incurred by each. The Total Costs (Z) must agree with the DD 633 cost proposal.

**Net Operating Capital Employed Factors (X).** The selection of the appropriate Net Operating Capital Employed Factor is determined by (a) the Profit Centers listed, and (b) the current Contract Type. Collect the latest historical data on Section(s) I for each Profit Center and determine the contract type for the current procurement action.

**Estimated Operating Capital Required (Y).** The product of Profit Center estimated costs (W) times the appropriate Operating Capital Factor (X). Sum the Profit Center requirements to arrive at the contract total operating capital (A').

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APPENDIX H  
DD FORM 1859

# APPENDIX H

CONTRACT AVERAGE OPERATING CAPITAL PROJECTION													
CONTRACTOR:										RFP/CONTRACT PLAN NO.			
PROFIT CENTER:										ESTIMATED DAYS TO			
ADDRESS:										BILL			
CONTRACT TYPE:										COLLECT			
<input type="checkbox"/> COST REIMBURSABLE <input type="checkbox"/> PROGRESS PAYMENTS <input type="checkbox"/> PARTIAL OR DELIVERY PAYMENTS		PAYMENT METHOD		BILLING PERIOD		ENDED		C		D			
		%		A		B		E		F			
		%											
CONTRACT PERFORMANCE PROJECTION													
MONTH	INURRED (in Thousands)				DELIVERIES (in Thousands)				MONTH	INURRED (in Thousands)			
	COSTS	WEIGHTED	COST	WEIGHTED	COST	WEIGHTED	COST	WEIGHTED		COSTS	WEIGHTED	COST	WEIGHTED
1								24					
2								25					
3								26					
4								27					
5								28					
6								29					
7								30					
8								31					
9								32					
10								33					
11								34					
12								35					
13								36					
14								37					
15								38					
16								39					
17								40					
18								41					
19								42					
20								43					
21								44					
22								45					
23								46					
CONTRACT TOTALS													
G													
H													
I													
J													
AVERAGE TIME LAG COST TO DELIVERY				CONTRACT TOTALS				EARNED PROFIT OR FEE					
COST INCURRED		WEIGHTED		UNWEIGHTED		MEAN MONTH		AVERAGE TIME LAG EARNED TO RECEIPT		PAYABLE AS EARNED		FEE HOLDBACK	
N		H		G		L-R		L		A'		E'	
Deliveries		J		I		K		Estimated Days to Bill		B'		F'	
Average Time Lag (Months)								Estimated Days to Collect		C'		G'	
(Days) M = 30.4								Total Time Lag (days)		D'		H'	
								+ 365 (Yrs)		E'		I'	
AVERAGE TIME LAG COST TO RECEIPT		COST REIMB		PRG Pmts		DELIVERY PAYMENTS		TOTAL ESTIMATED PROFIT/FEE		Percent Each Method		Receipts Each Method	
Incurrence to Billable		O		N		L		J'		K'		M'	
Estimated Days to Bill		Q		P		R		Average Total Time Lag (Yrs)		L'		N'	
Estimated Days to Collect		C		D		E		ANNUALIZED CAPITAL		D'		O'	
Total Time Lag (days)		P		F		G		FINANCING BY ACCOUNTS PAYABLE		S'		P'	
+ 365 (Yrs)		Q		S		O		INDICATORS FROM LAST COMPLETE FISCAL YEAR		T'		Q'	
TOTAL ESTIMATED COSTS		G		S		O		Average Accounts Payable		U'		R'	
Percent Each Method		T		U		V		Total Outside Purchases		V'		S'	
Receipts Each Method		T		U		V		Average Payment Time Lag (Yrs)		W'		T'	
Average Total Time Lag (Yrs)		V		W		X		Est A/P Payment Lag - This Contract		X'		U'	
ANNUALIZED CAPITAL		Q		S		O		Estimated Contract Outside Purchases		Y'		V'	
V = Q		X		T		U		Estimated Financing by A/P		Z'		W'	
W = S		X		T		U				Y'		Z'	
NET OPERATING CAPITAL REQUIRED													
A * Y * N * O - X'													
W = V' X'													

[Source: Defense Procurement Circular 74-1]

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## APPENDIX H (Continued)

CONTRACT AVERAGE OPERATING CAPITAL PROJECTION  
INSTRUCTIONS for DD Form 1859

**PURPOSE.** The purpose of this form is to estimate the contract average operating capital requirements, by relating projected contract costs and profits to the time required to recover those costs and profits from the government procurement activity or finance office.

