

Copy GIVEN to HAL MILLER
& BILL BRYANT 3/1/61 60-40
(note UNDERLINED)
D. Barlow

"MORE VALUE FOR THE MISSILE DOLLAR"

Brig. Gen. Richard M. Hurst
Commander, Air Ballistic Missile
Agency
Redstone Arsenal, Alabama

"MANAGEMENT'S APPROACH TO VALUE"

George T. Willey
Vice President & General Manager
The Martin Company
Orlando, Florida



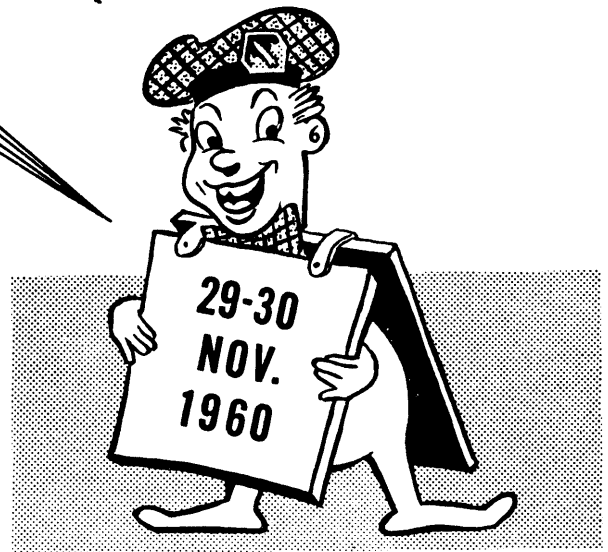
SEMINAR *Report*



**THE ARMY'S FIRST
VALUE ANALYSIS-ENGINEERING
SEMINAR FOR MISSILE SYSTEMS**

SPONSORED JOINTLY BY...

**ARMY BALLISTIC MISSILE AGENCY
AND THE MARTIN COMPANY AT
REDSTONE ARSENAL, ALABAMA**



MORE VALUE FOR THE MISSILE DOLLAR

BRIG. GEN. R. M. HURST

COMMANDER, AIR BALLISTIC MISSILE AGENCY

REDSTONE ARSENAL, ALABAMA

The present economic atmosphere creates a favorable climate for the opening of the Army's first Value Analysis-Engineering Seminar for missile systems. The continuing upward trend in munitions costs and the uncertainty as to costs of the future have become a source of increasing concern.

We are ready to listen attentively when someone speaks with authority on sound and realistic approaches to cost reduction. The need for immediate action to ease the pressures which have caused costs to rise is generally accepted as critical.

The subject itself is not new. Cost reduction has always been one of the constant goals of aggressive firms which have flourished in the face of the intense rivalry of our competitive economy. Top management's ability to clamp a damper on costs has greatly influenced every company's profits, and determined its success or failure.

We in the military have always been sensitive to costs, not because of the profit incentive, but because we operate within the limits of budgetary ceilings which sometimes seem more inflexible than the forces of the market place wherein industry's commercial products are distributed.

We have invited you here today because a fresh, strong, and united approach is needed to defeat this remarkably resurgent foe, i.e., rising costs. We in ABMA are firmly determined to wage effective combat against increasing costs in the 10 missile systems for which we are responsible in order that we may provide the maximum national security for the dollars we are spending.

We are convinced that something can and must be done to halt and even reverse the upward movement. This conviction has been the foundation for ABMA's Value Analysis-Engineering program. Some of you are already familiar with our program, and are seasoned exponents of Value Engineering in your own companies. Others among you may be new to the practice of Value Engineering techniques.

We have seen enough tangible results from our embryonic Value Analysis-Engineering program to appreciate its potential for producing marked reductions in costs. Its methods are bold and thorough.

Bringing you together has seemed the best way of defining clearly the concept, goals, and methods of implementing our program. We feel that through the communication of ideas in this seminar we can gain a great deal from the experiences of you who are more practiced users of this comprehensive approach toward cost reduction. And perhaps we can persuade those of you who are still waiting on the bank for further proof that Value Analysis techniques are effective, to jump in the stream and get your feet wet.

We intentionally invited to this Seminar, the key personnel from our own Agency and from our contractors. The success or failure of our program lies in the hands of this group. If you are now only vaguely familiar with Value Engineering, the two days here will be well spent in learning at least the basic concept and techniques involved. Frankly, we hope to create a ready acceptance of our program through convincing presentations on its merit during the next two days.

