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FINAL REPORT

CONTRACT NASW-1826



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I. BACKGROUND

The Government Contracts Program of The George Washington University developed a training course on Profit and Fee Negotiation for the National Aeronautics and Space Administration under contract NASW-1532. The course was given to 178 NASA procurement personnel at NASA Headquarters, Ames, Kennedy Space Center, Lewis Research Center, Manned Spacecraft Center, Langley Research Center, Goddard Space Center and Marshall Space Flight Center. As part of the task of development of the training course, the George Washington University developed several new profit analysis techniques, including a method of performing Return on Investment analysis. NASA then decided to enter into a controlled testing phase of these newly developed profit analysis techniques. By memorandum from NASA Headquarters, each NASA Center was requested to furnish negotiation memoranda on new procurements over \$100,000 detailing the present methods and techniques which the negotiators used in determining the profit negotiation. In addition, the centers were requested to furnish a profit objective analysis using the newly developed techniques including Return on Investment analysis. The profit objectives developed under the latter methods were not to be used in negotiations. The Government Contracts Program of The George Washington University was then awarded Contract NASW-1826 to monitor, evaluate and analyze these negotiation memoranda.

The results of our analysis of these negotiation memoranda were furnished to NASA in an interim report dated April 23, 1970. Since no further negotiation memoranda were received from NASA Centers it was decided to modify the contract to provide for other analysis affecting profit. Accordingly, Amendment 2 to Contract NASW-1826 was executed and provided for (1) a list and explanation of the factors affecting profit or fee objectives for the types of contracts negotiated by NASA and (2) a proposed technique or method for the negotiation of profit which shall provide for consideration of pertinent factors influencing profit.

This constitutes the final report under the contract, as amended.

II. EVALUATION OF NEGOTIATION MEMORANDA

A. Summary

A comparison of the differing profit computation is contained in Table A entitled "Summary of Negotiation Memoranda." (see page 3)

B. Analysis

Although the number of negotiation memoranda submitted was not as great as had been expected, sufficient data was gathered to perform a meaningful evaluation and analysis.

Present Profit Negotiation Techniques

The rationale used by the negotiators in developing negotiation objectives followed very closely the factors set

TABLE A - SUMMARY OF NEGOTIATION MEMORANDA

	<u>Location</u>	<u>Contract Type</u>	<u>Nature Of Work</u>	<u>Profit</u>	
				<u>Actually Negotiated</u>	<u>Simulated Profit</u>
1	Marshall	CPFF	R&D	\$ 17,700	\$ 32,620
2	Pasadena	CPIF	Hdwe. Dev.	836,000	1,019,802
3	Kennedy	CPFF	Support Svcs.	240,000	74,798
4	"	CPFF	Support Svcs.	3,129,000	1,696,662
5	"	CPAF	Services	1,450,588	332,421
6	"	CPAF	Support Svcs.	1,109,806	218,329
7	"	FFP	Systems Eng.	951	367
8	Ames-Moffett	CPFF	R&D	30,650	31,045
9	Flight Res. Ctr.	CPFF	Support Svcs.	18,349	13,629
10	"	FFP	Manufacture	19,195	47,649
11	Langley	CPIF	Initial Hdwe.	141,887	92,861
12	Marshall	CPIF	Config. Mgmt.	240,680	86,355
13	Houston	CPFF	R&D	12,500	2,850
14	"	FFP	Hdwe.	18,558	19,625
15	"	CPFF	R&D	181,000	231,767
16	"	CPFF	Support Svcs.	196,000	164,895
17	"	CPFF	Support Svcs.	188,000	113,356
18	Marshall	FFP	Hdwe. Follow-on	14,000	15,418

forth in NASA PR 3.808-2. In fact most of the centers have developed forms which require the negotiator to consider these factors in a systematic way. Some have even set up weighting formulae within these factors. However, this has not taken away the discretion of individual negotiators since many areas of subjective judgment remain. In this regard, it was not possible within the dictates of the study to make any conclusions concerning consistency and uniformity of treatment for the various factors. Such an undertaking, would, of course, require a major fact gathering and analysis effort. It should be noted that the negotiation memoranda analyzed for this report were a quantum improvement in the area of profit analysis and justification over those analyzed in conjunction with the effort under contract NASW-1532. They contained better documentation, were more specific and were more well reasoned.

Measurement of Investment

There were no major problems encountered in measuring the investment. There were only two negotiators who indicated difficulty in obtaining data and even so, they were able to complete a satisfactory investment analysis. All negotiators properly computed the investment indicating no major problems with the methods and techniques established for investment computation.

Performance, Management and Risk Factors

The use of the nomographs as a means of systematic consideration of these factors appeared to present no major problems. The negotiators nomographic presentations were

straightforward and easy to understand. The one defect was the failure of some negotiators to adequately document their reasons for selecting points on the nomographs.

Comparison of Profit Objectives

It is in the area of comparing profit objectives established under present techniques with those established under return on investment analysis that perturbations and difficulties appear. As is apparent from inspection of the profit dollars established under each method, the return on investment profits may range from 20% to 240% of the negotiated profits. In some cases this would present a difficult if not impossible negotiating position if the negotiator were to attempt to actually negotiate at this time on the investment basis. The profit dollars actually negotiated totalled \$7,844,864 while the simulated profit on investment analysis totalled \$4,195,019. This excess of 87% is at first startling. However, further analysis indicates that the major cause of these perturbations are the service contracts. In fact, when the service contracts are removed from the sample, thus leaving research and development and hardware contracts, the investment profits are 17.5% greater than negotiated profits. There does not appear to be any discernable pattern between the research and development and hardware negotiations reported.

C. Conclusion

Measurement of investment is feasible and negotiators

are able to perform investment analysis under operating conditions. Determination of profit through investment analysis does not appear to present major problems in overall effect on research and development and hardware contracts although individual contracts could vary widely either greater or lower. However, where service contracts are concerned, it is evident that determination of profit through return on investment is not feasible without major policy changes.

III. FACTORS INFLUENCING PROFIT OR FEE OBJECTIVES

Of the many factors which influence profit or fee objectives, two of the most important considerations are the conceptual nature of profit and the methods or techniques used to measure profit. The following discussion deals with the areas.

A. Nature and Uses of Profit

In the economic sense, profit is the payment to an entrepreneur who undertakes the risks of enterprise. The accountant considers profit to be the excess of revenue over costs of a commercial or business enterprise. The Government negotiator's view of profit or fee generally follows both of these concepts. Procurement regulations dealing with profit are primarily concerned with the use of profit as a means of motivating contractors by providing a reward or incentive for performance or compensation for capital supplied and risk undertaken. See, for example, NASA PR 3.402(a), 3.806 and 3.808. In addition, statutes dealing with profit or fee focus on the

accounting standard. See 10 U.S.C. §2306(d). However, there are other facets of profit which are of equal, if not greater importance, to the business enterprise and, indirectly, to the Government. The various uses which a business makes of its profits should be considered. Therefore, the following discussion will deal with the functions which profit must perform for a business involved in Government contracting. If consideration is not given to these functions in the establishment of negotiated profits for Government contracts, the contractor will not be able to provide and thus, the Government will not be able to enjoy, the benefits they obtain. The rules of cost allowability applicable to the negotiation and administration of Government contracts prohibit the recovery of these items as cost. Although it would be absurd to suggest that unallowable costs be computed and then included in negotiated profit on a dollar for dollar basis, it must be remembered that profits are the only source for such costs which are generally considered as necessary for the operation of a business. Thus, if profit dollars are not sufficient to provide for these functions, the business cannot long survive. If sufficient number of businesses either fail or leave the Government market because the rewards are insufficient, the Government can lose in two ways. First, the mobilization base may be jeopardized and second, there may not be sufficient firms remaining to make the Government's competitive system work.

1. Compensation For Capital

Profit is the source of dividends to shareholders who have invested their capital in the company. Of course, some companies are considered successful even though they have never paid a dividend. In fact, some investors are more interested in growth potential rather than dividends. However, a company's ability to pay dividends usually has a direct effect on the entire financial position of the business. Equity financing may become difficult and creditor's terms on debt financing are likely to be harsh if a company fails to pay dividends. Thus, the payment of dividends can be looked at as the basic foundation of a company's financial structure.

2. Replacement, Modernization or Expansion of Plant and Equipment

Shareholder's contributions are used for the initial acquisition of plant and equipment. Depreciation, which is an allowable item of cost under Government contracts, provides for the recovery to the company of the cost of the plant and equipment. However, depreciation does not cover replacement value and inflation often causes a business to spend an amount greater than accumulated depreciation for the purposes of replacing worn or obsoleted plant and equipment. Similarly, the funds for expansion of plant and equipment are not funded from allowable costs. Such capital may be initially obtained from equity or debt financing, but profits have been the traditional source of expansion capital.

It should be noted that expansion may be directed at increasing overall plant capacity or may be for the purpose of acquiring plant and equipment which will increase the efficiency of the contractor's operations. Both features ultimately inure to the benefit of the contractor's customers.