**METHOD OF PAYMENT.** The various methods of payment by the government involve only three types:

1. Payments based on costs incurred over time periods (Cost Reimbursement and Progress Payments).
  2. Fee payments based on percent-of-completion, and
  3. Payments based on physical delivery of end items or contract completion (Partial Payments and Delivery Payments).
- This form accommodates conditions created by all three types.

**HEADING.** Identify the Contractor and principal Profit Center, with address, where the contract will be performed. Identify the specific contract or contractual action by RFP or contract PIN number. Identify the contract type.

**PAYMENT METHOD.** Check the appropriate blocks to show Cost Reimbursable or Partial/Delivery Payments. If a fixed contract authorizes Progress Payments, check that block and show the Progress Payment Rate (% of Cost). For Cost Reimbursable or Progress Payments, enter the Billing Period (e.g., monthly) and cut-off (e.g., EOM). For each method of payment checked, estimate the average days that will be required to bill and collect each series of payments under this specific contract and conditions. The estimated average days should be based on the most reasonable experience with the specific procurement/administrative activity and finance office involved, adjusted for any conditions peculiar to this contract action. Since payment patterns vary substantially among government procurement/administrative activities and finance offices, the contractor should use (and be prepared to demonstrate) his recent actual experience with the government activities involved. For example, a history of unusual payment delays by specific government activities should be clearly reflected in the "estimated days to collect."

**CONTRACT PERFORMANCE PROJECTION.** Required only for Partial/Delivery Payments. The purpose is to establish the relationship between the rate of cost incurrence, and the rate of billable deliveries. Project the contract estimated cost over the proposed period of performance. Project deliveries (at either cost or price) over the anticipated realistic delivery schedule, not necessarily that reported in the RFP. Enter incurred and delivered cost in nearest thousands, e.g., \$142,789 would be entered as \$143. Weight each month's cost and deliveries by the contract's unitary (cost or delivery) month, e.g., 1st month's cost = 1, 5th month's deliveries = 5. Total all columns. Contract total costs (C) must agree with the cost proposal. Total deliveries (D) must agree with either the proposed cost or price.

**INCURRED COSTS**

**AVERAGE TIME LAG - COST TO DELIVERY.** Required only for Partial/Delivery Payments. The purpose is to reduce the data above to the average time lag in days between cost incurrence and billable delivery. Divide the contract total weighted costs incurred (H) by the unweighted (G) to determine the mean month of all costs. Divide the contract total weighted deliveries (J) by the unweighted (I), to determine the mean month of all deliveries. Subtract the cost mean (K) from the delivery mean (L) to determine the average time lag, from cost to delivery, in months (M). Multiply by 30.4 to convert the lag to Average Days (N).

**AVERAGE TIME LAG - COST TO RECEIPT.** This part develops the total time lag, from cost incurrence to recovery by government payment, for each of the two methods of payment. Use of the two columns must correspond with the payment method(s) checked above.

**COST INCURRENCE TO BILLABLE:**

**Cost Reimbursable or Progress Payments.** Enter the number of days representing one-half of the billing period (O). This is the time lag from the mid-point or mean of the period's costs, to the date they become billable. For a monthly billing period, use 15.2 days.

**Delivery Payments.** Enter the average time lag, in days, determined in Average Time Lag, Cost to Delivery (N).

**DAYS TO BILL.** Enter the estimated average days to bill each basis of payment (C & E). The cut-off is normally the date of billings, if they are promptly mailed.

**DAYS TO COLLECT.** Enter the estimated average days to collect each basis of payment (D & F). The cut-off is normally the day payment is first recorded in company records. Both Days to Bill and Days to Collect should be supportable by recent comparable experience, rather than broad averages, since payment patterns vary among government procurement activities and finance offices. See "Payment Method" above.

**TOTAL TIME LAG.** Add each column to determine the Total Average Time Lag, in days, from cost incurrence to recovery. (Q & R). Divide each column by 365 to convert days to fractions of a year (Q & R).

**TOTAL ESTIMATED COSTS.** Enter the total estimated costs proposed on DD Form 633. Must agree with Contract Totals above (G).

**PERCENT UNDER EACH PAYMENT METHOD:**

Cost Reimbursement only - 100% in first column (T).  
Delivery Payments only - 100% in second column (U).  
Progress Payments and Delivery Payments - stated percent of cost in the first column (e.g., 80%), remainder in the second column (e.g., 20%).

