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REPORT DOCUMENTATION PAGE

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1. REPORT NUMBER <i>the</i>	2. GOVT ACCESSION NO.	3. RECIPIENT'S CATALOG NUMBER
4. TITLE (and Subtitle) INHIBITORS TO USE OF LIFE CYCLE COSTING: RESULTS OF A SURVEY OF MILITARY/INDUSTRIAL MANAGERS, (REPORT)		5. TYPE OF REPORT & PERIOD COVERED <i>12</i>
7. AUTHOR(s) <i>10</i> Troy V./Caver (LTC)		8. CONTRACT OR GRANT NUMBER(s) <i>11</i>
9. PERFORMING ORGANIZATION NAME AND ADDRESS Troy V. Caver (Troy V.) 1127 Parker Road, Dover, NJ 07801 <i>New</i>		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS Individual Report. Author is controlling office.		12. REPORT DATE <i>11</i> 1 Aug 79
14. MONITORING AGENCY NAME & ADDRESS (if different from Controlling Office) <i>12</i> 27p		13. NUMBER OF PAGES
15. SECURITY CLASS. (of this report)		15a. DECLASSIFICATION/DOWNGRADING SCHEDULE

16. DISTRIBUTION STATEMENT (of this Report)

Approved for public release; distribution unlimited.

17. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from Report)

18. SUPPLEMENTARY NOTES

19. KEY WORDS (Continue on reverse side if necessary and identify by block number)

Life cycle cost
LCC model
Life cycle cost criteria
Life cycle cost policy

Attitudes toward LCC
Survey
DSARC

20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

This study was undertaken in an attempt to determine the reasons for limited use of life cycle costing in material management. The author, while a member of Training and Doctrine Command in Combat Developments for six years and then in project management activities for the next two years, saw a great divergence of opinion in the use of life cycle cost. The decision makers in TRADOC were considering long range cost to the government in their Cost and Operational Effectiveness Analysis (COEA), DoD policy makers were praising

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20. Abstract (continued)

life cycle cost as a decision criteria, The Defense Systems Management College taught life cycle cost as the primary consideration for long term logistic decisions, yet the project management personnel appear to be lacking in how and when to apply life cycle cost techniques.

It was apparent to the author that this was a wide spread problem which would result in continued higher long term cost to the government unless an acceptable cost criteria could be established by DoD and provided to decision makers as implementing guidance.

This study examined the attitudes of DoD policy makers, DoD project managers, and Industry project managers toward life cycle costing and their perception of the guidance and criteria in its implementation.

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EXECUTIVE SUMMARY

INHIBITORS TO THE USE OF LIFE CYCLE COSTING: RESULTS OF A SURVEY OF MILITARY/INDUSTRIAL MANAGERS

LTC Troy Caver

~~XXXXXXXXXX~~
~~Donkey, NO 07001~~

Introduction: This paper reports the results of a survey of congressional staff, DOD members, and industry conducted to determine the inhibitors to implementing life cycle cost in material acquisition in government. The survey concentrated on program managed systems and solicited opinions pertaining to guidance, tools, motivation and criteria. Over three hundred responses are included in the report.

Problem: The DOD system acquisition review procedure (DSARC) includes a look at the actual experienced cost and schedule growth on a project managed system's research and development effort versus that which was originally projected. This review is normally presented as an examination of the deviation or variance from the original cost projection.

System reviews do not normally require a presentation of an expected life cycle cost with a variance and cause analysis, although this appears to be the intent of DODD 5000.28. The actual carrying out of the design to cost policy of DOD appears to be through monitoring "Design to Unit Production Cost". If this is so, clearly the impact of the high operating cost will fall on the operational community but more generally on the service and DOD as a whole. The impact of a higher Life Cycle Cost on the total force will be a reduction of funds available to sustain other elements of the force.

Findings and Conclusion: The report concludes that a very low percentage of managers presently believe decision makers attention is directed to long term cost. Problems appear to exist that hinder such long range planning. The following areas are seen as inhibitors to desired Life Cycle Cost implementation:

- (1) Predicting and verifying life cycle costs and savings.
- (2) Gathering valid and reliable data.
- (3) Getting continuous and sufficient program funding through DOD.
- (4) Lack of a workable implementation policy.
- (5) Lack of management perserverance at implementing levels.

Recommendations: As a result of the survey findings and conclusions, the author has recommended the following:

- (1) That DOD issue an implementing instruction to DODD 5000.28. That the implementing instruction be provided as guidance for project managers or "high cost system" developers. The instruction should provide the needed guidelines for making life cycle cost a parameter for minimization during development.

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- (2) That DSARC/Service SARC require that a Life Cycle Cost Model be identified and if necessary modified for the specific system. This model should be specified in the DCP when coordinated for signature/ approval and used by the system PM and industry.
- (3) That the PM include Life Cycle Cost minimization as an element in the RFP/contract with industry.
- (4) That Project Managers use a criteria of: more than 5:1 projected pay back to investment ratio with less than a five year pay back period.
- (5) That each Service's System Command: a. Permit use of "risk capital" and M account funds for Life Cycle Cost reductions when justified by the above criteria and cost model. b. Require presentations at program reviews to show deviations from the projected LCC.
- (6) That policy makers and Congress make Life Cycle Cost a key parameter in system development. That any funding changes be made with full realization of the impact to Life Cycle Costs.
- (7) That industrial contractors: (a) Use Life Cycle Cost models in decision making. (b) That industry program reviews with the government address the changes to the predicted Life Cycle Cost expressed in the proposal. (c) That high pay-off opportunities be presented to the Government PM when the investment is beyond the scope of the existing contract.

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INTRODUCTION

Project Management is a dynamic process. Projects are in a constant state of change, and with each change comes a management opportunity. The project manager must constantly be aware of the state of his project and consider each opportunity for project enhancement. To do this in a way that constantly drives the project toward an optimal ending, the Project Manager should go through a mini-max process. That is, a process introduced through Operations Research/ Systems Analysis that identifies the limiting parameters for minimization, such as time, life cycle cost or procurement cost; and at the same time identifies the parameters to be maximized, such as performance and cost effectiveness. It is the project managers decisions that optimize the mini/max solutions that provide the potential to the government for Department of Defense efficiency improvements.

Knowing the mathematical techniques to solve mini/max problems, however, is not the challenge. The management challenge is to be aware of the project risks and the limiting factors both stated and unstated from the many controlling sources. These factors come from congressional attitudes, the Project Charter, the Decision Coordinating paper, DA and DOD staffs and other key figures that have veto authority on a projects continuance. As was stated at the beginning this is a dynamic process. The attitudes, opposition and sources of support are constantly changing.

Let me now concentrate on only one of those limiting factors, the problem of Life Cycle Cost.

