

UNDERSTANDING VALUE ENGINEERING

Questions and Answers

Copyright 1964

by

L. D. Miles

1. Is analyzing of bids Value Analysis? No - that's purchasing.
2. Is analyzing a design for labor and material content Value Engineering? No - that's engineering.
3. Is questioning the customer on his real functional needs Value Analysis? No - that's marketing.
4. Is studying materials flow in a plant Value Engineering? No - that's manufacturing.
5. Is getting suggestions from suppliers Value Analysis? No.
6. Is naming functions in two words Value Engineering? Yes.
7. Is dividing function into basic and second degree Value Engineering? Yes.
8. Is assigning appropriate cost, or "value", to a function--i. e., evaluating a function-- Value Engineering?
 If arrived at by analysis..... No.
 If arrived at by comparison..... Yes.
9. Is applying better processes Value Engineering? No.
10. Is studying material substitution Value Engineering? No.
11. Is associating costs with functions Value Engineering? Generally Yes.
12. Does Value Engineering work better on high volume items? No.

13. Does Value Engineering work better on hardware than on maintenance or service?

No. All expenditures are for the accomplishment of a function. Sometimes this money is spent through hardware to accomplish functions; Other times, through service to accomplish functions; And still others, through an organization or group of people to accomplish functions.

The approaches and techniques are applied similarly regardless of which medium is used to move from the cost to the function.

14. We used to find a good supplier, then deal almost exclusively with him. Now I insist on three bids on everything over \$100. Is that Value Analysis?

No - that's purchasing.

15. Our suggestion system asks for everybody's ideas, keeps them on their toes, keeps them thinking. Is that Value Analysis?

No.

16. As a purchasing agent--if instead of accepting the best quotation I negotiate with the supplier for better prices, is that Value Analysis?

No.

17. I'm a salesman. If I sell a standard item instead of causing the factory to make something different, is that Value Analysis?

No.

18. As a salesman--if I stop taking a customer to lunch, is that Value Analysis?

No.

19. If I as a salesman rearrange my time and route so that I call on my customers with less traveling expense and traveling time-- is that Value Analysis?

No.

20. If as an engineer I use a new material that makes just as good a product at lower cost, is that Value Engineering?

No.

21. If I design out labor, is that Value Engineering?

No.

22. If I keep all of the utility of the product but eliminate some of the "gingerbread", is that Value Engineering?

No.

23. If we are having field failures and I design in some more quality, is that Value Engineering? No.
24. As a process engineer, if I find a process that reduces costs, still keeps quality, is that Value Analysis? No.
25. If I study the manufacturing line and find I can rearrange work stations and make the product on one floor instead of two with large savings, is that Value Analysis? No.
26. If I can improve work flow and reduce overtime, is that Value Analysis? No.
27. If by better plans with different job rotation or work scheduling, I can reduce idle time in the factory, is that Value Analysis? No.
28. If I benefit the company by shipping scarce items first to the customers who need them most, then completing shipments to others, is that Value Analysis? No.
29. If as a manager I have two engineering departments and can combine into one reducing the payroll--still get the same good results--is that Value Analysis? No.
30. If as a manager I see men who are not doing their jobs well, hire teachers to teach them and, as a result, increase output substantially, is that Value Analysis? No.
31. I study and measure the similar work of two groups, then, by causing each to also use the better approaches of the other, I get 25% more results. Is that Value Analysis? No.
32. What do you mean by value?
Appropriate performance of customer functions at appropriate cost.
33. How does VA or VE fit into this?
Keep appropriate function performance. Cause appropriate cost to be secured.

34. What do you consider to be the appropriate cost for a function?

The lowest cost that will reliably accomplish it to the full satisfaction of the customer.

35. Do I understand that the words Value Analysis and Value Engineering have exactly the same meaning?

No. They cover precisely the same approaches and techniques--the same system. When parts of the system are used in the non-engineering sphere, the system is called Value Analysis. When the system is used by men who are professionally qualified engineers in the sphere of engineering work, it is called Value Engineering.

36. Isn't this foolish or irregular to apply different names at different times to the same thing?

No. It is very common to call identical products or techniques by different names when they are differently used. For example, the same product to a farmer is a rope, to a ranchman a lariat, to a boatsman a line.

The identical piece of fabric will, according to its use, be called a tie, a coat, a dress.