3. Payment of Management.

Profit is often used as a basis or indicator of the compensation which a business pays to its management. In such cases, if profits decline for reasons not within the control of management, the company will have a difficult time retaining its personnel. There is some question, however, whether this factor should be considered in negotiating profits on Government contracts since such payments are generally reimbursed as allowable costs.

4. Support of Independent Research and Development

A portion of the costs associated with the development of new products, processes or items must be supported by the contractor from his profits since the Government does not normally reimburse the contractor for the full costs of his independent research and development. While these costs benefit the contractor by making him more competitive they also benefit the Government by creating the basis for technological and price competition.

5. Support of Unallowable Costs

There are several items of cost not connected directly with contract performance which are generally con-

sidered necessary for a business, but which are not allowable. Included are such costs as contributions and donations, interest on borrowing and advertising. Profits are the source of funds for such costs. There may be other unallowable costs which should not be considered by the Government negotiator in negotiating profits. For example, it would appear inappropriate to give consideration in profit for such costs as entertainment, fines and penalties.

6. Losses

Another function of profits is to enable the contractor to survive loss contracts by permitting him to offset losses against profits. The Government's Cost Principles preclude such recovery through cost. Further, the Cost Principles and negotiating practices discourage or prohibit the use of contingencies. Thus, profit may be the only "safety valve" for a tightly priced fixed price or incentive contract. In addition, there are many cases of uncompensated overruns on cost reimbursement contracts. Again, profits are the major source for the payment of such costs by the contractor.

7. Organizing and Maintaining Capability

The Government depends upon the contracting community to organize and mobilize the resources necessary to perform its work. When a contractor enters the Government contract market, he takes a considerable risk that his costs of organizing for performance (personnel and productive capacity) will be amortized over the volume he can reasonably anticipate. However, the cyclical nature of the Government

contracts market often results in a contractor's volume being drastically reduced. Cancellation of Government programs, shifts in appropriations or apportionment of funds, terminations for convenience of the Government, etc., may cause loss of business through no fault of the contractor or his performance. Thus, the contractor is faced with two alternatives. He may maintain his excess and unused capacity until further opportunities arise or he can wind up the business. Costs incurred in either of these actions are not recoverable as allowable costs. Thus, the support of such contingencies is another function of profit. While it may be contended that these same risks exist for the venturer in the commercial market, the Termination For The Convenience Of The Government clause included in practically all Government contracts is not generally applicable to commercial contracts. In addition, the unique nature of many Government programs makes it impossible, as a practical matter, for the contractor to seek alternative markets or uses for its facilities

The functional analysis of profits for Renegotiation purposes is discussed by Arthur E. Burns in his article, "The Tax Court and Profit Renegotiation," 13 Journal of Law and Economics 307 (1970). Prof. Burns suggests that the functions of profit can be summarized under the following broad headings, which correspond generally to the uses of profit discussed above:

- (a) Managerial remuneration
- (b) Compensation for capital supplied
- (c) Compensation for risk bearing
- (d) Compensation for organization and mobilization
- (e) Compensation for innovation

He also recommends that consideration should be given to these functions in establishing Government contract profits.

B. Methods of Measuring Profit

In the final analysis, the only true measure of profits is in terms of dollars. However, for purposes of comparability, uniformity, and analysis, rates of profit are used to describe the profitability of a particular enterprise or job. In the discussion which follows, we deal with the nature of the most common ratios used to measure profitability.

1. Sales and Cost of Sales

The percentage of cost of performance technique and its companion, the cost of sales method, has been practically the only means of profit measurement used by the Government contracting community. Both Government and industry personnel usually think of profit rates in terms of a percentage of the cost of performance. The validity of this technique is that it tends to raise or lower the profit based upon the amount of effort which the contractor is to undertake. The theory is that the cost of a project will reflect the degree of management and the amount of risk involved. To a point, this theory is correct. Assuming that the same type of contract is used, that the mix of work is identical, and that

other factors are the same, the larger project will often require a higher degree of management and involve greater risk than the smaller one. However, this is not always so. The larger project may be of sufficient size to permit the contractor to establish management controls as direct costs and as a result, he may be better equipped to manage the job than the contractor on the smaller project. Of course, the cost of the management controls would be allowable and borne by the Government. As to contract risk, there are usually more opportunities for a contractor on the larger project to offset areas of increased cost against areas of decreased cost because more individual elements of cost are normally involved. Thus, the smaller contractor may actually bear a greater degree of contract risk and management than the larger contractor.

Another problem associated with the cost of sales technique is that it is somewhat insensitive to changes in volume which do not require additional investment by the contractor. For example, suppose an airframe contractor had a contract for production of 300 aircraft which utilized his plant for one shift, and the Government orders 300 additional aircraft which the contractor can produce without additional investment by adding a second shift. In all probability, the same profit rate would be negotiated for the second quantity as for the initial quantity assuming the same type of contract and pricing within the same time period. At the same time it is quite unlikely that the contractor would have a correspondingly increased investment.

A further disadvantage of the profit on cost ratio is that its use provides no incentive for a contractor to take steps to reduce his costs through investment. In fact, it motivates the contractor to do just the opposite. Under this system, the greater the contractor's cost, the higher his profit will be. Therefore, a contractor, particularly in view of the unallowability of interest, would be foolish to invest in plant or equipment which would reduce his overall cost of performance. His profit would be lower and he would receive no compensation for the capital he had to invest in the facilities. This "negative" incentive was discussed at length in Logistics Management Institute Task 66-12 dated September 1967 entitled, "Weighted Guidelines Changes and Other Proposals for Incentives for Contractor Acquisition of Facilities."

2. Investment

The comparison of profit to investment is relatively recent in the area of Government contracting. Therefore, there has been little experience using it to measure Government contract profits. Application of a percentage to a contractor's investment will undoubtedly be an accurate measure of the compensation which should be given for the capital provided by the contractor. However, the amount of capital provided by a contractor does not reflect the other functions which he undertakes. For example, the organizational and mobilization functions are not necessarily affected by the amount of capital provided nor is the degree of management or the contract risk. Of course, these functions could be recognized

in the return or investment technique by paying differentials. For example, the higher the contract risk the higher the return on investment would be. The contractor's performance of the organization and mobilization function would also be considered. The problem with using a return on investment system at this time is that there is not yet the degree of empirical data necessary to determine the size of these differentials for all types of contracts and industries. Comparability data is available on an industry-wide and on an individual company basis. From this data, ranges of return on investment for different types of ventures and different areas of risk can be obtained. An initial compilation of such data was included in the Appendices to the Profit and Fee Negotiation Manual prepared under Contract NASW-1532. An update of this data is included with this report. (See Appendices A through D). However, the question of whether such rates of return should be applied to Government contracts still remains. Experience thus far has shown that the return on investment approach will yield a profit similar to that obtained by the cost of sales method for most Government contracts. Investment computed profits, however, can be either very high or very low based upon the nature of the job and the industry involved. For example, see the results obtained in service contracts for the controlled test analyzed under Part II of this Report.

IV. INCORPORATING INVESTMENT ANALYSIS INTO NATIONAL AERONAUTICS AND SPACE ADMINISTRATION PROCUREMENT REGULATIONS

A. Recommendation

It is our recommendation that formal consideration be given to the rate of return on investment in negotiated contracts and amendments involving significant dollar amounts of profit. To this end, we have enclosed a proposed modification to the National Aeronautics and Space Administration procurement regulations which, we believe, would accomplish this result. Initially, we are suggesting that computation of investment be required for contracts and amendments exceeding \$100,000 and requiring cost or pricing data. It is our opinion that the dollar amount of profit involved in a pricing action under \$100,000 does not necessarily require the additional effort involved in investment analysis since the differences in profit between systems would rarely exceed \$3,000. However, there would appear to be no undue difficulty if this requirement were applied to all contract actions requiring submission and analysis of cost and pricing data.

It should be noted that we are not recommending the determination of profit by the application of a predetermined percentage or formula. We have preserved the principle stated in NASA PR 3.808-1. Our recommendation, if adopted, would require the discretion of the individual contracting officer and would permit the negotiation of higher or lower profits where circumstances warrant. However, it would require that differences between investment and sales computations of profit (1) be

recognized, and (2) be justified.

The proposed regulation does not specify the methods or techniques to be used for the computation of investment. There are several existing methods which would yield reasonably accurate measurements. However, for the sake of uniformity, it is recommended that the technique for investment computation described in the Profit and Fee Negotiation manual developed under Contract NASW-1532 be utilized. For that purpose, we have included a condensed excerpt from the Manual which could be used along with the proposed regulation. See subpart C, hereunder. Consideration might also be given to the techniques used by the General Accounting Office in its study of defense and aerospace profits and to the technique which is ultimately adopted by the Department of Defense when it modifies the weighted guidelines to provide for consideration of contractor's investment. Since the techniques used by the GAO have not formally been released and since the DOD system has not yet been finalized, it is not possible to comment upon them in detail. It is our understanding that the GAO technique closely resembles that spelled out in the Profit and Fee Negotiation manual as does the fixed asset portion of the DOD system. Our major concerns with the DOD system which was forwarded to industry for comment in September 1970 are (1) that it determines working capital ratios based upon past history, which may have little relationship to the working capital requirements for the period of proposed contract

performance, and (2) that it appears to be somewhat unnecessarily complex. We would be happy to comment on both these systems when they are released or finalized.