Life Cycle Cost has been recognized by almost all of the high level policy makers as a parameter to be minimized. A primary problem, however, comes in putting life cycle cost in the proper perspective. No hard cost numbers are presented for life cycle costs at decision time. In fact, if any attempt were made to present those numbers as firm, the services have no way to validate them. Fuel, people and other operating expenses are not costed and accounted for against individual systems after fieldings. They are each costed under separate accounts.

Therein lies the problem, -- a lack of confidence in the projected life cycle cost -- and an inability of the services to verify any actual system costs incurred to compare to

a projection. These shortcomings do not make the costs any less real, however. Many times the decision comes to selecting between competing contractors -- one willing to sign a contract for a lower production cost while the second has a slightly higher production cost but a significantly lower projected life cycle cost. We are at a point in management where policy guidance is loosely stated and decision makers are hesitant to "bet on the outcome" without that guidance.

A recent GAO study⁽¹⁾ expressed doubt that DOD sufficiently emphasized to the military services the need for fully exploiting the life cycle cost procurement concept. The Army Material Acquisition Review Committee (AMARC),⁽²⁾ found a lack of high level emphasis in exploiting the LCC concept.

In an effort to develop recommendations for that needed emphasis and policy guidance, this writer conducted a survey of attitudes, ideas and recommendations from six hundred managers associated with military/ industrial project management. Over three hundred of those surveyed responded and provided information that gives insights into the problem as well as supporting information for decision criteria to be used in life cycle cost considerations. The details of the survey and the findings are in Section III.

Purpose of the Study

It is the purpose of this study to examine the attitude and recommendations of managers and decision makers involved in the military industrial decisions regarding life cycle costs. An additional purpose was to consider these responses to develop a policy recommendation for considering life cycle cost in future procurement decisions.

Significance of the Study

Many Department of Defense Directives and Instructions have been published stating life cycle cost will be a consideration in system acquisition. However, the decision makers continue to make decisions based primarily on the lowest procurement cost. While most all decision makers are aware of the DOD acquisition policies, the implementing instruction in the life cycle cost considerations have not been forthcoming. Armed Services Procurement Regulation⁸ 1-335 defines LCC and mentions that guidelines are available to apply it. No additional policy could be found explaining

implementation of life cycle cost procedures. If the recommendations of this study are recognized as worthwhile, and implemented as DOD policy, the decision makers will have guidance for life cycle cost decision criteria. The benefits that will result will be long term cost reductions while establishing uniform criteria recognized by policy makers, as well as decision makers and implementers, thereby reducing decision makers fears of being charged with waste, when incurring cost in excess of the lowest bid for procurement.

Organization of the Study

This study is organized into sections. The first introduces the study with its purpose, significance and organization. The second section discusses life cycle cost and other related cost terms and DOD guidance. The third section provides the study approach, the survey and the findings. The fourth section translates the findings of the survey into conclusions and recommendations for implementing the findings into DOD acquisition policy.

SECTION II

Life Cycle Cost

Life Cycle Costing is a procedure for including all cost aspects of a system into one total cost figure.

Life Cycle costing started as a formal concept as a result of initial Logistics Management Institute studies in the early 1960's. Integrated Logistic Support (ILS) called for Life Cycle Cost considerations in system level support planning. Logisticians also provided an initial methodology for estimating the cost of logistic support elements of total system cost.

In 1970 DOD Directive 5000.1 was issued making cost an equal partner with performance and schedule for Defense System Acquisition trade-offs. In 1972 DODI 5000.2 defined Life Cycle Cost estimates and stated that they would be presented to a Defense System Acquisition Review Council (DSARC) for its consideration before a program "Go-Ahead" decision was made. Design to Cost became a major Acquisition Policy.

DOD Directive 5000.28 on Design to Cost was issued in 1975 defining design to Life Cycle Cost as the overall goal of the design to cost concept. Finally DODD 4105.62 titled "Selection of Contractual Sources for Major Defense Systems"

was issued in 1976. It defined Life Cycle Costs as a major consideration in contract source selection.

DOD goals are spelled out in these many directives.

DODD 5000.1 - "Cost parameters shall be established which consider the cost of acquisition and ownership; discrete cost elements (e.g., Unit Production Cost, operating and support cost) shall be translated into "design to" requirements.

The total cost of "Acquisition and Ownership" is Life Cycle Cost. DODD 5000.28 defines "Design to Cost" as: "... A management concept wherein rigorous cost goals are established during development and the control of system costs (acquisition, operating and support) to these goals is achieved by practical trade-offs between operational capability, performance, cost, and schedule.

DODD 5000.28 goes on to state -- "Operation and support cost goals will be utilized to control initial outfitting cost, personnel, spares, rework, etc."

A final report on Life Cycle Cost(6) prepared for Assistant Secretary of Defense (I&L) includes in Para 3.1. "... to have Life Cycle Cost of a system managed throughout its development, production and operational use requires that it (LCC) be specified, designed to, monitored, tested and validated." Except in a few recent cases this is not happening. That Committee Report recommended several actions, one of which was "Provide a standard Life Cycle Cost Estimate accounting structure (model) to the competing contractors. It should be tailored to the specific acquisition and type of hardware.

A summary (Pg 21) of the final report:

"Life Cycle Costs are not being managed, but are being made isolated program considerations. There is still skepticism regarding the concept of design to Life Cycle Cost on both the part of industry and government. Many of the elements of Life Cycle Cost management have been incorporated into various programs but LCC is frequently not integrated. It is not a "managed" acquisition characteristic. There is a major communication gap existing between the government and industry program managers and Life Cycle Cost Analysts."

Within DOD, major systems are conceived and studied in great detail before requirements are written. Once a requirement is approved, a project manager is assigned to insure that the system is intensely managed by the government to minimize cost overruns, unexpected technical shortfalls, and schedule slippage. In this process of management, the primary hardware or weapon system is normally contracted to industrial elements for research and development.

During the development cycle of a DOD project managed system, several decision reviews are scheduled to either stop, modify, or continue a systems development and acquisition. At each of these reviews a cost estimate is required to make visible the system Life Cycle Cost and Unit Production Cost⁽⁷⁾. General agreement exists as to what goes into determining the unit production cost, however, many have looked into Life Cycle Costs without agreement on what to include in the total tally. Some go to extremes. A senior officer in the Pentagon told this writer in the summer of 1977 that he had amortized some of the cost of a European war cemetery in his total weapon system life cycle cost!

Life Cycle Costs for hardware systems is intended to be a composite figure consisting of all development, acquisition, operating, support, and disposal costs. A dilemma develops as we realize that these costs are funded through different accounts and different money managers. The Service Development Command is responsible for development and acquisition, using Research, Development and Procurement funds. A second big cost comes as the user expends funds for operations and support of a fielded system using operation and maintenance (OMA) funds. Disposal is usually a minor portion of life cycle costs and is usually handled through the developmental command. Unfortunately these actions or phases are not independent. The capabilities, limitations and quality built into a system during research and development drive the operating and support cost borne by the user after fielding. For instance, very little can be done to reduce the number of operations required for a system after the system has been built with three separate consoles.