It isn't my intention to debate the propriety of calling the same product by different names depending upon the way it is used, but rather to call attention to the fact that it is a normal established practice in our education system and way of life.

37. Is there Value Analysis work to be done in management area?

Yes.

38. Is there Value Analysis work to be done in marketing area?

Yes--also in the engineering, manufacturing, purchasing, and procedures type of work.

39. Doesn't good Value Engineering work even carefully handled usually embarrass someone?

Yes.

40. Isn't it embarrassing for a good engineer to call on a VE, therefore admitting a deficiency in himself?

Depends on his boss and his peers. If they still think that an engineer can handle his traditional job, and, ignoring specialized help, achieve superior economic objectives--the answer is yes. When they learn the depth and vitality of the contribution available--they would criticize him if he didn't use it.

41. How can VE's operating as such avoid making the engineers feel uncomfortable in their work with them?

They can't, entirely, but the engineers' boss can fix much of it. He can keep them from feeling uncomfortable while working with specialists in heat transfer, vibration, stress analysis, value engineering, or other. This is one reason why the degree of accomplishment with VE is so controlled by the manager's attitude.

42. When value engineering a product, how do you overcome the "not-invented-here" complex?

You can't. The manager of the business must cope at least reasonably with it or results will be cut drastically.

43. Have you had any interesting and valuable surprises while developing and using VE?

Yes. An outstanding surprise was... "Most popular conceptions are wrong."

44. Others?

Yes. A related and very useful guide impressed itself. It was:

"Take nothing for granted"--

The complete facts with different thinking usually show a different picture from the one that meets the eye.

45. Others?

Yes. We found that in an effort to stop consideration of new or different methods, the "test to its 'logical' extremes" is often verbalized.

This test is always invalid--has no bearing whatsoever--but is often quite an effective retardant. For example, you suggest to me that drinking water might be good for me. I answer, "You test it to its extremes first--drink 10 gallons--and let's see if it is good."

46. I don't understand it. How do we know when an engineer is doing VE and when he's just doing his engineering job?

How do you know when he's using metallurgy, or stress analysis, or advanced electronics science? What he and his peers can learn in each field and take in their stride becomes part of their "engineering." He is not doing VE. If, however, the amount of either VE, or metallurgy, or electronics he can know and use does not produce the needed objectives, specialization in any or all is brought in to help him.

47. Is VE just done by full-time people? Yes and No.

To do VE work requires working knowledge of the philosophy, techniques, and approaches of the entire system; and developed skill in applying them to every-day situations.

Nothing says that a medical doctor be full time. He could take up law--he could become an accountant--he could manage a grocery store...but if accident or illness are critical, I'd sooner go to one who uses his entire being in advancing in his medical profession--not dividing himself so thin.

A problem we have now in VE, to use the same simile, is that the lawyer, the accountant, the store manager take a week's course in medicine, then say and believe, "I'm a doctor"--and start setting bones.

48. Is there that much depth to VE? Yes.

49. How do we know?

It's hard to learn for sure. If we were not "conditioned" to expect the contribution of medical doctors--How would we learn? I think we'd take one who is vomiting to him and see what happened. We'd take one with a broken bone to him and see what happened. We'd take one who acted hysterical. We'd take one covered with sores. Then, if we found that all or most of them improved or were completely restored to health, we'd want to know how it was done. We'd want a sensible pattern in our own frame of knowledge to explain the effects we'd observed. We then would have both proof and understanding. We'd no longer be perplexed. We wouldn't worry about doctors or self-medication. We'd just call one when needed and live our lives.

Learning that VA has the depth--excepting for those who can invest the time to learn its techniques--is the same situation.

50. How would you apply VE to the R&D area-- still not inhibit creativity?

Nine-tenths R&D money is not in the area of unknown. The same benefits of different thinking with psychological brakes partly removed will get simpler better solutions sooner.

In 10% area of unknown, proceed full-speed as before. Even there, some thought from a different angle produced by the approach will often shorten time.

51. Would you say there is a fairly fixed optimum ratio of value engineers to the total complement of personnel of a business?

No. Having value in a product, service, or procedure usually means that it performs its use and esteem functions as good as or a little better than competition, and has costs as low as or a little lower than competition. If the in-place competence and procedures are selling it at competitive prices and making a suitable profit--then they need no VE. If the opposite is true--if costs are too high--they need it. They may need much of it--and quick.