The Army Ordnance Corps initiated its first Value Analysis effort in 1956. It was begun on a modest scale in the conventional weapon area.. The outstanding success of this limited scale effort led to its extension into other commodity areas in a search for potential savings.

Value Analysis-Engineering faces its greatest challenge within the Ordnance Corps in the missile field. Not only are our systems amazingly complex -- they are not as standardized nor produced in quantities on the same scale as conventional weapons.

But the missile field also presents Value Analysis-Engineering with its greatest opportunity. More than 60 per cent of the Ordnance Corps budget for Fiscal 61 is allotted for development and procurement of missiles and rockets and their ground support equipment.

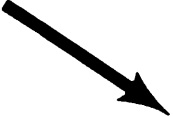
ABMA's share of the annual Ordnance Corps budget is more than 400 million dollars. With this money we presently support ten missile systems, ranging in complexity from the relatively simple Light Anti-Tank Weapon, a free-flight rocket, to the inertially-guided two-stage Pershing.

We think it not unreasonable to anticipate reductions in costs in the order of 25 per cent with a vigorous Value Analysis-Engineering program. Looking at the end result, this could mean one more missile provided the combat arms for every three now programmed, for the same money, with the same or improved performance.

Our initial goal may sound ambitious. We meant for it to be so. We believe that this is a realistic figure, and it may even prove to be conservative. When we reach it, we plan no let-up in our cost reduction efforts. There is no end to improvement as techniques advance.

We are not proposing that more people be added to the payroll nor that a lot of money be spent to implement this program. Rather we seek the adoption of an attitude, an awareness of goals and techniques, a realization of the necessity for cost cutting, and a willingness to participate on the part of every person who takes home a dollar of the taxpayer's money that is channeled through ABMA. The program will succeed if management at every level accepts it and uses it as a tool, for the basic concept of Value Analysis and Value Engineering is an integral part of good management practices.

Value Analysis should be inherent in the tasks, performance, and responsibilities of every individual in an organization as a vital part of his motivation for compliance with established policy. Every person has a clear-cut responsibility to keep costs at the minimum level consistent with the satisfactory performance of his duties.



Top management, which is always responsible for the ultimate success or failure of a program, has the accompanying power to make the final decisions which determine the direction of efforts to reach planned goals. A Value Analysis program cannot therefore operate apart from top management. If the program is placed in an isolated booth away from the main stream of operations, the booth becomes its coffin. It must be projected as an inherent part of day-to-day management, as an additional tool in supervision.

An objective look by the Value Specialist at the research or production design engineer's work can be a catalyst that accelerates savings. Objectivity is necessary because of the difficulty of evaluating and criticizing one's self or one's own handiwork. If self-analysis could be done impartially, every man could stretch out on his living room couch and be his own psychoanalyst.

The value analyst is an experienced engineer who is further trained in special Value Analysis and Value Engineering techniques which represent a composite of tested methods of cost reduction. He is trained to foresee and prevent unnecessary costs in paper work, procedure, and hardware. His contributions in the early Research and Development stage can decrease engineering time, provide simpler, lower cost solutions, and shorten the development period. This would help us in ABMA to achieve two major goals -- reaching target dates on time or ahead of schedule, and doing so with more equipment to show for the same money. This would certainly be more gratifying experience than having to justify a request for additional funds caused by slippage in one of our programs.

The application of Value Analysis is almost useless as an after-the-fact approach in the missile field. Our program provides management with a value specialist, who must enter the research-development-design-manufacturing cycle at the very beginning and remain with it full circle. Consultation with the Value Analyst in the first stages of planning is also essential from the psychological and human relations standpoint. It is far better for the Value Specialist, as a member of the team, to be able to suggest, "Joe, why don't we do it this way?" than to be brought in later with the after-the-fact lament, "Mr. Jones, it would have been cheaper to have done it in this manner."

Our entire program is predicated on the team approach. We will have a small Value Analysis Office in ABMA to serve as a sparkplug in developing Value Analysis as a "work habit" among Agency employees and contractor personnel. This office will eagerly advise and assist in the developing and administering of value analysis programs. It will arrange schools and seminars here at Redstone Arsenal, encourage participation in Corps-wide Value analysis seminars and attendance at Value Analysis Courses given by the Ordnance Management Engineering Training Agency.

Tangible reductions in cost, however, depend upon your acceptance of this program, and your ability to encourage your people to learn the Value Analysis techniques and to use them to seek out the basic values that are essential to function, design, material, and method of fabrication, and to refer items which they feel have questionable value to their Value Analysis-Engineering Coordinator.