As early as May 1975, in Department of Defense Directive 5000.28, the policy makers emphasized a design to life cycle cost objective. Many factors which will be examined in Section III, however, have impacted on the carrying out of this objective.

Design to Unit Production Cost or "Design to Rollaway Cost" is usually the goal presented to a project manager when he takes management responsibilities in the development of a system. In fact, that goal or a derivative of it is usually presented in contracts passed on to industry as a production cost goal with a generalized statement of "with minimum life cycle costs" or some other non quantifiable statement.

In the absence of strong or specific guidance as to which elements to include, Design To Unit Production Cost (DTUPC)⁽⁷⁾ has evolved as the cost most often presented and examined at critical reviews. This DTUPC is much easier to use in system design engineering since it can be related more directly with performance parameters from the requirements document and with accompanying cost variances that relate to specific improvements or changes in a subsystem.

SECTION III

THE SURVEY

Study Approach

To better identify the communication gap problem that GAO⁽¹⁾ and others⁽²⁾ perceived to exist several hypothesis were developed as to why LCC is not being reduced. It was then theorized that if these hypothesis with supporting rational were supported by a large portion of the R&D community, then, action could and would be taken to correct the root cause problems. Therefore, the hypothesis:

H₀ - Project Managers are not designing systems to optimize Life Cycle cost if it means using increased R&D or procurement funds to get the LCC savings.

Realizing that an unsupported hypothesis has little credibility, the writer sought the opinions and conclusions of DOD managers throughout the military - industrial complex. To do this objectively, a questionnaire was used with four subordinate supporting hypothesis developed for survey purposes.

H₀ (1) R&D/procurement money is allocated in constrained amounts and the project manager's performance is evaluated as to how well he manages without spending beyond the allocation.

H₀ (2) The Project Manager doesn't use a tool such as a life cycle cost model to evaluate recommended design changes, hence, he has no confidence of an O&S saving projected in the future.

H₀ (3) The Project Manager gets no serious challenge to the LCC aspects of his program if he doesn't take life cycle cost saving opportunities hence, he worries about expenses incurred that have to be paid - from his checkbook or "on his watch".

H₀ (4) No clear criteria exist to say under what circumstances an investment in Research and Development funds should be made to reduce Life Cycle Costs.

A survey/questionnaire was developed and sent to 600 managers (mid to senior level). The population included members from congressional staffs, DOD staffs, Service Staffs, Project Managers, PM Staffs, and Industry. Over 300 of the surveys were returned. The purpose of the survey was to investigate:

(1) The hinderances to success in reducing Life Cycle Costs of military systems.

(2) Potential solutions to the problem.

Special emphasis was placed in the survey questionnaire on operating and support costs, a major component of a system's life cycle costs.

Survey Questions

Question 1 and 2 were for identification. Question 3 of the survey was intended to elicit the degree of the respondent's agreement or disagreement with the stated hypothesis or the causes for difficulties encountered in achieving life cycle cost savings. Questions 4 through 15 were concerned with criteria and means for reducing life cycle costs. Question 16 was to determine the predominant guidelines applied to the expenditure of funds allotted for systems acquisition.

A major purpose of the survey was to determine if adequate criteria are perceived by project managers for allocation of funds for the reduction of long-term system operating and support costs. If that criteria does exist, what is it perceived to be? If it does not exist, what should it be?

A breakdown of the survey population follows:

Senate/House Armed Services Committee Staffs	40
DOD, Principals and Senior Staffs	50
Services: Army	98
Air Force	88
Navy	105

Defense Systems Management College, Project Manager Class, 77-2 80

DSMC, PM Cost Accounting Class (May 77) 30

DSMC, PM Class 77-1 100

The responses to the questionnaire were grouped as:

Congress/DOD Principles 6

Project Managers and Project Management Staff 127

Services 24

Industry 16

Others 132

All groups (includes above) 305

The Mann-Whitney-Wilcoxon (MWW) test was used for statistical confidence in the hypothesis testing. Analysis support was provided through the Army Material Scientific Analysis Agency and its computer support facility. Time and space prohibit reproducing the survey and the graphical representation of responses; however, the findings are summarized below:

Findings:

The responses were classified as 'strongly agree', 'agree', neutral, 'disagree' or strongly disagree'.

Question 3: There is general agreement (88.2%) from the total surveyed population that decision makers are directing attention to the near term procurement cost as funded by congress. (Q.3a) In fact 41% strongly agreed with that statement. If this near term concern is at the expense of a long term operating and support cost the results could be a higher life cycle cost. Industry responses (50%) show a belief that the number of DOD operating and support personnel is fixed (Q 3b). Only 21% of the total population surveyed, however, felt that was a cause or limiting factor. Question 3c asked if the reason for life cycle cost failures was inadequate funds to design systems for reduced operating and support costs. Only the Project Managers felt this was a primary cause (52.8%). Interestingly enough congressional and DOD responses showed 67.7% disagreed with that. There was general agreement (67.9%) that a reason for failure to achieve life cycle cost savings was that the PM performance rating is based on meeting the requirements within R&D funding limits (3d). There were no strong or extreme dissenters to this reason and the Congressional and DOD responses were 83.3% in agreement.

Question 4: Probably the most significant question (Q4), was which cost, unit production or life cycle is understood to be of most importance to the Program Manager. Overwhelming response (75.1%) was that Unit Production Cost is seen as most important to the PM. A critical observation was noted in the response from Congress and DOD where 100% stated that they think unit production cost is most critical to the PM. This could be significant as a misunderstanding between the policy maker and the system managers.

Question 5: Perhaps as significant to cause and effect was the agreement (76.4%) from the total responding population that no clear criteria exists to guide PM decisions concerning life cycle cost saving opportunities. There was strong agreement expressed by 27.9% that this was the case. Policy makers were less positive about this lack of criteria being a problem with only 50% agreeing. Only 6% of the total responding believe that criteria does exist for LCC savings decisions.

Question 6: To help develop a criteria the survey considered a payback period. The survey asked what recovery time should DOD be willing to tolerate to recover an investment. Of the total responding, 87.9% felt we should make LCC investments if we can expect to recover the investment within five years. Responses indicate that industry is willing to wait longer for payback with 75% willing to wait as long as ten years. This compares with only 3.4% Cong/DOD policy makers willing to wait that long.