**RECEIPTS UNDER EACH METHOD:** Multiply the total estimated costs by the percent to be recovered under each basis. (V & W).

**AVERAGE TOTAL TIME LAG (YR):** Bring down the respective Total Time Lags (YR) from above (Q & R).

**ANNUALIZED CAPITAL REQUIRED:** Multiply the receipts under each method (V & W) by the appropriate Average Total Time Lag (YR). (Q & R). Enter product in X & Y.

**EARNED PROFIT OR FEE:**

**Average Time Lag - Earned in Advance:** The purpose is to estimate operating capital required because of delays in collecting contract profit or fee.

**Estimated Days to Bill & Collect:** Fixed Price Profit. The entire time lag (A', B', C' & D') is identical to "Incurred Costs - Delivery Payments" (E & F).

**Cost-Type Fee:** Payable on Earned (A', B', C' & D') - estimate the average time lag for currently payable fee revenues. The period begins with the end of the billing period (B).  
Fee Holdback (E', F', G' & H') - estimate the time lag to bill and collect the fee holdback. The period begins with the date of contract completion.

**TOTAL ESTIMATED PROFIT/FEE:** Enter the total proposed on DD Form 633 in I'.

**PERCENT EACH METHOD:**

Fixed Price Profit - enter 100% in J'.  
Cost-type Fee - enter the currently payable portion (e.g., 80%) in J'. Enter the close-out holdback (e.g., 15%) in K'.

**RECEIPTS EACH METHOD:** Multiply the total estimated profit or fee (I') by the percent to be paid each way (J' & K').

**ANNUALIZED CAPITAL REQUIRED:** Multiply the receipts under each method (L' & M') by the average time lag (D' & H'). Enter the products in N' & O'.

**FINANCING BY ACCOUNTS PAYABLE:**

**INDICATORS FROM LAST COMPLETE FISCAL YEAR.** Determine the average Trade Accounts Payable during the latest fiscal year, for both the total Profit Center and the Defense Contracts portion (P' & S'). If defense contract Accounts Payable are not isolated in the records, allocations based on outside purchases may be used to estimate.

**TOTAL OUTSIDE PURCHASES.** Enter the total outside purchases from suppliers and subcontractors that generated the above Trade Accounts Payable. (Q' & T').

**AVERAGE ACCOUNTS PAYABLE PAYMENT LAG (YR).** Divide each average Accounts Payable by the corresponding Total Outside Purchases, to determine the historical average payment lag for each class of purchases. (R' & U').

**ESTIMATED ACCOUNTS PAYABLE PAYMENT LAG - THIS CONTRACT.** Using the historical indicators as a guide, estimate a reasonable payment lag time for outside purchases under this contract (V'). Departures from the Defense Contract historical indicator should be supportable by anticipated changes in supplier/subcontractor relations.

**ESTIMATED CONTRACT OUTSIDE PURCHASES.** Total the planned outside direct purchases for this contract (W'). The estimate should agree with the DD Form 633 cost proposal, supporting shroud and/or the Make-or-Buy program. Common materials and supplies cleared thru stores should be included.

**ESTIMATED FINANCING BY ACCOUNTS PAYABLE.** Multiply Contract Outside Purchases by the estimated Accounts Payable payment lag, in years, to estimate the amount of contract financing by Trade Accounts Payable (X').

**NET OPERATING CAPITAL REQUIRED (Y').** Sum the annualized capital required for each series of payments (X + Y + N' + O') and subtract the Estimated Financing by Accounts Payable (X').

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APPENDIX I  
DD FORM 1860



## APPENDIX I (Continued)

## PROFIT CENTER FACILITIES CAPITAL PROJECTION

INSTRUCTIONS  
(DD Form 1860)

**PURPOSE.** The purpose of this form is to (a) project and accumulate total facilities values for each Profit Center by contractor fiscal years, and (b) reduce those values to Facilities Capital Employed Factors applicable to the total Overhead Allocation Base of each Productive Burden Center.

**BASIS.** All data pertains to the same fiscal years for which the contractor prepares capital budgets and overhead projections, and should be compatible with both of those procedures. More specifically, facilities values projected here should relate to facility - generated costs proposed or allowed in overhead rate projections.