Beware of lip service from those who might be indifferent or even opposed to your program. Effective implementation demands an initial educational program, followed by continuing internal communication, and a method for accurately measuring results.

Progress will depend on how frequently practical suggestions are generated, and how effectively action is secured. The first stems from the rigorous application of Value Analysis techniques. The second requires the timely exercise of judgment and swift follow-up action by management.

The balance between value and the dollar mark is a delicate one. While standards of performance and reliability must not be sacrificed, quality level above need is wasteful. We must find the exact point at which the quality requirement ends and waste begins, and mercilessly eliminate any nice-to-have appendages and frills which are not essential to effective performance.

We appreciate your taking the time to come to ABMA for participation in this seminar on cost reduction. We know that we shall benefit from the contributions you make to our program during this two-day meeting, and in the days to come. Every dollar saved through Value Analysis will help the Army in its goal to modernize equipment, providing a combat-ready force for the security of our nation.

MANAGEMENT'S APPROACH TO VALUE

G. T. WILLEY

VICE PRESIDENT & GENERAL MANAGER

THE MARTIN COMPANY

ORLANDO, FLORIDA

General Hurst, special guests, Value Engineering seminar attendees:

Management's Approach to Value. What is "value" and why the newly coined expression "value engineering?"

Briefly, I would like to tell you what "value" means to me.

VALUE is a state of mind -- a "cost conscious" state of mind throughout all levels of our organization. Management's responsibility is the engineering of value.

When I refer to value engineering, I am describing the method or manner in which management instills a cost conscious state of mind in every person connected with our organization.

Value engineering -- or the engineering of value -- is not limited to design or manufacturing alone. Value engineering has no organizational or functional boundary.

Value engineering is doing things from a cost standpoint which under normal circumstances would not be done economically. Yet it is what, by our very American heritage, we should do. Our ancestors were compelled because of circumstances to evaluate what they were doing -- and to approach it in the most economical way. Their very existence depended upon it.

I believe this can again mean our very existence. If we fail to use this approach, we can price ourselves out of world and domestic markets. Our country cannot stand a continued inflationary program. The defense business can be run more economically both from an industry and government standpoint if we give due consideration to value engineering.

WHY THE NEWLY COINED EXPRESSION, "VALUE ENGINEERING?" Because our very life blood depends on a new approach. How did we get the way we are? When Government and Industry get big, they get cumbersome. Consequently, control is more difficult.

Let's reflect 30 or 40 years ago. Some of us remember being young budding engineers. It was demanded of us that our designs were both economical and reliable. The engineer on the desk or drawing board had to check his design to see that to the best of his ability every manufacturing operation was satisfied and that it would give the most value for the money. We had college trained men, but these men were also experienced in tooling, machining, cost analysis. After a very tough apprenticeship, we were recognized as engineers.

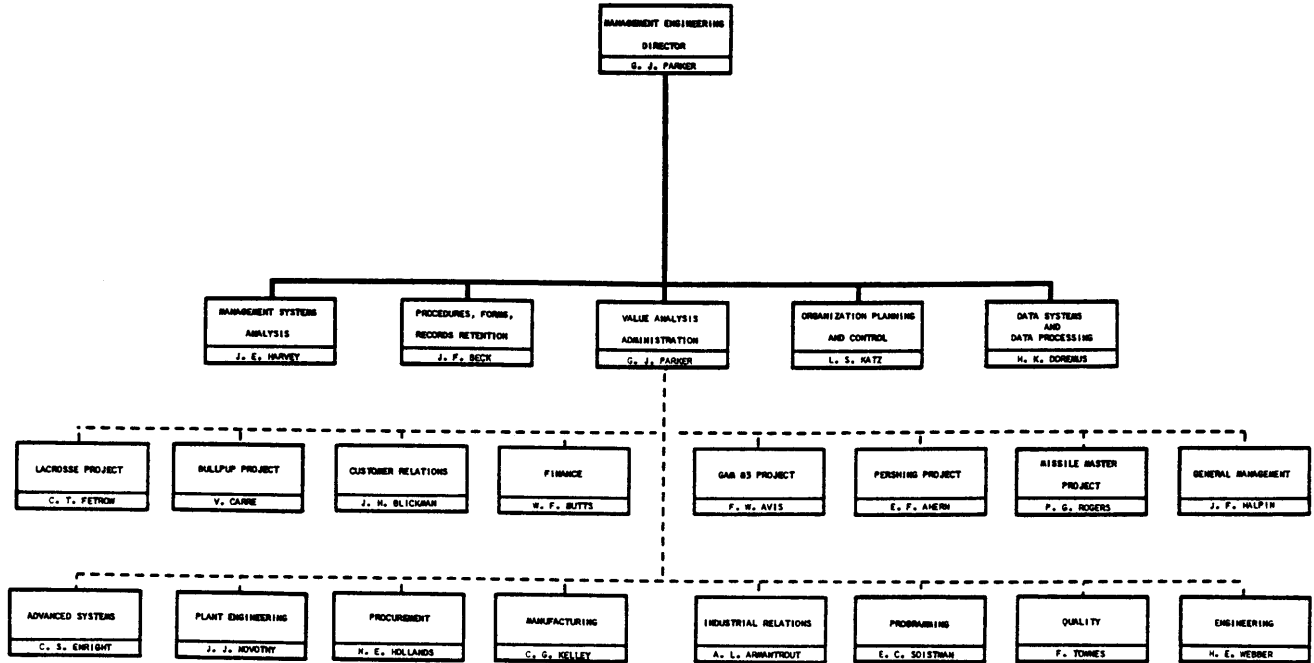
WHY DO WE NEED SUCH AN EMPHASIS ON VALUE ENGINEERING TODAY? Because in our driving desire to get big--stimulated by two World Wars--a creeping paralysis of worldwide socialism has changed our present generation's thinking to collectivism. As a result, we have lost many of the good techniques we once had.