Question 7: Another approach considered was the payback ratio (savings/investment = ratio). If a payback ratio can be shown, how large does it have to be before an investment should be made to realize the savings? Of the total group responding 77.2% said 5:1 or better. This dropped to 49.7% if the savings is 2:1 or less. Again the big difference was between Congress/DOD and Industry. When offered a 5:1 or better payback ratio, 66% policy makers (Cong & DOD) were willing to invest. Industry showed 81.3% were willing to invest at that ratio. Even more significant was that at the 2:1 ratio, only 33.3% of the policy makers were willing to invest, however, 56.3% of industry was willing.

Question 8: Realizing that the check-book balance or available cash has an impact on willingness or ability to invest in the future,

each was asked how that savings/investment ratio changes if the PM is approaching a cost threshold (or cost overrun). The overall risk factor dropped. Now 66.2% of the total said they would invest only if they could get a 10:1 return or better. The biggest change was with Industry where only 43.8% are willing to invest with a 5:1 return when cash is short, and only 56.3% at a 10:1 return. DOD policy makers show 50% are willing to invest with a return of 5:1 but 100% are willing at 10:1. Project managers fall between these groups with 67.7% willing to invest for a 10:1 return.

Question 9: To determine if budgeted funds were seen as fenced for specific hardware development, the population was asked if the PM should be expected to use funds for life cycle cost savings if funds weren't budgeted for that purpose. The reader should recognize that previous cost studies have developed independent cost estimates in entering design engineering effort and funds were programmed against that estimate. Approximately 1/2 (42%) said they should not be expected to spend budgeted dollars. A big disparity again exists between policy makers (16.7%) and industry (56.3%). The PM's responding were closer to industry (52%).

Question 10: No strong attitudes were revealed when asked if tools existed to aid in trade-off decisions. A larger number responding said tools do not exist (42.6%). Only 34.8% of the surveyed population believe models and other analytical tools are available to examine and project life cycle costs.

Question 11: To determine if decision makers believe bosses and reviews really are serious about LCC other than passing directives, etc, the question was asked "would missed opportunities for life cycle cost savings be challenged"? About 50% of the total said yes with only 30% saying no. However, 75% industry participants and 47.3% of the PM's said they did not believe they would be challenged. Again, this may be a key perception problem.

Question 12: There was strong overall agreement (64.9%) that LCC savings were nebulous and difficult to access to justify expenditures. The policy makers led the way with 83.4% expressing that belief.

Question 13: As to how to elevate the problem and get the funds to take advantage of an identified and projected life cycle cost savings, 84.6% of the group felt the way to

do was to go through the development or system command. There was general agreement on that procedure.

Question 14: In an effort to determine what was perceived as a cost driver, the population was asked to rank order five cost drivers. People requirements were number one by 52.8% of the total. a disparity exists between policy makers (83.3%), industry 43.8% and PM's 45.7%. The second ranked cost driver was support with 56.1% of all ranking it 1st or 2d.

Research and development was ranked as the least cost driver of the five.

Question 15: To determine what priority the PM places on the development of these cost drivers, all were asked what elements of the program would get cut first if money is short. About 50% said the desired specification gets cut first. No significant discrepancy appeared between groups on that point. The other areas to be cut in priority were training devices, 2d (62.2%); data (training & tech manuals) 3d (70.5%); and logistic support equipment 4th (58.4%). Noted here was that the industry responses, as well as the project managers, showed they would cut the people interface items, training and data, before log support. Yet from the previous question they had stated the number one "cost driver" to be people!

Question 16: To the question of who do you try to satisfy, the response for the total group was (1) user, (2) specification and (3) self in that order.

The user was 1st in rank ordering by all categories of respondents with the exception of Industry which has (1) specifications (2) user (3) boss.

SECTION IV

Conclusions and Recommendations

Conclusions: Problems seem to exist in: predicting and verifying life cycle cost and savings, gathering valid reliability data, getting continuous program funding through DOD, and lack of implementation policy and management perseverance.

Specifically, the DOD system acquisition review procedure (DSARC) includes a look at the experienced cost and schedule of the project managed system's research and development effort versus that which was originally projected. This financial review is normally presented as an examination of the deviation or variance from the original cost projection.

System reviews do not normally require a presentation of expected Life Cycle Cost with a variance and cause analysis. Although this is the stated intent of DOD 5000.28. The actual carrying out of the design to cost policies is through monitoring "Design to Unit Production Cost". Clearly the impact of a high operating cost will fall on the operational community but more generally on the service and DOD as a whole. The impact of a higher life cycle cost on the total force will be the reduction of funds available to sustain other elements of the force.

Most Project Managers believe that money is not available to take advantage of serendipitous discoveries that occur during research and development. The money appropriated by congress is usually less than that needed by industry to fulfill the requirement for the basic system. Therefore, funds for life cycle cost reduction is an expense that the developer believes he cannot afford from his constrained funds.

The result of these funding reductions is that the expense for operating and support of the system is not made visible and is not optimized as is unit production cost. The resulting newly developed weapon may then become a financial burden with payment deferred to the operating force.

Recommendations: As a result of the survey findings and conclusions, the author has recommended the following

(1) That DOD issue an implementing instruction to DODD 5000.28. That the implementing instruction be provided as guidance for project managers or "high cost system" developers. The instruction should provide the needed guidelines for making life cycle cost a parameter for minimization during development.

(2) DSARC/Service SARC require that a Life Cycle Cost Model be identified and if necessary modified for the specific system. This model is to be specified in the DCP when coordinated for signature/approval and used by the system PM and industry.

(3) That the PM include Life Cycle Cost minimization as an element in the RFP/contract with industry.