In our proposed regulation, we have selected 15% and 30% as cut-off points based upon our review of NASA business clearances, NASA and DOD statistical reports on profit, the Logistic Management Institute's reports on profits, cases involving renegotiation, and statistics involving both individual companies and industry-wide averages. Based upon this review, it is our opinion that rates of return below 15% or higher than 30% are exceptional. See, for example, the rates of return on total capital invested (TCI) in Appendices A through C hereunder. However, it should be understood that these rates of returns were not obtained through the use of a statistical analysis of deviations. Such an approach is not warranted at this time in view of the cost involved, and differences in the population, such as types of business endeavor and the nature of the customer involved. Neither is it our view that these cut-off points are low or high rates of return. There are many reasons why a rate of return greater than 30% or one lower than 15% may be a reasonable rate for a given procurement. The purpose of the proposed regulation is to see that these reasons are documented and reviewed.

B. Proposed Modification to National Aeronautics and Space Administration Procurement Regulations

3.808-3 Return on Investment. Because of the wide variations

in the rate of return on investment which are possible due to such factors as time and method of payment and amount of contractor fixed assets employed, an investment analysis shall be conducted for all new procurements and contract modifications (excluding final price redeterminations) which exceed \$100,000 and for which cost or pricing data is required pursuant to

3.807-3. The investment analysis shall be conducted as follows:

(i) The contractor's investment shall be computed using an accepted method of determining investment.

(ii) The dollar amount of profit or fee objective established pursuant to 3.808-1 shall then be applied to the investment to compute the return on investment for the proposed contract action.

(iii) If the rate of return on investment so computed is under 15% or over 30% on a before the tax basis, the negotiations memorandum shall contain, as a minimum, the following:

(a) An explanation of the reasons why the rate of return is either high or low as the case may be.

(i.e. no progress payments and an extended time for performance, high degree of Government-furnished facilities, little or no work in progress, etc.)

(b) A statement of the reasons justifying the negotiation of a dollar amount of profit which would yield the indicated rate of return.

(iv) In all procurements over \$500,000 where the indicated rate of return is under 15% or over 30% on a before the

tax basis, the negotiation memorandum shall be approved at a level higher than the contracting officer.

C. Method for Computing Investment

The determination of the rate of return on investment is accomplished by dividing the dollars of profit by the amount of investment. This is expressed by the formula:

$$\text{Return On Investment (ROI)} = \frac{\text{Profit \$}}{\text{Investment \$}}$$

Since investment rates (interest on borrowings, general financial return on investment, etc.) are generally thought of as "annual" rates, it is extremely important for the negotiator to keep in mind that he must "annualize" his figures or the rates he obtains will be distorted and not comparable. For example, a profit of \$50,000 earned on a job which took 3 months to complete and required a capital investment of \$1,000,000 for that period would not yield 5% ROI as might be indicated if the profit of \$50,000 were divided by \$1,000,000. The "proper" rate of ROI in that case would be 20% which would be obtained by dividing the "annualized" profit (\$50,000 x 4 quarters) of \$200,000 by the investment of \$1,000,000. Similarly if an investment of \$1,000,000 is required for a period of 24 months and a profit of \$100,000 is earned for the period, the rate of ROI would not be obtained by dividing the profit of \$100,000 by the investment of \$1,000,000. The proper rate of ROI would be 5% and is obtained by dividing the "annualized" profit (\$100,000/2) of \$50,000 by the investment of \$1,000,000. The method of determining investment which is discussed below

takes annualization into consideration.

1. Contract Investment

The computation of contractor investment required for the performance of a contract is accomplished in two parts. The first part, which we call "Contract Investment" and is roughly the equivalent of working capital is dealt with in this section. The following section deals with fixed asset investment, and the third and final section deals with the application of estimated profit to the total investment.

Costs to be incurred by the contractor will ultimately result in expenditures and, therefore, investment. By determining the monthly costs to be incurred by the contractor and determining the time and amounts of payment by the Government, it is possible to determine a portion of the amount of contractor investment for the performance of the contract.

Thus, the Average Contract Investment can be expressed in the following formula:

$$\text{Average Contract Investment (ACI)} = \frac{\text{Cost Incurred} \times \text{months unreimbursed}}{\text{Total months of performance}}$$

If the contractor incurred \$12,000 of costs on the first day of the month and was reimbursed on the last day of the month and the total period of contract performance was one month, his ACI would be calculated as follows:

$$\text{ACI} = \frac{\$12,000 \times 1}{1} = \$12,000$$

The ACI would be annualized by multiplying by the number of years of contract performance -- 1/12 of a year in this case. However, it is very unlikely for costs to be incurred

on the first day of the month. The normal situation is for costs to be incurred throughout the month. Thus, if \$1,000 were incurred per day for 30 days, the total costs incurred would be \$30,000. However, the full \$30,000 would not have been unreimbursed for a full month. The first \$1,000 would be unreimbursed for 30 days, the 2d for 29 days, etc. and the last \$1,000 would have been unreimbursed for only one day. Assuming an even flow of costs and payment at the end of the month, \$30,000 would be unreimbursed for 1/2 of a month. Assuming that this \$30,000 was reimbursed to the contractor on the fifteenth of the month following the month of cost incurrence, the full \$30,000 would be unreimbursed for an additional 15 days (1/2 month) and the total unreimbursed time would be 1 month. Assuming payment at the end to the month following incurrence, the unreimbursed period would be 1-1/2 months. For each additional month without reimbursement, an additional month would be added.

In order to apply this concept to a negotiating situation, we must determine the monthly costs, the method of payment, and the billing lag. Assume that a cost reimbursement contract is to be negotiated. Also assume that actual costs will be reimbursed upon the submission of monthly vouchers, that the contractor will submit vouchers 10 days after the end of each month, that the Government will require 10 days to process the voucher and draw a check and that 4 days mailing and handling time will be required. On this basis, the contractor's unreimbursed time for each month's incurred costs would be:

Month costs incurred	15 days
Billing time	10 days
Processing time	10 days
Mailing & Handling	<u>4 days</u>
Total	39 days

The 39 days can be expressed as 1.3 months and based upon the following estimate of monthly costs the Average Contract Investment would be as shown in Table B which follows. From Table B, it can be seen that this computation can be short cut and that monthly costs are not required if 100% payment throughout the contract performance period would be made uniformly. The total of the monthly investments (\$1,300,000) is equal to the total estimated cost of the project multiplied by the unreimbursed time ($\$1,000,000 \times 1.3 = \$1,300,000$). However, if uniform payment does not occur throughout the contract period, the monthly analysis must be made. Such a situation would occur where progress payments are liquidated or where costs must be carried unreimbursed for a number of months. Table C which follows represents the method of computing the Average Contract Investment for the same monthly costs but assumes that a lump sum fixed price contract without progress payments was involved and that payment would occur upon completion.

Next, assume that a fixed price contract with 80% progress payments and the same billing lay as in Table A is contemplated. Also assume that the contract calls for four items to be delivered, one each in July, September, November, and December, and that the unit price for each item is \$280,000.

TABLE B

	<u>COST</u> <u>INCURRED</u> X 1.3	<u>MONTHLY</u> <u>INVESTMENT</u>
Jan.	\$ 20,000	\$ 26,000
Feb.	40,000	52,000
Mar.	60,000	78,000
Apr.	70,000	91,000
May	80,000	104,000
June	90,000	117,000
July	100,000	130,000
Aug.	120,000	156,000
Sept.	140,000	182,000
Oct.	120,000	156,000
Nov.	100,000	130,000
Dec.	<u>60,000</u>	<u>78,000</u>
Total	\$ 1,000,000 X	\$1,300,000
ACI - $\frac{\$1,300,000}{12}$ = \$ 108,333		

TABLE C

	<u>BEGINNING BALANCE</u>	<u>COST INCURRED</u>	<u>ENDING BALANCE</u>	<u>MONTHLY INVESTMENT*</u>
Jan.	\$ 0	\$ 20,000	\$ 20,000	\$ 10,000
Feb.	20,000	40,000	60,000	40,000
Mar.	60,000	60,000	120,000	90,000
Apr.	120,000	70,000	190,000	155,000
May	190,000	80,000	270,000	230,000
June	270,000	90,000	360,000	315,000
July	360,000	100,000	460,000	410,000
Aug.	460,000	120,000	580,000	520,000
Sept.	580,000	140,000	720,000	650,000
Oct.	720,000	120,000	840,000	780,000
Nov.	840,000	100,000	940,000	890,000
Dec.	940,000	60,000	1,000,000	970,000
Totals		<u>\$1,000,000</u>		<u>\$5,060,000</u>

$$ACI = \frac{\$5,060,000}{12} = \$ 421,666$$

*Note that the monthly investment is computed as follows:

$$\text{Monthly Investment} = \text{Beginning Balance} + 1/2 \times \text{Cost Incurred}$$

The Beginning Balance is always the same as Ending Balance of the previous month. The reason for adding only 1/2 the cost incurred for a given month is that the costs are considered not all to be incurred on the first day of the month but are considered to be spread over the entire month.