I mentioned earlier that VALUE is a state of mind. The big question is: WHAT CAN WE DO ABOUT IT? HOW CAN WE ACHIEVE THIS STATE OF MIND?

First, this state of mind must be dynamically sanctioned from the top level of an organization. And, the organization must be such that it operates on a continual hard-hitting basis.

To illustrate what I mean, I would like to show you a chart of VALUE ANALYSIS ADMINISTRATION which has been in effect at the Orlando Division of The Martin Company for the past six months:

REPORTS TO VICE PRESIDENT AND GENERAL MANAGER



All project and division representatives (shown as dotted line above) are required to report accomplishments within their area each month. Each man is charged with the responsibility of generating cost consciousness and follow up on adoption of cost reduction suggestions. Forwards to Director all suggestions that have company wide application. Organizations (shown solid line above) Management Systems Analysis, Procedures Forms and Records Retention, Value Analysis Administration, Organization Planning and Control, and Data Systems and Data Processing have full time direct responsibility in the field of Value Analysis Engineering, Cost Reduction, Product Improvement and Simplification and Economy. The other organizations (not shown), Value Engineering and Manufacturing Research and Development have full time responsibility in this effort. Value Engineering reports to the Engineering Division and is charged with the responsibility for the constant study of hardware to improve, simplify, eliminate and reduce cost through better designing. Manufacturing Research and Development is responsible for work simplification, better tooling for manufacturing methods and reports to the Operations Division. All Directors reporting to the Vice President and General Manager are members of the Cost Control Board which supervises and directs the overall effort.

DATE DRAFTED 1/15/60

APPROVED [Signature]

APPROVED _____



REFERENCE TO CHART AND SLIDE

Reporting directly to the Vice President and General Manager is

the Director of Management Engineering.

You will note that the Director of Management Engineering is also directly responsible for Value Analysis Administration.

Four groups report directly--on a solid line--to the Director of Management Engineering. They are:

Management Systems Analysis; Procedures, Forms and Records Retention; Organization Planning and Control, and Data Systems and Processing.

These are the groups which lay the foundations for economical operations.

In addition, under Value Analysis Administration, the Management Engineering Director has reporting to him a functional staff, consisting of representatives at Department Head levels from each project and line division of the total Martin-Orlando organization.


Two other groups--which do not show on this chart--also devote a full-time effort to Value Engineering, Analysis and Cost Control. These two groups are:

Value Engineering, which has the responsibility for the constant study of hardware to improve, simplify, eliminate and reduce cost through better design. The Value Engineering group reports directly to the Chief Engineer.

Manufacturing Research and Development, which is responsible for work simplification, better tooling and manufacturing methods. This group reports to the Manufacturing Director.

All project and division representatives shown by dotted line on the chart are charged with the responsibility of generating cost consciousness and follow up on adoption of cost reduction suggestions within their areas. Each must forward to the Director of Value Analysis Administration, all suggestions that have company-wide application.