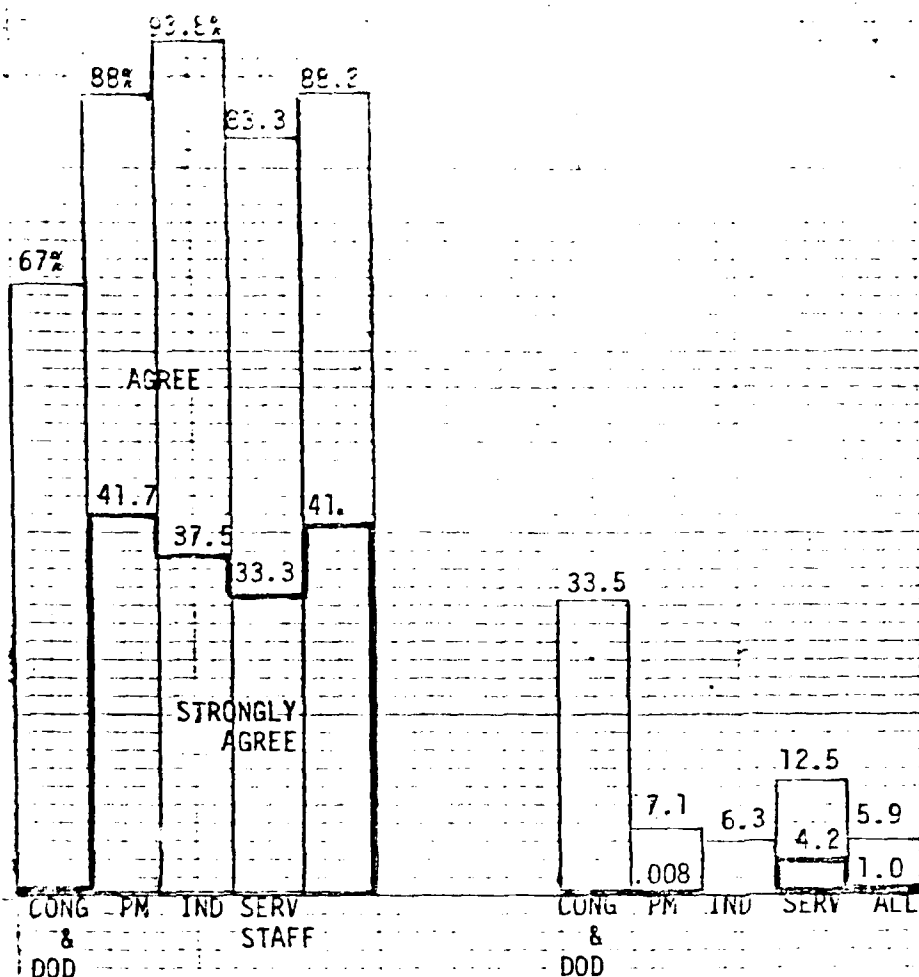
(4) That Project Managers use a criteria of: more than 5:1 projected pay back to investment ratio with less than a five year pay back period.

(5) That each Service's System Command: a. Permit use of "risk capital" and M account funds for Life Cycle Cost reductions when justified

by the above criteria and cost model. b. Require presentations at program reviews to show deviations from the projected LCC.

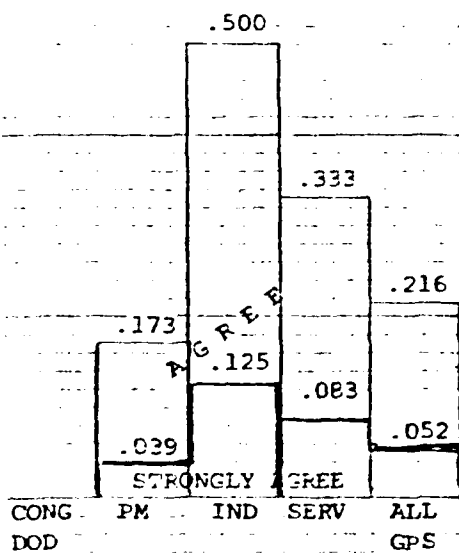
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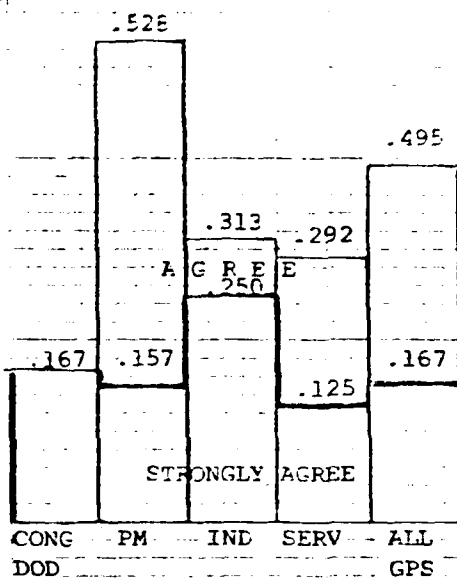
Decision makers direct their attention to near term R&D procurement cost as funded by Congress.

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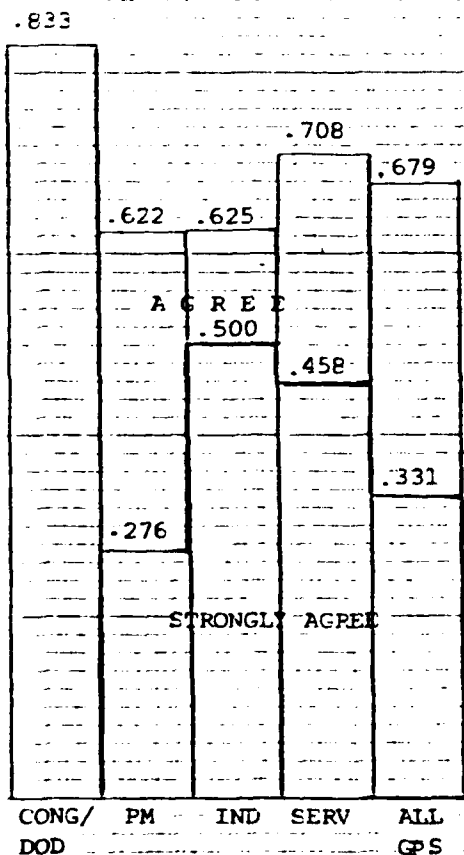
User will use same number O&S personnel so why bother with design improvements

3 B

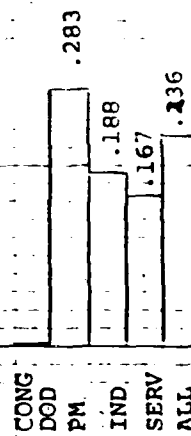


Funds are inadequate to design for reduced O&S Costs

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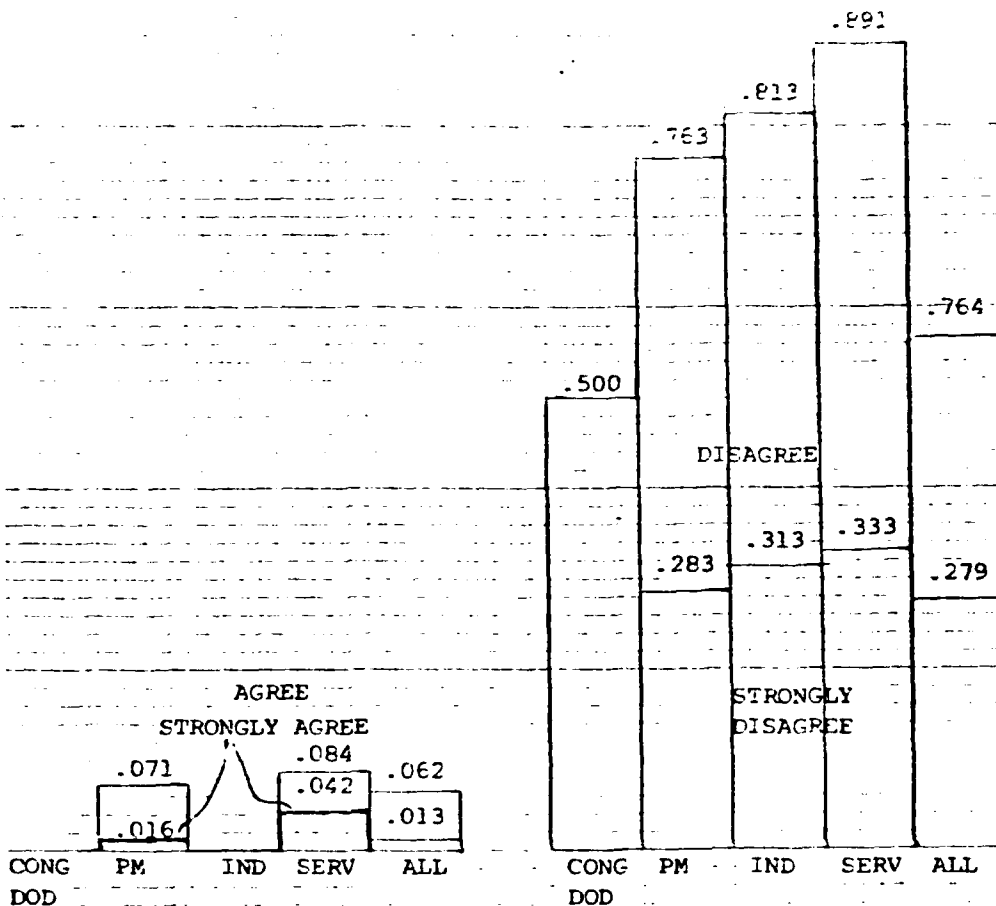
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Unit Production