**IDENTIFICATION.** Identify the contractor, profit center, address and fiscal years to which the data pertains. Sufficient fiscal years must be projected to cover the estimated performance periods of contracts to be negotiated.

**DEFINITIONS.** See ASPR 3-808.7(e)(3)(i) for definitions of the facilities values to be included, the different sources and classes of those values, the distinctions between Distributed and Undistributed facilities, and definitions of Productive Burden Centers and Overhead Allocation Bases.

**PRODUCTIVE BURDEN CENTERS.** List every Productive Burden Center within the Profit Center for which overhead rates are calculated for the allocation of indirect costs. The structure reported must be compatible with that used in DD 633 cost proposals or supporting detail.

**LAND, BUILDINGS, EQUIPMENT.** 'Land' is non-depreciable realty, improvements and property rights. 'Buildings' is depreciable realty and related improvements. 'Equipment' is all depreciable property other than Buildings.

**RECORDED, LEASED PROPERTY, CORPORATE.** 'Recorded' facilities are the normal Fixed Assets owned by and carried on the books of the Profit Center. 'Leased Property' is the capitalized value of leases for which constructive costs of ownership have been allowed in lieu of rental costs under ASPR 15-205.34 & .48. The government determination must be identified. 'Corporate' facilities are

the Profit Center's allocable share of corporate-owned and leased facilities. All of the above are summed on the 'Total' line which represents the Profit Center's total facilities values recognized for this purpose.

**DIRECT DISTRIBUTION.** (Col's 1a, b, c). All facilities values that are identified in the plant records as wholly assigned to or located in Productive Burden Centers, are listed against the applicable P.B.C. Detail is totaled upward to the Profit Center 'Distributed' line. Profit Center 'Undistributed' is the remainder of the P.C. 'Total'. Both source and distribution of Profit Center facilities values must balance at the 'Total' line.

**ALLOCATION OF UNDISTRIBUTED.** (Col's 2a, b, c). Profit Center 'Undistributed' facilities are allocated to Productive Burden Centers on any reasonable basis that approximates the actual absorption of the related costs of such facilities. This allocation will usually reflect the method of allocating G&A and/or Service Center costs for the purpose of computing overhead rates.

**PRODUCTIVE BURDEN CENTER**

**TOTAL NET BOOK VALUE** (Col's 3a, b, c). The sum of Col's 1a, b, c, & 2a, b, c. Total each class of facility separately, and prove back to the Profit Center 'Total'.

**OVERHEAD ALLOCATION BASE** (Col 4). The direct input bases (e.g., DLS, DLH, DMS, M-H, etc.) projected to be incurred in or by each P.B.C. (including service/support centers) for the purpose of allocating overhead or use charges. Identify each base unit-of-measure, which must be compatible with the bases used for applied overhead in DD 633 cost proposals or supporting detail. Quantities must agree with negotiated overhead rates for forward pricing purposes or FPRAs (ASPR 3-807.12).

**PROJECTED FACILITIES CAPITAL-EMPLOYED FACTORS** (Col's 5a, b, c). The quotients of the P.B.C. Total Net Book Values (Col's 3a, b, c) separately divided by the P.B.C. Overhead Allocation Bases (Col. 4). Carry each Factor to three decimal places, e.g., X.XXX. This Factor represents the amount of Facilities Capital required to support each unit of the Overhead Allocation Base.

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APPENDIX J  
DD FORM 1861



## APPENDIX J (Continued)

INSTRUCTIONS  
(DD Form 1861)

**PURPOSE.** The purpose of this form is to compute the estimated Contract Capital Turnover Rate, as an index of capital employed on the Contract. An intermediate step is to determine the facilities capital to be employed in each Profit Center and Productive Burden Center, using the Facilities Factors developed on DD Form 1860.

**HEADING.** Complete the identification data at the top of the form. The Performance Period determines the Facilities Factors, by Fiscal Year, that must be used in the computations.

**1. PROFIT CENTERS AND PRODUCTIVE BURDEN CENTERS.** List the contractor Profit Centers and Productive Burden Centers that will perform work on this procurement action. The breakdown is extracted from the cost proposal shroudout, price analysis report and/or audit report, and must correlate to the facilities breakdown used on DD Form 1860.

**2. FISCAL YEARS.** For each of the above organizational elements, breakout the Fiscal Years of performance by each. This breakout is secured from the same source as the above.