Furthermore, these men are required to report accomplishments within their area each month.



But, gentlemen, an organization chart is not a living thing. This chart merely represents the Value Analysis organizational structure. Management is action, and action is an ingredient that can only be imparted to value engineering by top level enthusiasm.

Therefore, at Martin-Orlando, we have a cost control council consisting of my entire staff of directors to evaluate and direct the effort of the Value Analysis Administrator. All directors reporting to the Vice President and General Manager are members of this Cost Control

Board which supervises and directs the overall effort.

You have seen, then, our organization. You have seen how we are set up to manage a complete value analysis program, and the heavy emphasis we place upon its execution.

Management's responsibility is to analyze, organize and administrate. You and I, as managers in our own spheres of life, have a direct input and responsibility to make hay out of the present world trend and use the tools we have in our hands to control it to our advantage.

Let us analyze the sort of program we need. It must be broad, it must be economical. It must start with the "front office"--the management of the company who set the pattern. It must reach every engineer, every specification expert, every study expert, every manufacturing man. It must be plantwide.

Then, let us organize. Having established the vital "state of mind"--having established the sense of urgency in every person, let us organize. Each industrial organization will be different. You have seen the one we use at Martin-Orlando. Every government agency will be different. The organization chart will have different individual ideas. This is not too important. Organization charts are very dead as such, but if the personalities--represented by that chart--begin to live and breathe value engineering, then we have an organization with life that moves and challenges. We have an organization that does things.

Finally, we must administrate. Having analyzed and organized our problem, it must be administrated. The program cannot be successful unless backed wholeheartedly by the president of any organization, down through the organization. There is nothing more drab nor more futile than a halfhearted Value Engineering program. It generates no enthusiasm and creates no interest and usually dies from its own lack of glamour. Therefore, it must be given life through direction, enthusiasm, and drive. The Chief Value Engineering director should be a man who emanates and generates these qualities--a man with overall industrial know-how--because Value Engineering takes into account all phases of the business. He must be a leader--one who can and does make things happen.

This is Management's job--to make things happen. If we are not accomplishing the desired results, then it is because we have not made things happen.

The Martin approach is to attack the problem from the inception of a project all the way to its active deployment in the field.

We start with our basic design. It's obvious we can't control such elements as cost, quality, accuracy, schedules, or reliability with a poorly designed system or part.

As the design is being established, we make certain that our engineering and tooling people work together. Here is where scheduling becomes so important.

It is management's responsibility to keep all items on schedule so that there is ample time for checks and balances through the development of the project.

We get our production engineering and procurement together. Too often, our engineers want to design something which is brand new instead of using something else which will do the job. Perhaps a slight change in a specification will permit the buyer to buy an "offi-the-shelf" item instead of going through the tedious process of finding a subcontractor to build a brand new part.

And speaking of subcontractors, we work closely with them, to instill in them the state of mind of the engineering of value. Since so much of our work is done outside our plant by our subcontractors, they play a vital role in any cost cutting program. They, too, must get into the spirit of value engineering.

Paralleling our entire effort is our quality program. Every employee, every person working on our projects must be "quality conscious" just as every person on the project must be "cost conscious". We do not save money by producing unreliable weapon systems.

Again, this is management's job to make certain that people have the proper goals and stimulation. People need performance standards... they need competition. Performances must be measured and reported back to the people doing the job.

It is management's job to make every person in the organization conscious of the importance of cost, schedules and reliability.

So, in administering our value analysis program we must set the climate, control the input, check the output on results, and administer it with courage and decisiveness. These elements are as vital to the success of a Value Engineering program as are Firepower, Mobility and Communications to military success in battle.

This, then, is how we are organized at Martin-Orlando.

BUT WHAT DO WE HAVE TO SHOW FOR OUR EFFORTS?

~~We can prove that real savings through the application of Value Analysis and Value Engineering amount to more than \$3 million in the last six months. This gives no credit to the tremendous indirect savings and benefits derived through avoiding expenditures and a smoother, faster moving organization.~~

Here are some typical examples of the results brought about by a concerted management effort to cut costs and improve performance:

Engineering found that we were using 379 types of non-structural mounting screws. A study indicated that 79 would do the job and resulting savings was \$138,000 per year. This was only one of 33 cost reduction suggestions submitted.

Early last June, the Manufacturing Division established a Methods Improvement Program with employee participation. A monthly plaque award is made on a departmental or work center basis for the best idea of the month. A tabulation of direct dollar savings since June 15 are in the amount of \$131,700.