Table D shows the Average Contract Investment calculation. The effect of progress payment and 100% cost reimbursement can readily be seen by comparing the above three tables. By following the procedure outlined, the negotiator should be able to calculate the Average Contract Investment for any given procurement. All that is required is a monthly estimate of costs (which is practically a necessity for an informed cost analysis), an estimate of the billing and payment lag (information which should be readily available to the negotiator), and the method of payment.

It should be noted that by basing the calculation on estimated cost there is no need for the creation of a special data base. The investment calculation will be an estimate and it should have approximately the same degree of accuracy as the estimated cost. Several points should be emphasized:

1. Unusual accruals or long delays in paying bills by contractors may require an adjustment in the incurred cost or in the unreimbursed time otherwise calculated.
2. Delays in payment by the Government have the very serious consequence of increasing the contractor's investment substantially. While this phenomenon is not created by an investment analysis, it is highlighted.

2. Fixed Asset Investment

In this component of the investment computation we

TABLE D

	<u>BEGINNING BALANCE</u>	<u>COST INCURRED</u>	<u>PAYMENT</u>	<u>END BALANCE</u>	<u>MONTHLY INVESTMENT*</u>
Jan.	\$ 0	\$ 20,000	\$ 0	\$ 20,000	\$ 10,000
Feb.	20,000	40,000	16,000	44,000	36,800
Mar.	44,000	60,000	32,000	72,000	67,600
Apr.	72,000	70,000	48,000	94,000	97,400
May	94,000	80,000	56,000	118,000	122,800
June	118,000	90,000	64,000	144,000	150,200
July	144,000	100,000	72,000	172,000	179,600
Aug.	172,000	120,000	136,000	156,000	204,800
Sept.	156,000	140,000	96,000	200,000	206,800
Oct.	200,000	120,000	168,000	152,000	226,400
Nov.	152,000	100,000	96,000	156,000	182,800
Dec.	156,000	60,000	136,000	80,000	158,800
Jan.	80,000	<u>-0-</u>	<u>200,000</u>	<u>-0-</u>	<u>40,000</u>
Totals		\$1,000,000	\$1,120,000		\$1,683,000

$$ACI = \frac{\$1,683,000}{.12} = \$140,250$$

* Note that the monthly investment is computed as follows:

$$\text{Beginning Balance} + 1/2 \times \text{Cost incurred} - .20 \times \text{Payment.}$$

The Beginning Balance is always the Ending Balance of the previous month. The reason for adding 1/2 of the cost incurred for a given month is that the costs are considered not all to be incurred on the first day of the month but are considered to be spread over the entire month. The reason for subtracting only 20% of the Payment is that the money is available to the contractor only for that percentage of the month.

again have the problem of determining the amount of contractor investment to be allocated and the method of allocation. Again, our technique should be fair and equitable to both parties and should be simple and not burdensome to administer. Since fixed assets are generally included in overhead, our technique should be consistent with the contractor's overhead allocation procedures and accounting periods. These objectives can be attained by computing the Average Fixed Asset Investment (AFAI) for each accounting period in which the contract is to be performed. Average Fixed Asset Investment can be defined as the average book value of plant, equipment and land utilized by the contractor in a given accounting period for the performance of the contract. AFAI can be expressed by the following formula:

$$\text{AFAI} = \frac{\text{BNBV} + \text{ENBV}}{2} \times \text{Allocable Percentage}$$

BNBV represents Beginning Net Book Value and ENBV represents Ending Net Book Value. Net book value represents the acquisition cost of assets less depreciation. It is the measure of facility investment which is found in the balance sheet and is consistently used in financial analyses, internal revenue considerations and audit reports. Unrealized appreciation which could result in the asset having a higher market value than that shown on the books (cost less depreciation) is ignored. Thus, the contractor would normally get no consideration if his assets had a higher "market value" or if their

"earning power" indicated a greater value than that shown on the books. While there may be charges that such treatment is unfair, it has been and is consistently used in the financial and business community; it does represent the unrecovered money which the contractor had to expend for asset and does compensate him fairly for that expenditure. If fully depreciated facilities are still efficient and usable by the contractor, he does receive a compensating benefit in that he will not have to replace the equipment and can apply investment dollars elsewhere. This would increase his overall earning capability without requiring a corresponding increase in new capital. Finally, if unrealistic results were indicated by the use of Net Book Value, the negotiator could adjust these values either upward or downward, as the circumstances warrant.

By dividing the sum of the beginning and ending net book values of fixed assets we take an average value. This average contemplates that there will be no unusual additions or deletions in the makeup of the contractor's facilities. Should a major plant addition occur or should the contractor sell or otherwise dispose of a substantial portion of his facilities during the contract period an adjustment may be required. Thus, the major activity in the fixed asset account will consist of increases resulting from the purchase of new or additional assets and decreases resulting from depreciation and retirement of assets. The averaging technique assumes that these changes will occur ratably during

the year.

It should be noted that depreciation was retained in the overhead pools and thereby included as a cost under the Average Contract Investment (ACI) calculation. This is consistent with the use of the average net book value in the AFAI calculation since depreciation as a cost relieves the contractor's investment when paid ratably during the contract period. Thus, there is no overlap between the two calculations. One further point should be noted. The total net book value to be allocated must include the cost of land as well as all depreciable assets and must exclude excess facilities (NASA PR 15.205-9(e)).

The contractor's method of allocating depreciation to contracts as a cost is the key to allocating net book value of facilities to contracts. Under the provisions of NASA PR 15.205-9, 15.201-4 and 15.203 the allocation of depreciation as a cost should be accomplished in such a manner so as to be distributed "on the basis of the benefits accruing to the several cost objectives." Under these principles, the allocation of depreciation (normally accomplished through overhead) will be a reasonable indicator of the use of facilities. Although land will not be subject to depreciation, it will normally be utilized in the same ratio as buildings and equipment. However, if the contractor requires a large investment in land (for example, a target or testing range)

to perform a particular type of work, a special method of allocation may be required to fit the circumstances.

The most accurate allocation will result if the beginning and ending net book values for each cost center or overhead pool are determined. Then the total depreciation for the accounting period and the amount to be allocated to the contract during the period is determined, again by cost center. This technique can be demonstrated by taking a hypothetical case. Assume that a contract involving design and production is to be performed by a company which has three overhead pools -- Manufacturing Overhead, Engineering Overhead and General and Administrative. The calculation would be accomplished as shown in Table E.

It should be noted that the technique described in Table E is only one of many ways to equitably allocate the average net book value of facilities to individual contracts. Other techniques which may be more suitable under specific circumstances may also yield equitable results. For example, it may be found that the total fixed assets are being employed in the same ratio as some direct cost is being employed. Thus, if the total average fixed assets employed by a company are used in proportion to manufacturing labor, then the fixed assets could be allocated in the same ratio as manufacturing labor hours on the contract to total manufacturing labor hours for the contractor. There may be many other equitable ways to allocate fixed assets. The method chosen should be selected

TABLE E

COMPUTATION OF AVERAGE FIXED ASSET INVESTMENT

	<u>MFG.</u>	<u>ENG.</u>	<u>G&A</u>	<u>TOTAL</u>
Beginning NBV	\$1,250,000	\$500,000	\$250,000	\$2,000,000
Ending NBV	1,000,000	400,000	200,000	1,600,000
Total Depreciation \$ in OH Pools	250,000	100,000	50,000	400,000
Deprec. \$ allocated this contract	25,000	10,000	5,000	40,000

AFAI

MFG.	$\frac{\$1,250,000 + \$1,000,000}{2}$	X	$\frac{\$25,000}{\$250,000}$	=	\$112,500
ENG.	$\frac{\$500,000 + \$400,000}{2}$	X	$\frac{\$10,000}{\$100,000}$	=	45,000
G&A	$\frac{\$250,000 + \$200,000}{2}$	X	$\frac{\$5,000}{\$50,000}$	=	22,500
TOTAL	$\frac{\$2,000,000 + \$1,600,000}{2}$	X	$\frac{\$40,000}{\$400,000}$	=	\$180,000

on the basis of the accuracy of the resulting allocation, the effort required to compute the allocation and the availability of the information. While accuracy of allocation is desirable, it should not be pursued to the point of diminishing return.

The information required to use this technique should be available in the contractor's accounting, budgeting and pricing reports and records. The information is also of the type which the Government must have in negotiating overhead rates. However, it may not be readily available to the negotiator in the form required. Although no novel and burdensome reporting requirements are indicated it will undoubtedly involve some additional effort to assemble the required data in a usable form for the negotiator.