**3. CONTRACT OVERHEAD ALLOCATION BASES.** For each Productive Burden Center and Fiscal Year, enter the amount of the related Allocation Base used to derive the contract estimated total cost. These bases should be the same as those used for burdening contract overhead. The base units of measure (e.g., DLS, DLH, DMS, etc.) must agree with those used in Col. 4 of DD Form 1860.

**4a, b & c. FACILITIES CAPITAL EMPLOYED FACTORS.** Carry forward the appropriate Facilities Factors from Col's 5 of DD Form 1860. Profit Centers, Productive Burden Centers and Fiscal Years must agree.

**5a, b & c. FACILITIES CAPITAL EMPLOYED AMOUNTS.** The products of each Contract Overhead Allocation Base (3) times its related Facilities Factors (4a, b & c).

**6. CONTRACT FACILITIES CAPITAL EMPLOYED.** Sum the above to determine the total facilities capital employed, by class.

**7. CONTRACT OPERATING CAPITAL EMPLOYED.** Carry forward the Operating Capital from DD Form 1858 or 1859.

**8. TOTAL CAPITAL EMPLOYED.** The sum of all classes of capital employed (lines 6 & 7).

**9. CONTRACT TOTAL ESTIMATED COST.** The total estimated or proposed cost, or cost objective, for the contract. For a contractor, this must agree with his DD Form 633 cost proposal. For a procurement contracting officer, with his DD Form 1547, total cost objective.

**10. CONTRACT CAPITAL TURNOVER RATE.** The quotient of Contract Total Estimated Cost (9) divided by the Contract Total Capital Employed (8).

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APPENDIX K  
DD FORM 633

APPENDIX K

DEPARTMENT OF DEFENSE CONTRACT PRICING PROPOSAL		Form Approved Public Domain No. 12-8180	
This form is for use when submission of cost or pricing data (see ASPR 3-007.3) is required		PAGE NO.	NO. OF PAGES
NAME OF OFFEROR		SUPPLIES AND/OR SERVICES TO BE FURNISHED	
HOME OFFICE ADDRESS (Include ZIP Code)		QUANTITY	TOTAL AMOUNT OF PROPOSAL \$
DIVISIONS AND LOCATIONS WHERE WORK IS TO BE PERFORMED		GOVERNMENT SOLICITATION NO.	
COST ELEMENTS		PROPOSED CONTRACT ESTIMATE	
		TOTAL COST <sup>1</sup>	UNIT COST <sup>2</sup>
1. DIRECT MATERIAL			REFERENCE <sup>3</sup>
A. PURCHASED PARTS <sup>4</sup>			
B. SUBCONTRACTED ITEMS <sup>5</sup>			
(1) RAW MATERIAL <sup>6</sup>			
(2) STANDARD COMMERCIAL ITEMS <sup>6</sup>			
(3) INTERDIVISIONAL TRANSFERS AT COST (or other than cost) <sup>6</sup>			
2. MATERIAL OVERHEAD <sup>7</sup>			
3. INTERDIVISIONAL TRANSFERS AT COST <sup>7</sup>			
4. DIRECT ENGINEERING LABOR <sup>8</sup>			
5. ENGINEERING OVERHEAD <sup>8</sup>			
6. DIRECT MANUFACTURING LABOR <sup>9</sup>			
7. MANUFACTURING OVERHEAD <sup>9</sup>			
8. OTHER COSTS <sup>10</sup>			
9. SUBTOTALS			
10. GENERAL AND ADMINISTRATIVE EXPENSES <sup>11</sup>			
11. ROYALTIES <sup>12</sup>			
12. FEDERAL EXCISE TAX <sup>13</sup>			
13. SUBTOTALS			
14. PROFIT OR FEE			
15. TOTAL PRICE (Amount)			
<p>I HAVE THE DEPARTMENT OF DEFENSE, NATIONAL AERONAUTICS AND SPACE ADMINISTRATION, OR THE ATOMIC ENERGY COMMISSION REPRODUCED AND REVIEWED YOUR ACCOUNTS OR RECORDS IN CONNECTION WITH ANY OTHER GOVERNMENT PRIME CONTRACT OR SUBCONTRACT IN THE PAST TWELVE MONTHS.</p> <p><input type="checkbox"/> YES <input type="checkbox"/> NO IF YES, IDENTIFY BELOW.</p>			
NAME AND ADDRESS OF REVIEWING OFFICE (Include ZIP Code)		TELEPHONE NUMBER	
<p>16. WILL YOU REQUIRE THE USE OF ANY GOVERNMENT PROPERTY IN THE PERFORMANCE OF THIS PROPOSED CONTRACT?</p> <p><input type="checkbox"/> YES <input type="checkbox"/> NO IF YES, IDENTIFY ON A SEPARATE PAGE.</p>			
<p>17. DO YOU REQUIRE GOVERNMENT CONTRACT FINANCING TO PERFORM THIS PROPOSED CONTRACT?</p> <p><input type="checkbox"/> YES <input type="checkbox"/> NO IF YES, IDENTIFY: <input type="checkbox"/> ADVANCE PAYMENTS <input type="checkbox"/> PROGRESS PAYMENTS OR <input type="checkbox"/> GUARANTEED LOANS</p>			
<p>18. HAVE YOU EVER AWARDED ANY CONTRACTS OR SUBCONTRACTS FOR SIMILAR ITEMS WITHIN THE PAST THREE YEARS?</p> <p><input type="checkbox"/> YES <input type="checkbox"/> NO IF YES, SHOW CUSTOMERS AND CONTRACT NUMBERS OR: ON OR ON A SEPARATE PAGE.</p>			
<p>19. DOES THIS COST SUMMARY CONFORM WITH THE COST PRINCIPLES SET FORTH IN ASPR, SECTION 37 (201-207.3)(X)(2)?</p> <p><input type="checkbox"/> YES <input type="checkbox"/> NO IF NO, EXPLAIN ON A SEPARATE PAGE.</p>			
<p>This proposal is submitted for use in connection with and in response to _____</p> <p>_____ and reflects our best estimates as of this date.</p>			
<p>In accordance with the instructions to offerors and the footnotes which follow: "DESCRIBE RFP, ETC."</p>			
TYPED NAME AND TITLE		SIGNATURE	
NAME OF FIRM		DATE OF SUBMISSION	