A "Timely Tips" Newsletter is published in the Manufacturing Division. This paper advertises ideas that have "paid-off" in one location and generates their use in all areas. One such idea that had handsome returns on one project was used again to obtain equal or greater results in other areas.

A complete study of organization and methods in the area of engineering support has made it possible to reduce the budget by \$40,000 per month. This savings of \$500,000 per year was accomplished even though the workload increased as follows:

Engineering packages processed up	64%
Engineering drawings handled up	63%
Engineering check prints up	48%
Window requests for prints up	67%

Time required for engineering release through reproduction reduced from 5 to 3 days.

Weapons System Support placed major items repair lists on IBM reducing 13 man months of manual labor to 4 hours. Elimination of training manuals through use of other methods on Pershing will result in a savings of over \$2,000,000.

Manufacturing hours required to produce Bullpup have been reduced by 23% since April. One suggestion for a special drilling tool saved \$33,000.

Pershing established a group in Procurement to monitor and screen all material requirements as released by Engineering to prevent excessive unit price and duplication. In August alone, this effort saved \$178,000.

Let's take a look at the Army's Lacrosse program for a moment:

During the four years we have had the Lacrosse program in Orlando, we have cut missile production time to one-third of the time it took us in 1956.

An excellent "value analysis" example can be seen in the work accomplished in improving the Lacrosse auto-pilot:

Total electronic parts on the improved auto-pilot were reduced from 305 to 254; hand solder joints were cut from 871 to 408, and the number of engineering drawings were reduced from 318 to 83.

Other Lacrosse examples point up similar savings and high performance:

The Lacrosse program has been on schedule for the past 22 months.

We have increased the number of missiles accepted by the Army on the first test from 10 per cent to more than 70 per cent.

By going to a complete systems test program--as contrasted to a component test program--we have reduced the average manpower on the line by 30 per cent and reduced manpower costs by 20 per cent.

Actual test time on the missile has been reduced--in some cases as high as 80 per cent.

Let's take a look at our Bullpup A program for a moment. Several years ago we were producing Bullpups at about the price of a Rolls Royce. We managed to get the price down, first to that of a Cadillac, and now we are producing Bullpups for the price of a Chevrolet. Our ultimate goal is to make them for the price of a Volkswagon.

We didn't bring this price down by accident. We have had a concentrated program underway on our entire Bullpup project to cut costs.

"Value Engineering" I am sure, can take some credit for the recent Army announcement to the effect that Martin was turning back \$10 million on the Missile Master program.

Is Value Engineering limited to industry? No! Nor is it limited to military organizations. Sometimes the direct effect of Value Engineering can only be achieved through joint effort. For example in 1958, we at Martin were dismayed at the costly and time consuming methods of Data Reproduction. We discussed our problem with representatives of ABMA. They made recommendations based on earlier studies of similar problems, and as a result we mechanized our Data Reproduction

operation by the use of Aperture Cards. But Value Engineering did not stop here. Upon completion of the installation we found many of our problems had been solved but continued the program of analysis until today various military organizations are visiting us to take a page from our book and up-date their systems. Value Engineering is a constant, never ending effort.

Everything we do...every move we make...costs money. Gentlemen, I assure you, we at Martin are dedicated to the proposition that the cost can be reduced.

I believe that management holds the key to value.

--It is management's job to refuse to accept the first solution to a problem. We must keep trying for better ways.

--It is management's job to staff these projects with qualified people.

--It is management's job to support these people and the programs with deeds and not just words.

--It is management's job to develop the plan of operation, to see that we follow a well-conceived program of action.

--It is management's job to establish the controls and then measure the performance.

To perform a proper management function, we certainly must have more than buildings, plant equipment, materials and tools.

We must have people. We must have that priceless combination of creative managers, engineers, scientists, and skilled workers.

We must attract and hold people who are dedicated to performing at peak efficiency--who have a pride in what they are doing--and who realize the urgency of the job that needs to be done.

We must know how to manage these people effectively; we must have a sound organization which can give us the flexibility, creativity and productivity we need.

We must apply creatively those management principles which have proved so successful in the past. And we must continue to develop new principles.

We must continue to work closely with our military counterparts. We must "know what the other fellow is thinking" if we are to give you what you want. It isn't a question of government dominance of

industry, or industry dominance of government. Instead, it is the pulling together of both government and industry to reach a common goal. It is a true team effort.