When contract performance extends over more than one accounting period, the AFAI will have to be determined for each accounting period, the AFAI will have to be determined for each accounting period and an average taken. Assuming that a contractor's fiscal year ran from January 1 to December 31 and that a contract began in June 1966 and ended on March 31, 1968, the AFAI's for 1966, 1967 and 1968 would have to be determined. If the amounts were \$300,000 for 1966, \$800,000 for 1967 and \$200,000 for 1968 the AFAI would be:

$$(\$300,000 \times \frac{7}{12}) + (\$800,000 \times \frac{12}{12}) + (\$200,000 \times \frac{3}{12})$$

or

$$\$175,000 + \$800,000 + \$50,000 = \$1,025,000$$

The above calculations of AFAI have been made for a complete contractor fiscal year. Special adjustments must be made if the contract period is less than a full fiscal year or extends over two or more fiscal years and/or the fixed asset employment is not uniform for such periods. In making these adjustments and calculations, the negotiator should always bear in mind that while asset utilization may vary from month to month, the methods of calculation prescribed herein average these variations out over the entire contract period. The following examples will illustrate this concept:

(a) Averaging Fixed Asset Investment When More Than One Fiscal Year is Involved

If two or more complete fiscal years of contract performance are involved, the averaging of fixed asset investment is relatively simple. The AFAI for each year is calculated, the AFAI's are added together and the sum is divided by the number of years involved. For example, if two complete years of contract performance are involved, and the AFAI for the first fiscal year is \$150,000 and for the second year \$100,000, then the AFAI for the contract period would be \$125,000 ($\frac{\$150,000 + \$100,000}{2} = \$125,000$).

Similarly, if the contract period is four complete fiscal years and the AFAI's for the four years are \$200,000, \$225,000, \$250,000 and \$25,000 respectively, the AFAI for the contract period

would be \$175,000

$$\frac{(\$200,000 + \$225,000 + \$250,000 + \$25,000)}{4} = \$175,000).$$

When the contract period extends over portions of two fiscal years or when the contract period spans one or more complete fiscal years and one or more portions of a fiscal year, the averaging is still accomplished, but the individual AFAI's must be weighted in order to obtain an appropriate average for the entire contract period. This is accomplished in the following example:

Assume that a contractor's fiscal year runs from January 1 to December 31 and that the contract period is to begin on June 1, 1971 and end on March 31, 1973. Also assume that the AFAI's for 1971, 1972 and 1973 are \$300,000, \$800,000 and \$200,000 respectively. The AFAI for the contract period would be computed by multiplying each AFAI by the number of months the assets were employed during the fiscal year involved by taking the sum of these products and dividing this sum by the total number of months involved in contract performance. The calculation would be as follows:

$$\frac{(\$300,000 \times 7) + (\$800,000 \times 12) + (\$200,000 \times 3)}{7 + 12 + 3}$$

$$\text{or } \frac{\$12,300,000}{22} = \$559,000$$

(b) Determining the AFAI for a Portion of
a Fiscal Year

The method of calculating AFAI discussed above is to multiply the average net book value of facilities used by the contractor on all work by the percentage of total depreciation which is to be charged to the contract for the fiscal year involved. This technique is not sensitive to changes in facility utilization from month to month within a given fiscal year, but this has no effect if the facilities are used on the contract for the entire fiscal year because the amount will be averaged out. Where, however, the contract period is less than a full fiscal year, or when the contract period extends only into a part of a given fiscal year, appropriate adjustments must be made. For example, if the contract is to be allocated 20 per cent of the entire depreciation chargeable to contracts for a given fiscal year, and the net book value of fixed assets is \$1,000,000, our technique would indicate that the AFAI for the year involved would be \$200,000, or 20 per cent of the contractor's total investment. This would be appropriate if the contract period covered the entire fiscal year. However, if the contract period covers only six months and during such period the contract bears

20 per cent of the total depreciation chargeable for the year, then the contract has utilized 40 per cent of the facilities for the six-month period. Thus, the AFAI for the six months would be \$400,000. Similarly, if a contract bears 10 per cent of the total annual depreciation related to a facility with a net book value of \$500,000 but the period of contract performance during the fiscal year was three months, the AFAI would be \$200,000 for the three months.

$$\frac{\text{Per cent annual availability}}{\text{Contract period in per cent of year}} = \text{AFAI for period less than a full year}$$

3. Application of Estimated Profit to Estimated Investment

In order to apply estimated profit to estimated investment for purposes of determining the expected ROI, it is necessary to combine ACI and AFAI. In doing so, it is necessary to make certain that both the profit and investment figures are on a common basis and are appropriately annualized.

V. UPDATING OF PROFIT STATISTICS CONTAINED IN PROFIT AND FEE
NEGOTIATION MANUAL (See following)

APPENDICES

APPENDIX A Industry Wide Statistics

Dollars in Billions

	All Manufacturing (Except Newspapers)			Durable Goods		
	<u>1967</u>	<u>1968</u>	<u>1969</u>	<u>1967</u>	<u>1968</u>	<u>1969</u>
SALES	595,427	631,911	694,584	300,646	335,497	366,478
EQUITY CAPITAL INVESTMENT (ECI)	254,255	273,225	297,116	128,579	140,374	151,087
ECI TURNOVER	2.26	2.31	2.33	2.33	2.38	2.43
LONG TERM DEBT (LTD)	67,861	79,126	90,694	33,816	39,967	46,002
TOTAL CAPITAL INVESTMENT (TCI)	322,116	352,351	387,810	162,395	180,341	197,089
TCI TURNOVER	1.78	1.79	1.79	1.85	1.86	1.86
PROFIT	47,772	55,405	58,133	25,724	30,647	31,544
% PROFIT/SALES	8.30	8.77	8.37	8.55	9.13	8.61
% PROFIT/ECI	18.78	20.27	19.57	20.00	21.83	20.87
% PROFIT/TCI	14.83	15.72	14.99	15.84	16.99	16.00
WORKING CAPITAL (WC)	122,935	132,606	137,542	69,430	75,329	77,754
FACILITIES & EQUIPMENT (FE)	337,188	192,656	215,291	82,126	91,484	102,338
WC/FE -- RATIO	.36	.69	.64	.85	.82	.76

APPENDIX A Industry Wide Statistics

Dollars in Billions

	Transportation Equipment				a -- Motor Vehicles and Equipment			
	<u>1967</u>	<u>1968</u>	<u>1969</u>		<u>1967</u>	<u>1968</u>	<u>1969</u>	
SALES	76,435	89,113	92,375		48,228	57,006	59,900	
EQUITY CAPITAL INVESTMENT (ECI)	27,447	29,578	31,787		20,391	21,806	22,833	
ECI TURNOVER	2.78	3.01	2.90		2.36	2.61	2.62	
LONG TERM DEBT (LTD)	5,025	5,904	7,006		2,052	2,327	2,623	
TOTAL CAPITAL INVESTMENT (TCI)	32,472	35,482	38,793		22,443	24,133	25,456	
TCI TURNOVER	2.35	2.51	2.38		2.14	2.36	2.35	
PROFIT	5,641	8,145	7,244		4,180	6,211	5,492	
% PROFIT/SALES	7.64	9.14	9.23		8.66	10.89	9.16	
% PROFIT/ECI	20.55	27.53	22.78		20.39	28.48	24.05	
% PROFIT/TCI	17.57	22.95	18.67		18.62	25.73	21.57	
WORKING CAPITAL (WC)	12,240	13,606	14,028		7,951	8,886	8,674	
FACILITIES & EQUIPMENT (FE)	17,285	18,125	20,099		12,688	13,167	20,099	
WC/FE -- RATIO	.71	.75	.70		.63	.67	.43	

Dollars in Billions

APPENDIX A Industry Wide Statistics

	b -- Aircraft and Parts				Electrical Machinery			
	<u>1967</u>	<u>1968</u>	<u>1969</u>		<u>1967</u>	<u>1968</u>	<u>1969</u>	
SALES	22,739	26,852	26,392		52,464	58,883	67,017	
EQUITY CAPITAL INVESTMENT (ECI)	5,419	6,352	7,312		18,866	21,919	24,384	
ECI TURNOVER	4.19	4.18	3.60		2.78	2.68	2.74	
LONG TERM DEBT (LTD)	2,261	2,930	3,618		6,344	346	8,272	
TOTAL CAPITAL INVESTMENT (TCI)	7,680	9,282	10,930		25,210	22,265	32,656	
TCI TURNOVER	2.96	2.89	2.41		2.08	2.64	2.05	
PROFIT	1,099	1,606	1,433		4,216	4,777	5,095	
% PROFIT/SALES	4.83	5.98	5.42		8.03	8.11	7.60	
% PROFIT/ECI	20.28	25.28	19.59		22.34	21.79	20.89	
% PROFIT/TCI	14.30	17.30	13.11		16.72	21.45	15.60	
WORKING CAP.TAL (WC)	3,294	3,914	4,531		12,902	14,561	15,250	
FACILITIES & EQUIPMENT (FE)	3,278	3,731	4,496		9,753	12,304	14,254	
WC/FE RATIO	1.00	1.04	1.00		1.32	1.18	1.06	