DD FORM 633  
1 APR 66

PREVIOUS EDITIONS ARE OBSOLETE.

[Source: Armed Services Procurement Regulation F-200.633]

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## APPENDIX K (Continued)

## F-200.633 DD Form 633: Contract Pricing Proposal—Continued

## INSTRUCTIONS TO OFFEROR

1. The purpose of this form is to provide a standard format by which the offeror submits to the Government a summary of incurred and estimated costs (and attached supporting information) suitable for detailed review and analysis. Prior to the award of a contract resulting from this proposal, the offeror shall, under the conditions stated in ASPR 3-807.3, be required to submit a Certificate of Current Cost or Pricing Data (see ASPR 3-807.3(a) and 3-807.4).

2. As part of the specific information required by this form, the offeror must submit with this form, and clearly identify as such, cost or pricing data (that is, data which is verifiable and factual and ascertainable as defined in ASPR 3-807.3(a)). In addition, he must submit with this form any information reasonably required to explain the offeror's estimating process, including:

a. The judgmental factors applied and the mathematical or other methods used in the estimate including those used in projecting from known data, and

b. The contingencies used by the offeror in his proposed price.

3. When attachment of supporting cost or pricing data to this form is impracticable, the data will be specifically identified and described (with schedules as appropriate), and made available to the contracting officer or his representative upon request.

4. The formats for the "Cost Elements" and the "Proposed Contract Estimate" are not intended as rigid requirements. These may be presented in different format with the prior approval of the contracting officer if required for more effective and efficient presentation. In all other respects this form will be completed and submitted without change.

5. By submission of this proposal, offeror, if selected for negotiation, grants to the contracting officer, or his authorized representative, the right to examine, for the purpose of verifying the cost or pricing data submitted, those books, records, documents and other supporting data which will permit adequate evaluation of such cost or pricing data, along with the computation and projections used therein. This right may be exercised in connection with any negotiations prior to contract award.

## FOOTNOTES

NOTE 1. Enter in this column those necessary and reasonable costs which in the judgment of the offeror will properly be incurred in the efficient performance of the contract. When any of the costs in this column have already been incurred (e.g., on a letter contract or change order), describe them on an attached supporting schedule. When "preproduction" or "startup" costs are significant or when specifically requested in detail by the contracting officer, provide a full identification and explanation of same.

NOTE 2. The use of this column is optional for multiple line item proposals, except where the contracting officer determines that a separate DD Form 633 is required for selected line items.