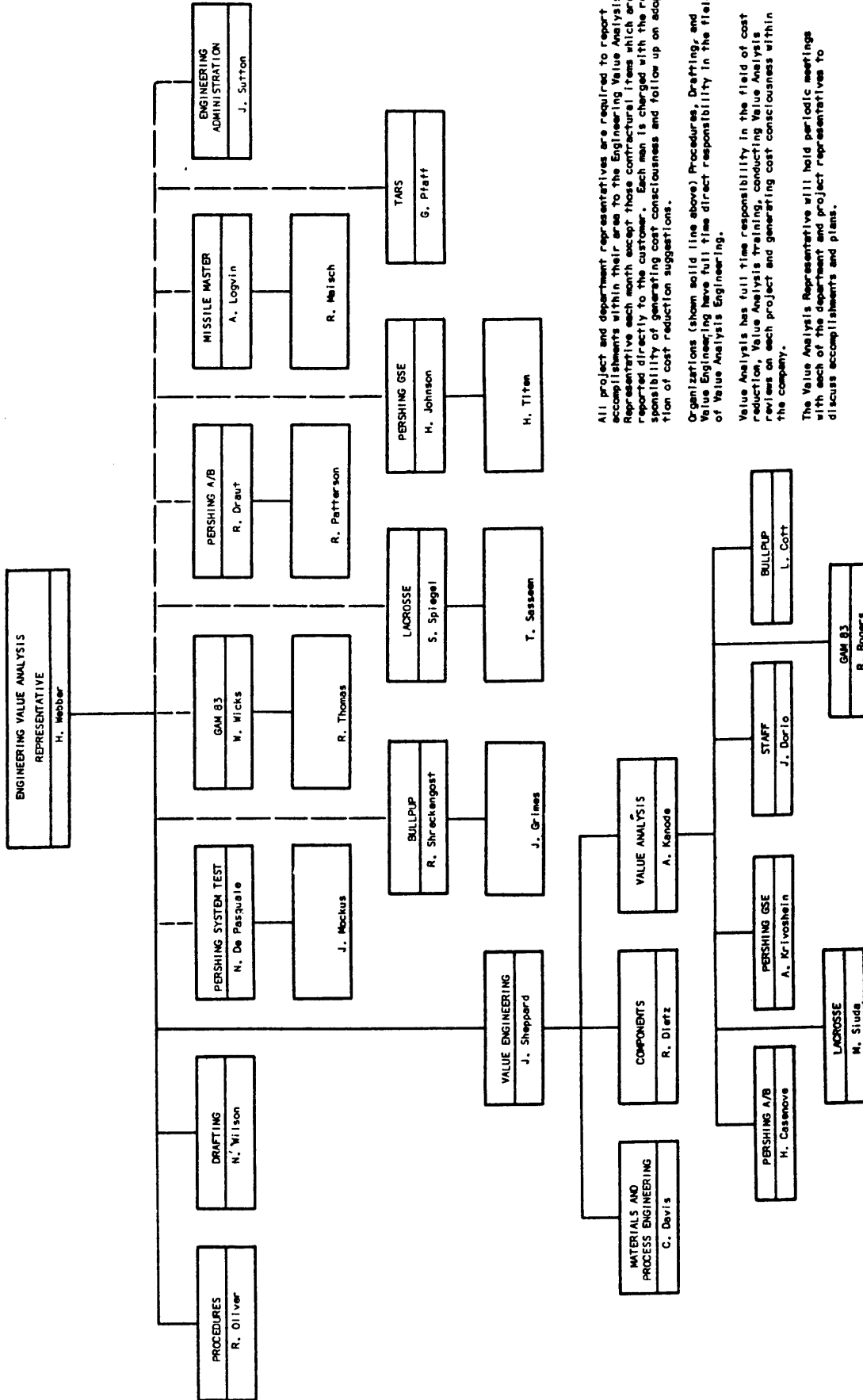
Finally, we must develop and effectively use true measurements of our performance. When we measure our performance, when we reward good work and penalize poor work, we need have little concern as to our future.

Gentlemen, today's seminar is an excellent example of the type of government-industry cooperation which can only bring untold benefits to the programs we are attempting to accomplish.

What you are after is reliability, availability, maintainability, and all the other "ilities." But, most of all, you demand "VALUE-ability."

And VALUE is everyone's business--but it is YOUR and my BUSINESS.