APPENDIX A Industry Wide Statistics

Dollars in Billions

	Machinery (other than electrical)			a -- Metal Work in Machine & Equipment		
	<u>1967</u>	<u>1968</u>	<u>1969</u>	<u>1967</u>	<u>1968</u>	<u>1969</u>
SALES	50,657	53,810	57,667	6,992	6,677	7,239
EQUITY CAPITAL INVESTMENT (ECI)	22,996	25,226	26,392	2,844	2,798	3,210
ECI TURNOVER	2.20	2.13	2.18	2.45	2.38	2.25
LONG TERM DEBT (LTD)	518	6,465	7,188	518	614	940
TOTAL CAPITAL INVESTMENT (TCI)	23,514	31,691	33,580	3,362	3,412	4,150
TCI TURNOVER	2.15	1.69	1.71	2.07	1.95	1.74
PROFIT	5,339	5,776	6,213	715	659	662
PROFIT/SALES	10.53	10.73	10.77	10.22	9.86	9.14
PROFIT/ECI	23.21	22.89	23.54	25.14	23.55	20.62
PROFIT/TCI	22.70	18.22	18.50	21.26	19.31	15.95
WORKING CAPITAL (WC)	14,666	15,853	16,045	1,769	1,718	2,030
FACILITIES & EQUIPMENT (FE)	12,364	13,537	14,701	1,393	1,445	1,744
WC/FE -- RATIO	1.18	1.17	1.09	1.27	1.18	1.16

APPENDIX A Industry Wide Statistics

Dollars in Billions

	Fabricated Metal Products				Primary Metal Industries			
	<u>1967</u>	<u>1968</u>	<u>1969</u>		<u>1967</u>	<u>1968</u>	<u>1969</u>	
SALES	29,452	32,153	35,236		39,695	44,274	49,187	
EQUITY CAPITAL INVESTMENT (ECI)	10,645	11,309	12,023		25,062	26,695	28,095	
ECI TURNOVER	2.76	2.84	2.93		1.58	1.65	1.75	
LONG TERM DEBT (LTD)	2,580	2,907	3,806		8,228	10,544	11,367	
TOTAL CAPITAL INVESTMENT (TCI)	13,225	14,216	15,829		33,290	37,239	39,462	
TCI TURNOVER	2.22	2.26	2.22		1.19	1.18	1.25	
PROFIT	2,332	2,484	2,529		3,529	3,734	4,177	
% PROFIT/SALES	7.91	7.72	1.12		8.89	8.43	8.49	
% PROFIT/ECI	21.90	21.96	21.03		14.08	13.98	14.86	
% PROFIT/TCI	17.63	17.47	15.97		10.60	10.02	10.58	
WORKING CAPITAL (WC)	6,388	6,778	6,778		10,827	10,928	10,973	
FACILITIES & EQUIPMENT (FE)	6,007	6,570	7,407		21,103	23,869	25,986	
WC/FE -- RATIO	1.06	1.03	.915		.513	.457	.422	

APPENDIX A Industry Wide Statistics

Dollars in Billions

	a -- Primary Iron & Steel				b -- Primary Nonfer- rous Metal Industries			
	<u>1967</u>	<u>1968</u>	<u>1969</u>		<u>1967</u>	<u>1968</u>	<u>1969</u>	
SALES	24,146	25,774	27,747		15,549	18,500	21,441	
EQUITY CAPITAL INVESTMENT (ECI)	15,284	15,611	16,203		9,777	11,084	11,891	
ECI TURNOVER	1.58	1.65	1.71		1.59	1.66	1.80	
LONG TERM DEBT (LTD)	4,656	5,215	5,888		3,571	5,329	5,479	
TOTAL CAPITAL INVESTMENT (TCI)	19,940	20,826	22,091		13,348	16,413	17,370	
TCI TURNOVER	1.21	1.23	1.25		1.16	1.12	1.23	
PROFIT	1,816	1,939	1,940		1,714	1,796	2,237	
% PROFIT/SALES	7.52	7.52	6.99		11.02	18.50	10.43	
% PROFIT/ECI	11.88	12.42	11.97		17.53	16.20	18.81	
% PROFIT/TCI	9.10	9.31	8.78		13.09	10.94	12.87	
WORKING CAPITAL (WC)	6,296	5,863	5,812		4,531	5,065	5,161	
FACILITIES & EQUIPMENT (FE)	16,670	14,384	15,736		7,913	9,485	10,249	
WC/FE -- RATIO	.38	.41	.37		.57	.53	.50	

APPENDIX A Industry Wide Statistics

Dollars in Billions

	Stone, Clay & Glass Products				Furniture & Fixtures			
	<u>1967</u>	<u>1968</u>	<u>1969</u>		<u>1967</u>	<u>1968</u>	<u>1969</u>	
SALES	13,503	14,864	12,485		6,912	7,366	7,978	
EQUITY CAPITAL INVESTMENT (ECI)	8,231	8,607	9,109		2,015	2,115	2,286	
ECI TURNOVER	1.69	1.73	1.91		3.43	3.48	3.49	
LONG TERM DEBT (LTD)	2,193	2,464	2,714		370	421	444	
TOTAL CAPITAL INVESTMENT (TCI)	10,424	11,071	11,823		2,385	2,536	2,730	
TCI TURNOVER	1.33	1.34	1.47		2.89	2.90	2.92	
PROFIT	1,129	1,385	1,513		443	482	525	
% PROFIT/SALES	8.12	9.31	8.65		6.41	6.54	6.58	
% PROFIT/ECI	13.71	16.09	16.60		21.99	22.78	22.96	
% PROFIT/TCI	10.83	12.51	12.79		18.57	19.00	19.23	
WORKING CAPITAL (WC)	3,353	3,571	3,597		1,402	1,489	1,569	
FACILITIES & EQUIPMENT (FE)	6,627	6,986	7,748		857	898	988	
WC/FE -- RATIO	.51	.51	.46		1.64	1.66	1.59	

APPENDIX A Industry Wide Statistics

Dollars in Billions

	Lumber & Wood Products (except Furniture)			Instruments & Related Products		
	<u>1967</u>	<u>1968</u>	<u>1969</u>	<u>1967</u>	<u>1968</u>	<u>1969</u>
SALES	9,714	11,894	13,331	12,534	14,022	16,440
EQUITY CAPITAL INVESTMENT (ECI)	4,070	4,501	5,034	6,394	7,361	8,707
ECI TURNOVER	2.39	2.64	2.65	1.96	1.90	1.88
LONG TERM DEBT (LTD)	1,819	1,936	2,494	1,049	1,291	1,743
TOTAL CAPITAL INVESTMENT (TCI)	5,889	6,437	7,528	7,443	8,652	10,450
TCI TURNOVER	1.65	1.85	1.77	1.68	1.62	1.57
PROFIT	506	1,002	1,055	1,944	2,167	2,490
% PROFIT/SALES	5.22	8.42	7.91	15.51	15.45	15.14
% PROFIT/ECI	12.48	22.26	20.95	30.40	29.43	28.59
% PROFIT/TCI	8.63	15.56	14.01	26.11	25.04	23.82
WORKING CAPITAL (WC)	1,872	2,037	2,122	3,734	4,340	5,153
FACILITIES & EQUIPMENT (FE)	3,487	3,804	4,725	3,331	3,804	4,878
WC/FE -- RATIO	.536	.54	.45	1.12	1.14	1.05

APPENDIX A Industry Wide Statistics

Dollars in Billions

	Miscellaneous <u>Manufacturing & Ordnance</u>		
	<u>1967</u>	<u>1968</u>	<u>1969</u>
SALES	8,876	9,057	9,756
EQUITY CAPITAL INVESTMENT (ECI)	2,854	3,062	3,271
ECI TURNOVER	3.11	2.95	2.98
LONG TERM DEBT (LTD)	876	885	967
TOTAL CAPITAL INVESTMENT (TCI)	3,730	3,947	4,238
TCI TURNOVER	2.38	2.29	2.30
PROFIT	642	695	701
% PROFIT/SALES	7.23	7.67	7.19
% PROFIT/ECI	22.49	22.69	21.43
% PROFIT/TCI	17.21	17.60	16.54
WORKING CAPITAL (WC)	2,045	2,162	2,239
FACILITIES & EQUIPMENT (FE)	1,313	1,466	1,553
WC/FE -- RATIO	1.55	1.47	1.44

APPENDIX B

Net Income As Percent of Sales and Invested Capital
(Source Fortune "500" Statistics)