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Life Cycle

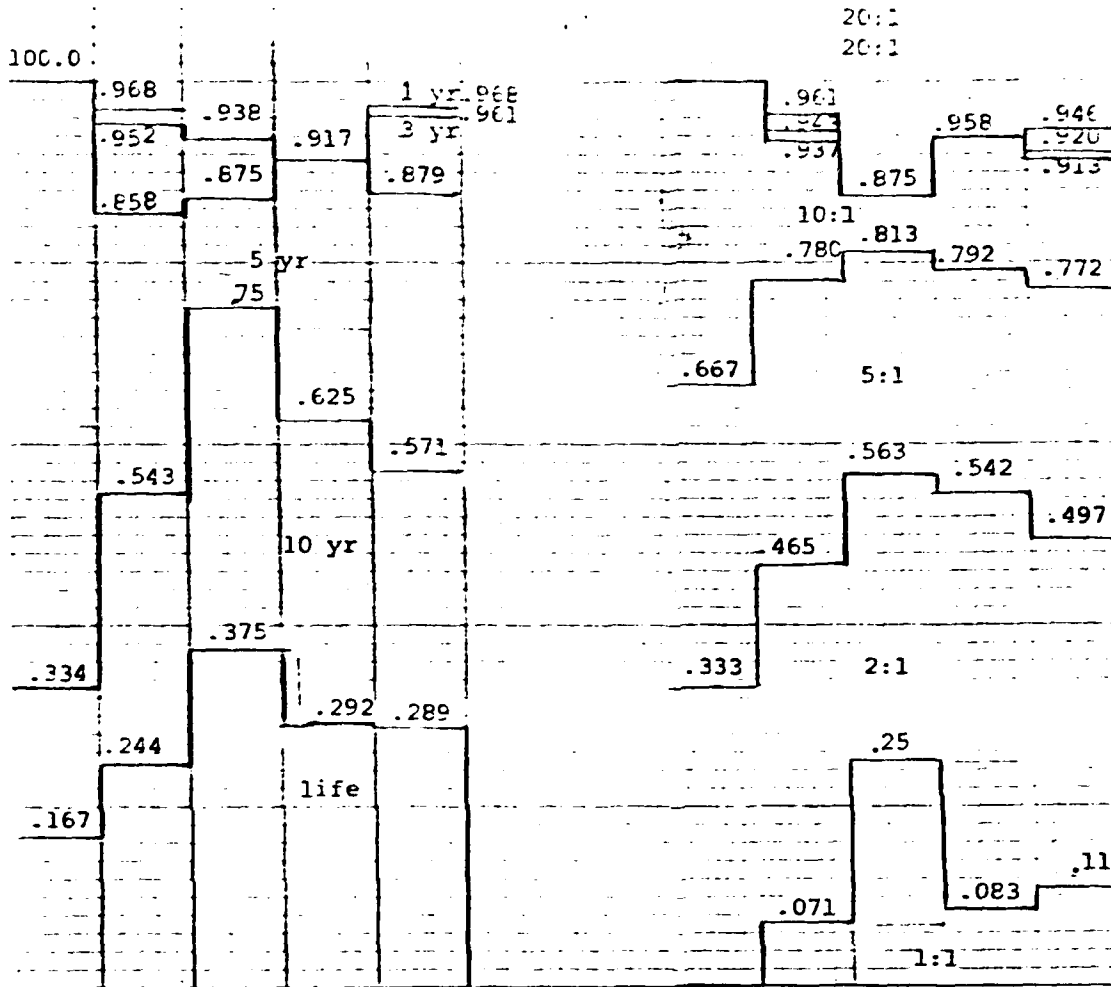
PM performance rating is based on meeting requirements within funding limits

3 D



A clear criteria exists to guide Program Manager's decisions concerning potential life cycle cost savings at the PM level.