NOTE 3. Attach separate pages as necessary and identify in this column the attachment in which the information supporting the specific cost element may be found. No standard format is prescribed; however, the cost or pricing data must be accurate, complete and current, and the judgment factors used in projecting from the data to the estimates must be stated in sufficient detail to enable the contracting officer to evaluate the proposal. For example, provide the basis used for pricing the bill of materials such as by vendor quotations, shop estimates, or invoice prices; the reason for use of overhead rates which depart significantly from experienced rates (reduced volume, a planned major rearrangement, etc.); or justification for an increase in labor rates (anticipated wage and salary increases, etc.). Identify and explain any contingencies which are included in the proposed price, such as anticipated cost of rejects and defective work, anticipated costs of engineering redesign and retooling, or anticipated technical difficulties in designing high-risk components.

NOTE 4. Provide a list of principal items within each category of material indicating known or anticipated source, quantity, unit price, competition obtained, and basis of establishing source and reasonableness of cost.

NOTE 5. Include material for the proposed contract other than material described in the other footnotes under the cost element entitled "Direct Material."

NOTE 6. Include parts, components, assemblies, and services to be produced or performed by other than you in accordance with your designs, specifications, or directions and applicable only to the prime contract.

NOTE 7. Include raw and processed material for the proposed contract in a form or state which requires further processing.

NOTE 8. Include standard commercial items normally fabricated in whole or in part by you which are generally stocked in inventory. Provide explanation for inclusion at other than the lower of cost or current market price.

NOTE 9. Include all materials sold or transferred between your plants, divisions or organizations under a common control at other than cost to the original transferor and provide explanation of pricing method used.

NOTE 10. Indicate the rates used and provide an appropriate explanation. Where agreement has been reached with Government representatives on the use of forward pricing rates, describe the nature of the agreement. Provide the method of computation and application of your overhead expense, including cost breakdown and showing trends and budgetary data as necessary to provide a basis for evaluation of the reasonableness of proposed rates.

NOTE 11. Include separate breakdown of costs.

NOTE 12. Provide a separate breakdown of labor by appropriate category and furnish basis for cost estimates.

NOTE 13. Include all other estimated costs (e.g., special tooling, facilities, special test equipment, special plant rearrangement, preservation packaging and packing, spilage and rework, and warranty) which are not otherwise included. Identify separately each category of cost and provide supporting details. If the proposal is based on a F.O.B. destination price, indicate separately all out-of-pocket transportation costs included in total amount.

NOTE 14. If the total cost entered here is in excess of \$250, provide on a separate page for an DD Form 783, *Royalty Report* the following information on each separate item of royalty or license fee: name and address of licensor; date of license agreement; patent numbers, patent application serial numbers, or other basis on which the royalty is payable; brief description, including any part or model numbers of each contract item or component on which the royalty is payable; percentage or dollar rate of royalty per unit; unit price of contract item; number of units; and total dollar amount of royalties. In addition, if specifically requested by the contracting officer, a copy of the current license agreement and identification of applicable claims of specific patents shall be provided.

NOTE 15. Selling price must include any applicable Federal excise tax on finished articles.

F-200.633

ARMED SERVICES PROCUREMENT REGULATION

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Major Donald E. Leedle was born in Durand, Michigan, November 7, 1940. His family moved to Detroit, Michigan, in 1944 where he obtained his primary and secondary education. Major Leedle graduated from Wayne State University, Detroit, Michigan, in 1964 with a Bachelor of Arts in Chemistry.

Major Leedle has spent four years in materials engineering, four years as a laboratory chief in the PACAF area and three years as a buyer at the Space and Missile Systems Office prior to entering AFIT.

Captain Ronald K. Coslett was born and reared in Downers Grove, Illinois. He received a Bachelor of Science degree in Industrial Management from Purdue University in 1966. In August 1966 Captain Coslett entered the Air Force through ROTC in the Procurement career field. He has been assigned to Warner Robins ALC for three years; Wiesbaden, Germany, for one year; Izmir, Turkey, for one year; the Air Force Inspection and Safety Center, Norton AFB, California, for two years; Martin-Marietta Corporation in Denver, Colorado, in EWI for one year; and the Air Force Contract Maintenance Center in Ping Tung, Taiwan, for two years. Upon graduation from AFIT in September 1976, he will be assigned to the F-16 SPO in ASD, Wright-Patterson AFB, Ohio.