Company	1967		1968		1969	
	S.	I.C.	S.	I.C.	S.	I.C.
A.C.F. Industrials	8.7	17.0	7.8	12.0	7.8 ^a	11.3 ^a
A.M.P.	19.3	18.5	9.7	19.0	11.5	23.3
Admiral	----	----	0.1	0.6	0.4	1.7
Allis-Chalmers	0.6	1.4	----	----	2.3	5.0
Aluminum Company of America	3.7	9.0	7.7	9.4	7.9	10.2
American Chain & Cable	4.5	8.8	2.7	5.3	3.0	6.2
American Machine & Foundry	5.0	12.8	----	----	5.6	18.4
American Metal Climax	11.8	13.5	11.8	14.8	9.2	12.5
American Motors	----	----	1.5	6.2	0.7	2.4
American Opticals	NL	NL	NL	NL	NL	NL
Ampex	4.8	12.6	3.3	8.4	4.6	10.2
Amphenol	3.3	9.5	NL	NL	NL	NL
Avco	7.5 ^b	23.0 ^b	4.8	16.1	5.7	12.2
Beech Aircraft	5.2	17.4	4.2	13.7	1.1	3.5
Bell and Howell	4.4	11.7	4.6	11.2	3.7	8.7
Bendix	3.4	10.5	3.2	9.9	3.8	11.3
Bethlehem Steel	5.0	7.0	5.6	8.5	5.3	8.0
Black and Decker	8.8	18.2	7.9	16.6	7.9	17.9
Bliss, (E.W.)	3.4 ^c	9.1 ^c	NL	NL	NL	NL
Boeing	2.9	11.2	2.5	10.2	0.4	1.3
Borg-Warner	4.5	8.9	4.8	9.3	4.8	9.6
Budd	0.7	1.6	2.4	7.1	1.8	6.1
Burlington Industries	4.3	10.1	4.9	12.5	4.4	11.2
Burroughs	6.3	14.2	6.7	15.1	7.3	13.2
Caterpillar Tractor	7.2	13.8	7.1	14.7	7.1	15.8
Cessna Aircraft	5.0	15.1	4.8	16.1	5.4	17.4
Champion Spark Plug	12.0	21.1	10.3	20.3	9.9	19.3
Chrysler	3.2	10.9	3.9	14.1	1.3	4.2
Cincinnati Milling Machines	6.0	13.9	5.7	12.5	5.1	10.7
Collins Radio	2.8	13.5	2.9	11.7	2.2	7.6
Colt Industries	3.9	14.9	4.3 ^d	11.3 ^d	0.8	2.3
Combustion Engineering	3.1	14.1	3.3	10.4	3.5	12.7
Cons. Electronics Industries	4.0	10.8	NL	NL	NL	NL
Continental Can	5.6	12.8	5.5	12.7	5.1	12.9
Control Data	3.4	7.6	10.4	7.8	9.3	8.1
Corning Glass Works	11.5	17.6	9.8	15.0	9.4	14.5
Crown Zellerbach	5.9	9.1	7.5	12.0	5.9	9.6
Cutler-Hammer	3.6	10.8	2.4	6.6	2.8	7.5

^aIncludes U.S. Lines^b1967 Figures include Paul Revere Life which was merged^cBliss merged into Gulf-Western at end of 1967^dIncludes Crucible Steel

NL-- Not Listed

APPENDIX B

Net Income As Percent of Sales and Invested Capital
(Source Fortune "500" Statistics)

Company	1967		1968		1969	
	S.	I.C.	S.	I.C.	S.	I.C.
Douglas Aircraft	NL	NL	NL	NL	NL	NL
Dow Chemical	9.5	14.0	8.2	13.3	8.3	13.8
DuPont (E.I.) de Nemours	10.1	13.0	10.7	14.6	9.7	13.3
Eastman Kodak	14.7	21.4	14.2	20.4	14.6	19.7
Emerson Electric	7.7	18.7	7.6	18.2	7.9	17.8
F.M.C.	4.6 ^a	12.2 ^a	5.5	13.7	4.8	11.4
Fairchild Camera & Instruments	----	----	0.3	0.7	1.1	3.2
Fairchild Hiller	2.0	10.4	----	----	4.2	30.1
Federal-Mogul	5.2	9.8	5.5	10.9	5.4	10.7
Federal Pacific Electric	3.6	12.4	3.5	11.0	2.9	8.9
Firestone Tire & Rubber	5.5	11.2	6.0	12.6	5.1	11.0
Ford Motor	0.8	1.8	4.5	12.7	3.7	10.5
General Aniline & Film	3.6 ^b	6.9 ^b	NL	NL	NL	NL
General Dynamics	2.5	17.0	1.5	11.5	0.1	0.8
General Electric	4.7	15.4	4.3	14.3	3.3	10.9
General Mills	4.7	14.7	4.7	14.5	4.2	13.1
General Motors	8.1	17.6	7.6	17.8	7.0	16.7
General Precision Equipment	4.1	11.3	NL	NL	NL	NL
General Telephone & Electronics	8.5	13.1	9.5	14.9	7.3	12.2
General Tire and Rubber	3.4	9.1	4.2	11.3	3.2 ^c	8.7 ^c
Genesco	2.9	12.4	3.2	12.9	2.6	10.2
Goodrich (B.F.)	6.8	9.1	3.9	8.1	3.1	6.4
Goodyear Tire and Rubber	4.8	12.0	5.1	12.8	4.9	12.5
Grace (W.R.)	3.3	8.8	1.9	5.5	2.8	8.0
Grumman Aircraft Eng.	2.2	16.4	1.7	13.3	1.9	14.0
Hercules	7.3	13.1	7.4	13.9	5.9	11.2
Hewlett-Packard	8.3	17.0	7.7	14.6	7.9	14.8
Honeywell	4.0	11.0	3.9	12.0	4.4	12.6
Ingersoll-Rand	10.7	18.7	9.9	16.2	9.3	15.9
Inland Steel	5.4	7.7	7.4	10.7	5.0	7.9
International Business Machines	12.2	17.0	12.7	19.1	13.0	17.7
International Harvester	3.7	8.2	3.0	6.5	2.4	5.5
Internat'l. Telephone & Telegraph	4.4 ^d	10.7 ^d	4.7 ^e	11.6 ^e	4.3 ^f	11.2 ^f

^a1967 figures include Link-Belt which was merged

^b1967 figures include Ruberoid which was merged

^cIncludes Consolidated Electronics Industries

^d1967 figures include Rayonier which was merged

^eIncludes Rayonier & Continental Banking

^fIncludes Grinnell

NL -- Not Listed

Company	1967		1968		1969	
	S.	I.C.	S.	I.C.	S.	I.C.
Jones & Laughlin Steel	4.0	5.1	NL	NL	NL	NL
Kaiser Aluminum & Chemical	7.0	11.4	6.1	10.3	7.4	11.7
Kaiser Industries	9.0	21.5	4.2	9.1	0.8	16.5
Kaiser Steel	8.3	16.0	8.0	13.3	6.1	9.1
Kelsey-Hayes	3.3	9.8	3.3	10.9	2.7	9.5
Koppers	3.1	7.4	3.4	8.0	3.4	9.0
Lear Siegler	3.4	13.5	3.8	14.9	3.8	15.1
Libbey-Owens-Ford Glass	12.8	12.9	11.6	15.5	8.9	12.8
Ling-Temco-Vought	1.9 ^a	30.9 ^a	1.3	20.7	----	----
Link-Belt	NL	NL	NL	NL	NL	NL
Litton Industries	4.5	16.4	3.2	9.8	3.8	11.7
Lockheed Aircraft	2.3	15.5	2.0	12.0	----	----
Magnavox	6.6	24.9	7.5	26.0	7.2	22.6
Martin Marietta	5.3	11.6	5.9	11.7	4.5 ^b	10.5 ^b
McDonnell	0.0 ^c	0.2 ^c	2.6	20.6	3.9	20.5
McGraw-Edison	6.4	13.8	6.0	12.7	5.4	11.8
Minnesota Mining & Mfg. Co.	11.9	19.0	11.5	18.7	11.1	18.2
Monsanto	6.4	9.7	6.1	9.7	6.0	9.6
Motorola	3.0	9.1	3.6	11.8	3.9	10.4
National Cash Register	3.7	9.0	3.3	6.9	3.5	7.7
National Lead	7.2	13.6	5.8	12.3	5.5	12.5
National Steel	6.8	9.1	6.6	9.3	6.4	9.2
Newport News Shipbuilding	2.2	7.4	NL	NL	NL	NL
North American Aviation	2.8 ^d	11.0 ^d	2.8	10.7	2.4 ^e	8.6 ^e
Northrop	2.7	11.4	3.2	12.7	3.3	13.2
Olin Mathieson Chemical	6.0	9.7	7.5	12.9	4.4	8.2
Otis Elevator	4.4	9.4	4.4	10.0	4.1	10.2
Owens Corning Fiberglass	3.9	7.0	4.5	8.7	5.1	10.2
Owens-Illinois	4.7	9.3	5.1	11.1	5.0	11.4
Pacific Car & Foundry	4.9	17.7	4.1	14.0	4.1	16.5
Parker-Hannifin	6.3	19.1	5.7	16.3	5.6	17.1
Pittsburgh Plate Glass	4.6	7.2	4.6	7.6	4.7	8.2

^a1967 includes Wilson which was merged

^bIncludes Harvey Aluminum

^c1967 figures include Douglas Aircraft which was merged

^d1967 figures include Rockwell-Standard which was merged

^eIncludes Miehle-Goss-Dexter

NL -- Not Listed

APPENDIX B

Net Income As Percent of Sales and Invested Capital
(Source Fortune "500" Statistics)