Q 5

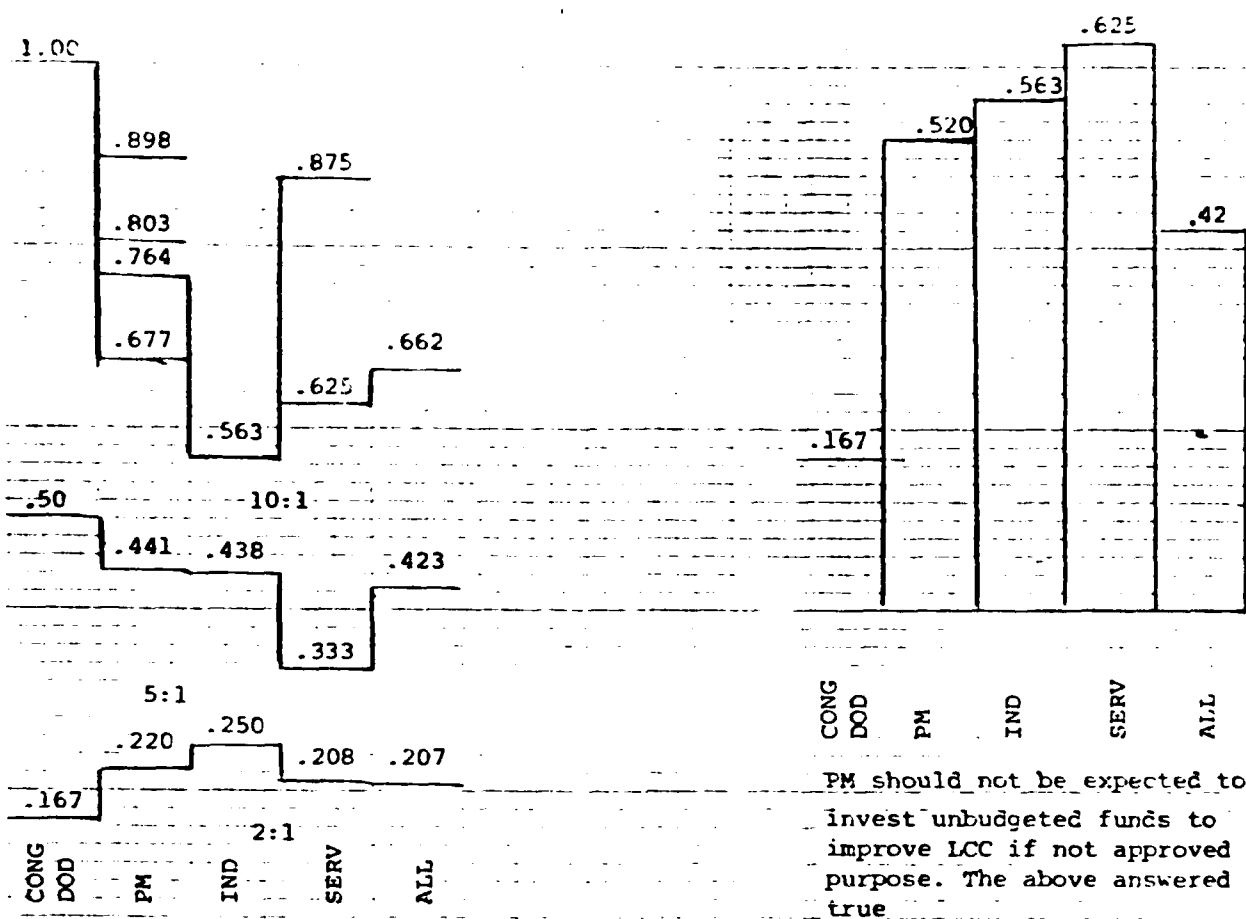


An investment should be made to decrease life cycle costs if it can be recovered in _____ years

Q 6

An investment should be made to decrease life cycle costs if the investment is returned on a ratio of _____ to 1 over the projected life of the system $\frac{LCC \text{ Savings}}{\text{Investment}} = \text{Ratio}$

Q 7



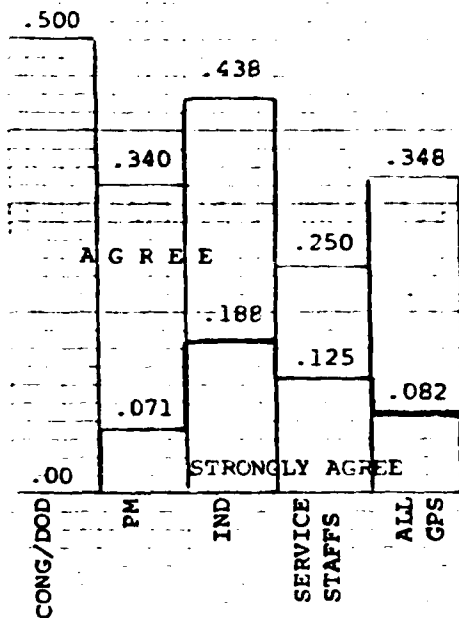
CONG
DOD
PM
IND
SERV
ALL

PM should not be expected to invest unbudgeted funds to improve LCC if not approved for that purpose. The above answered true

If your program was in cost trouble and you were approaching your Cost (ceiling) threshold, you would use your R&D and procurement money to improve Life Cycle Cost providing the investment showed a LCC saving ratio of 1:1 to 1 over the projected life of the system.

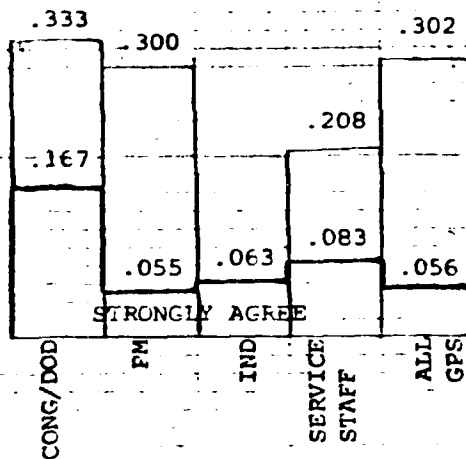
Q 9

Q 8



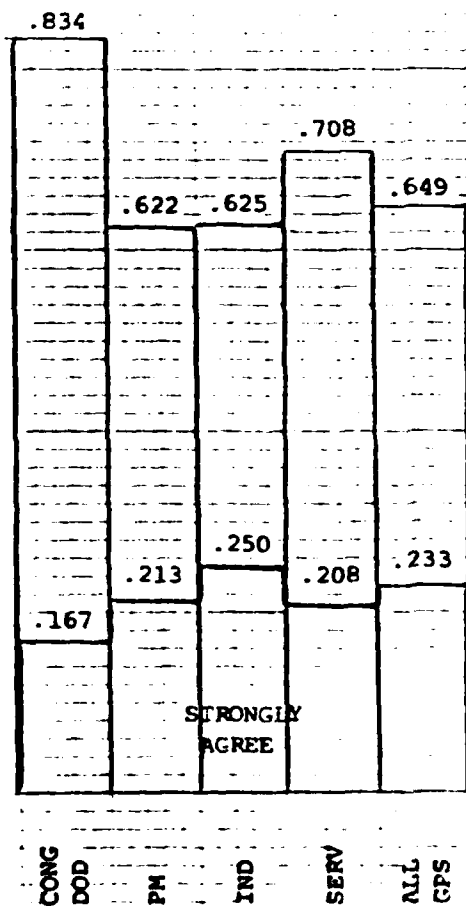
Tools exist at the PM level to evaluate for LCC savings