* * *



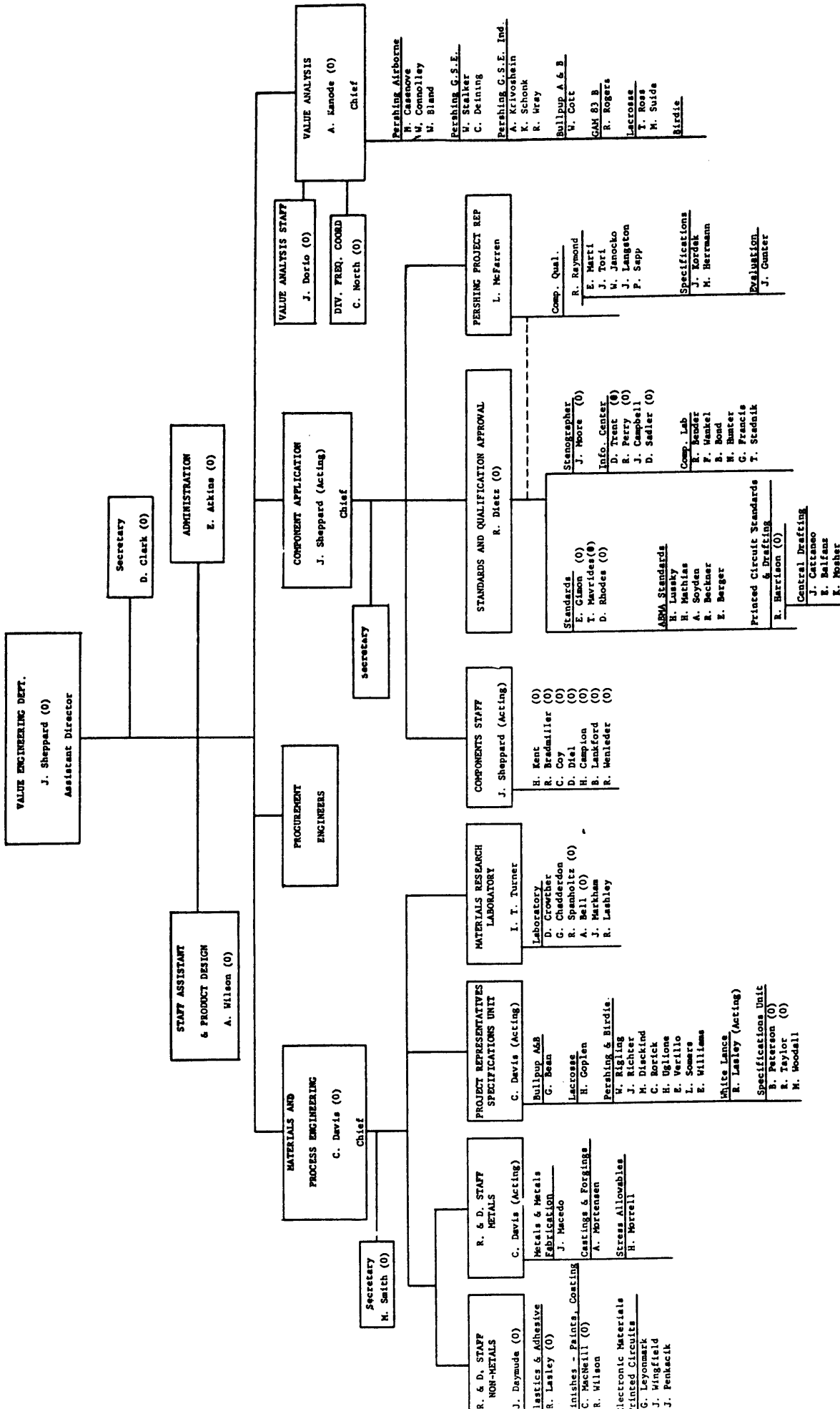
All project and department representatives are required to report accomplishments within their area to the Engineering Value Analysis Representative each month except those contractual items which are reported directly to the customer. Each man is charged with the responsibility of generating cost consciousness and follow up on adoption of cost reduction suggestions.

Organizations (shown solid line above) Procedures, Drafting, and Value Engineering have full time direct responsibility in the field of Value Analysis Engineering.

Value Analysis has full time responsibility in the field of cost reduction, Value Analysis training, conducting Value Analysis reviews on each project and generating cost consciousness within the company.

The Value Analysis Representative will hold periodic meetings with each of the department and project representatives to discuss accomplishments and plans.

APPROVED _____
 R. W. CUTHILL
 CHIEF ENGINEER
 12-28-60



J. Sheppard
DEC. 1, 60