Company	1967		1968		1969	
	S.	I.C.	S.	I.C.	S.	I.C.
Radio Corporation of America	4.9	17.4	5.0	16.5	4.7	14.8
Raytheon	2.6	14.2	2.6	13.1	2.7	13.6
Republic Steel	5.9	7.9	5.6	7.9	5.3	7.6
Revere Copper & Brass	6.0	13.9	4.9	10.9	3.1	7.3
Reynolds Metals	6.5	8.5	3.5	4.8	5.4	8.4
Rheem Manufacturing	5.2	12.4	NL	NL	NL	NL
Rockwell Manufacturing	6.2	13.0	5.1	11.1	5.0	11.4
Rockwell-Standard	NL	NL	NL	NL	NL	NL
Rohr	1.2	7.0	3.5	17.6	3.8	16.8
S.C.M.	3.7 ^a	15.0 ^a	1.8	6.2	2.6	9.1
Singer	4.4	10.8	4.0 ^h	11.2 ^b	4.1	11.4
Sperry Rand	3.6	11.4	4.1	10.7	4.8	11.8
Sprague Electric	NL	NL	NL	NL	NL	NL
Stewart-Warner	6.3	12.8	6.6	13.2	6.4	13.0
Sunbeam	4.1	8.8	4.0	7.9	3.7	7.9
T.R.W.	4.1	14.5	4.9	15.3	4.9	15.3
Teledyne	4.8	14.2	5.0	12.8	4.6	11.9
Texas Instruments	4.0	9.8	3.9	10.4	4.0	11.9
Textron	4.3	16.7	4.3	16.0	4.5	15.7
Thiokol Chemical	1.4	4.7	3.2	9.6	2.3	7.3
Timken Roller Bearing	10.0	12.2	9.7	11.1	8.7	10.8
Uniroyal	2.6	7.5	4.0	11.5	3.0	8.9
United Aircraft	2.6	12.4	2.5	12.2	2.2	9.5
U.S. Gypsum	8.7	7.9	8.3	8.3	6.8	7.4
U.S. Steel	4.3	5.4	5.6	7.6	4.6	6.3
Warner & Swasey	8.9	15.5	11.4	18.6	6.5	9.9
Warwick Electronics	0.4	2.7	----	----	----	----
Western Electric	4.1	9.2	4.8 ^c	10.2 ^c	4.6	11.3
Westinghouse Air Brake	4.0	7.3	NL	NL	NL	NL
Westinghouse Electric	4.2	10.3	4.1	10.6	4.3	10.8
Wheeling Steel	----	----	3.8 ^d	6.1 ^d	2.9	4.7
Whirlpool	4.3	16.6	4.4	16.5	4.0	18.3
Youngstown Sheet & Tube	5.5	6.4	5.8	7.0	NL	NL
Zenith Radio	6.3	22.1	6.7	22.7	5.9	17.6

^a1967 figures include Glidden^bIncludes General Precision^cBecame a subsidiary of AT&T^dIncludes Pittsburgh Steel

NL -- Not Listed

APPENDIX C Selected Companies

Dollars in Billions

	BENDIX			BOEING		
	<u>1967</u>	<u>1968</u>	<u>1969</u>	<u>1967</u>	<u>1968</u>	<u>1969</u>
SALES	1,274.0	1,430.2	1,467.9	2,880.0	3,274.0	2,835.0
EQUITY CAPITAL INVESTMENT (ECI)	418.4	459.5	495.7	752.0	810.0	796.0
ECI TURNOVER	3.0	3.1	2.9	3.8	4.0	3.6
LONG TERM DEBT (LTD)	135.3	143.0	159.4	574.0	587.0	726.0
TOTAL CAPITAL INVESTMENT (TCI)	553.0	602.0	654.0	1,326.0	1,397.0	1,522.0
TCI TURNOVER	2.3	2.4	2.2	2.2	2.3	1.9
PROFIT	82.9	90.3	97.9	144.4	149.6	(14.3)
% PROFIT/SALES	6.5	6.3	6.6	5.0	4.5	0.49
% PROFIT/ECI	19.8	19.6	19.5	19.1	18.3	1.8
% PROFIT/TCI	14.9	14.9	14.8	10.8	10.6	.91
WORKING CAPITAL (WC)	233.1	370.8	349.7	358.0	467.0	610.0
FACILITIES & EQUIPMENT (FE)	165.6	198.0	207.1	915.0	1,032.0	1,106.0
WC/FE -- RATIO	1.41	1.86	1.68	3.91	4.52	5.51

Dollars in Billions

APPENDIX C Selected Companies

	GENERAL ELECTRIC			GRUMMAN		
	<u>1967</u>	<u>1968</u>	<u>1969</u>	<u>1967</u>	<u>1968</u>	<u>1969</u>
SALES	7,741.2	8,381.6	8,448.0	968.5	1,152.5	1,180.3
EQUITY CAPITAL INVESTMENT (ECI)	2,342.2	2,493.4	2,540.0	130.6	143.0	157.9
ECI TURNOVER	3.3	3.3	3.3	7.4	8.0	22.0
LONG TERM DEBT (LTD)	724.0	749.1	673.3	80.1	78.2	74.6
TOTAL CAPITAL INVESTMENT (TCI)	3,066.0	3,242.0	3,213.0	210.0	221.0	231.0
TCI TURNOVER	2.5	2.6	2.6	4.6	5.2	5.1
PROFIT	361.4	357.1	278.0	21.4	19.0	22.0
% PROFIT/SALES	4.7	4.2	3.3	2.1	1.6	1.9
% PROFIT/ECI	15.4	14.3	10.9	16.1	13.2	14.0
% PROFIT/TCI	11.7	11.0	8.6	10.0	8.6	9.5
WORKING CAPITAL (WC)	1,615.9	1,738.2	1,781.0	100.1	112.0	104.3
FACILITIES & EQUIPMENT (FE)	1,821.0	1,951.0	2,167.1	92.5	114.5	129.9
WC/FE -- RATIO	.88	.89	.82	1.09	.98	.81

APPENDIX C Selected Companies

Dollars in Billions

	IBM			MC DONNELL-DOUGLAS		
	<u>1967</u>	<u>1968</u>	<u>1969</u>	<u>1967</u>	<u>1968</u>	<u>1969</u>
SALES	5,345.2	6,888.5	7,197.2	2,933.7	3,609.2	3,023.8
EQUITY CAPITAL INVESTMENT (ECI)	1,936.9	2,095.6	2,277.4	363.8	459.3	573.6
ECI TURNOVER	2.7	3.2	3.1	8.0	7.8	5.2
LONG TERM DEBT (LTD)	521.0	545.0	554.0	161.3	164.8	145.3
TOTAL CAPITAL INVESTMENT	2,457.0	2,640.0	2,831.0	524.0	623.0	718.0
TCI TURNOVER	2.1	2.6	2.5	5.6	5.7	4.2
PROFIT	1,297.4	1,864.4	1,978.8	(8.5)	193.6	241.1
% PROFIT/SALES	24.2	27.0	27.4	.03	5.3	4.1
% PROFIT/ECI	66.9	88.9	86.8	.22	42.0	42.0
% PROFIT/TCI	52.7	70.6	69.8	.15	30.9	33.5
WORKING CAPITAL (WC)	916.3	1,770.0	1,814.1	69.0	138.0	160.0
FACILITIES & EQUIPMENT (FE)	3,496.3	3,415.0	3,863.4	211.1	220.9	276.6
WC/FE -- RATIO	.26	.61	.46	3.27	.63	.58

APPENDIX C Selected Companies

Dollars in Billions

	North American Rockwell			TRW		
	<u>1967</u>	<u>1968</u>	<u>1969</u>	<u>1967</u>	<u>1968</u>	<u>1969</u>
SALES	2,671.2	2,803.1	2,667.3	1,365.1	1,487.5	1,588.3
EQUITY CAPITAL INVESTMENT (ECI)	724.8	748.6	752.7	294.9	472.7	512.6
ECI TURNOVER	3.6	3.7	3.5	4.6	3.1	3.1
LONG TERM DEBT (LTD)	148.2	307.2	324.2	164.1	200.9	273.1
TOTAL CAPITAL INVESTMENT	872.0	1,055.0	1,076.0	458.0	672.0	785.0
ECI TURNOVER	3.0	2.7	2.5	2.9	2.2	2.0
PROFIT	147.9	158.9	128.7	128.4	149.2	158.2
PROFIT/SALES	5.5	5.6	4.8	9.3	10.0	9.9
PROFIT/ECI	20.3	21.1	17.0	43.5	31.5	30.8
PROFIT/TCI	16.8	14.9	11.9	27.9	22.1	20.1
WORKING CAPITAL (WC)	483.6	615.0	528.2	223.3	328.0	346.6
ACTIVITIES & EQUIPMENT (FE)	785.3	870.7	936.9	182.8	277.4	312.0
WC/FE -- RATIO	6.15	7.06	5.64	1.22	1.18	1.10

APPENDIX D

RENEGOTIABLE SALES AND PROFITS

<u>Fiscal Year</u>	<u>Renegotiable Sales</u>	<u>Renegotiable Profits</u>	<u>Percentage</u>
1968	\$38,773,000,000	\$1,694,000,000	4.37%
1969	48,495,000,000	2,189,000	4.51%
1970	48,008,000,000	1,515,000,000	3.16%

END