Q 10

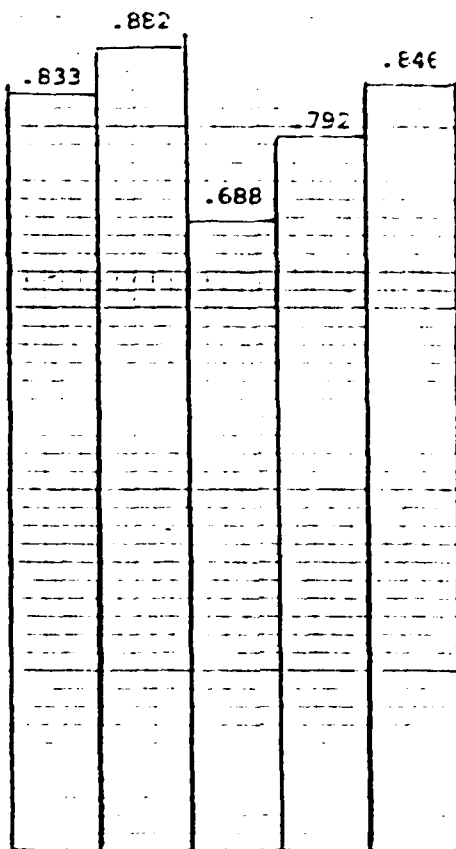


PM will be challenged if he fails to take LCC saving opportunities

Q 11



Q 12



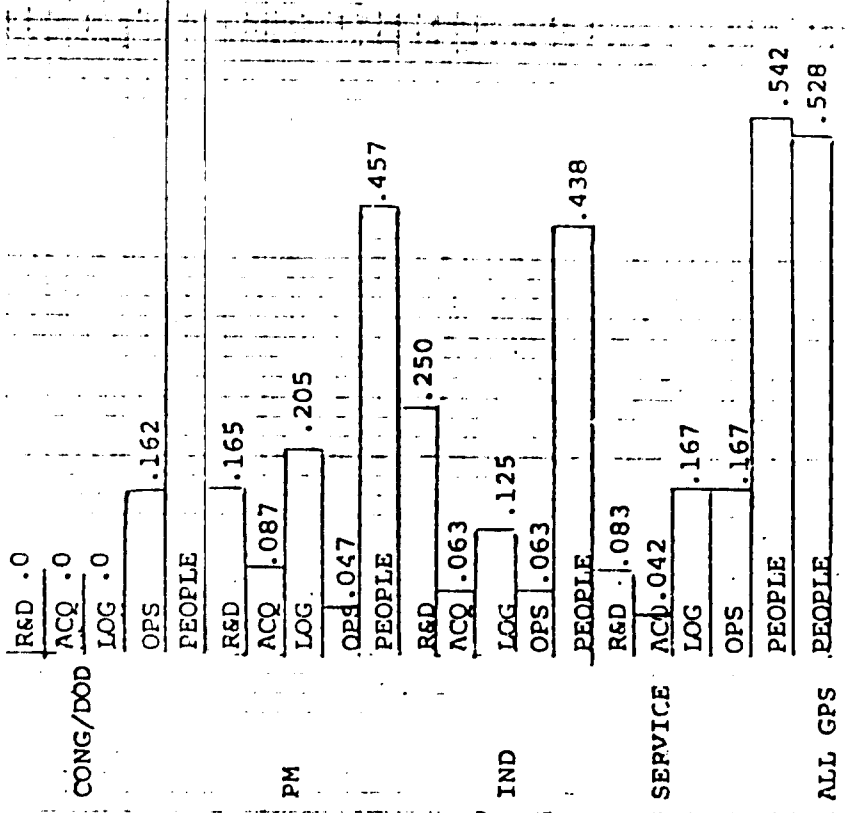
CONG PM IND SERV ALL
DOD STAFF OPS

Notify system command and
request funds

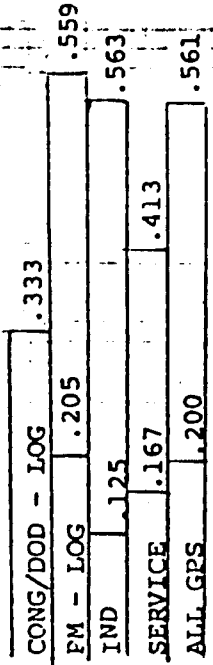
Q 13

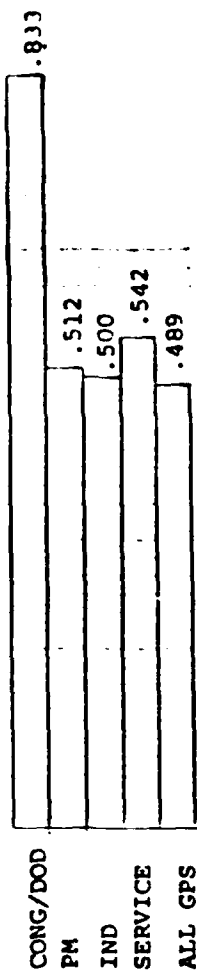
1.833

#1 Cost Driver People

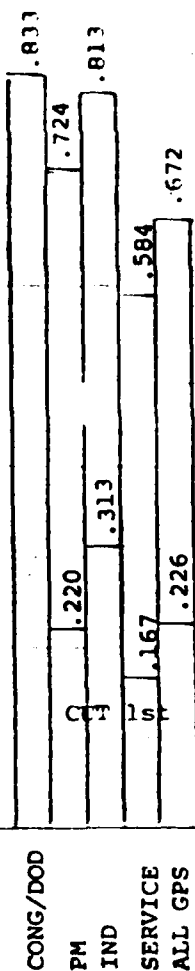


#2 Cost Driver Log Support

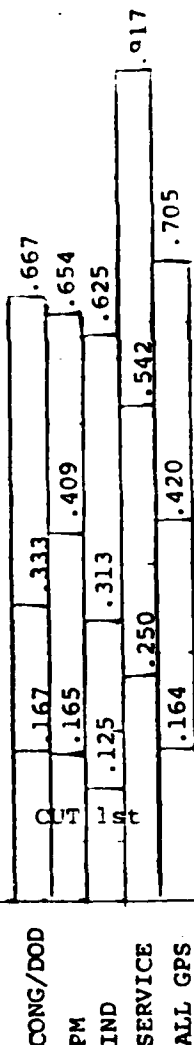




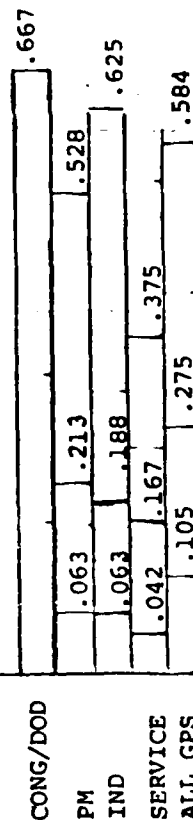
Desired Spec
Cut 1st by



Training Devices
Cut 1st or 2d

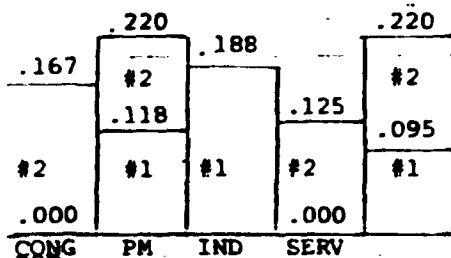


Data Cut 1st, 2d,
or 3d



Log Spt Cut 1st,
2d or 3d

Q 15



(1) I would try to satisfy
Directives or Instructions

Q 16