52. Do you believe that the good use of the VA system returns \$10 for \$1? If you do-- why all of the delay and talk, why don't thousands of managements use it at once and well?

Responsible people, unless forced by unusual circumstances to deviate from their normal life patterns, accept something new that affects them only when two conditions are met:

1. They must have seen unmistakable proof in their frame of reference.
2. They must understand how the results were achieved.

It isn't easy to get an opportunity to prove it in the frame of reference of millions. Furthermore, as we can see here today, it isn't easy even in the face of proof to communicate understanding.

53. How does the use of VE affect quality?

Good quality and good value come hand in hand. Good quality is the result of a thinking process which has developed the right approaches and methods for accomplishing the functions needed. Good value is the result of a thinking process which has developed the right approaches and methods for accomplishing the functions needed. Hence, as the VA techniques are used, better solutions are developed and better quality is a normal by-product.

54. Is it applicable to an entire missile system? Yes.

55. Is it applicable to a communications expense?

Yes. The purpose of any communications expense is to accomplish a function which can be spelled out as precisely as the function accomplished by the shaft on a motor. The same thinking processes in the VA system are used in the same manner with similar results.

56. Is it used to study labor practices?

No. There already are technologies such as time and motion study, work simplification and many others in this field.

57. Is VE now being accepted overseas? Yes.

58. How do we know when we need VE?

How do we know when we need a doctor? Although we continually use good health practices, something in our environment or in our acts or in our lack of action has caused us to be sick, so we call in specialization to solve it.

When the costs in a business are so high that a product or service cannot be sold competitively at a profit, that part of the business is sick. Specialization will solve it.

Or, when the costs in a branch of government or an educational institution make it impossible to perform the functions needed with the dollars available, it has an illness. The VA system was created to solve it.

59. What got it started?

So much unnecessary cost, that had been missed so long, occasionally came into view. Vice presidents of engineering, manufacturing, and purchasing decided to do something different about it.

60. How did it start?

Research was organized and carried out to better understand the reasons for so much unnecessary cost, and to determine ways to avoid it.

61. What "need" does VE fill?

Primary pressures in most operating groups are to "make it work" and to "get it shipped". Secondary emphasis at the "do-it" level is "make a profit". While the pressure for profit may equal the pressure for quality and shipments at the president's level, it becomes definitely secondary and tertiary in important decision areas. A healthy business is as vital as a good product. The VE technology provides a competent base for necessary planned actions to assure appropriate cost.

62. I've had the feeling that VE was after the fact--
looked over the hardware after the job is done--
as a matter of fact, it's the same with a doctor--
you don't call a doctor until the patient is sick.

That's right--and many are doing that in VA right now. BUT--many have found it better to use the right amount of a doctor's advice day to day to avoid these crash trips to the hospital.

63. What determines the right cost?

The state of the art and the offerings of competition.

64. Isn't VA trying to get reliable function the lowest cost way--if necessary, change the design or manufacturing?

Yes.

65. Wouldn't nearly every engineer or manager say that was what he was trying to do?

That's right, but systems or technologies are not defined by what they are trying to do--but rather by what they accomplish. The truck and the ship and the DC-6 are all trying to transport weight a distance--so is the jetliner. Each have different jobs. Each is a different "system". Each does poorly--if at all--on some jobs. On the others, it is efficient.

What we're saying is that VE is a system to use if costs are a problem, that it causes different thinking, gets better criteria to the established decision-makers at the proper time.

66. Isn't VA re-thinking?

Yes--or new thinking.

67. Couldn't we say that as production engineers we are doing VE every day?

No.

68. Isn't it the function of the VE group to pick up everyone's mistakes?

No. A "mistake" is using wrong some idea or some tool we have. It was not a "mistake" of Napoleon not to use the bazooka. Neither the tool nor the idea were around. It's the function of the VE group to provide better and appropriately-developed ideas for one sole purpose--to accomplish reliably the functions the customer wants at lower cost.

69. How can we measure a good VE job?

How can you measure a good medical doctor's job? How can you measure a good metallurgist's job? If the patient lives, the doctor succeeded. If the new metal allows the objectives of 10% increased thrust from the jet engine to be accomplished, the metallurgist has succeeded. With the VE--if the business has satisfactory costs enabling it to sell at competitive prices at an appropriate profit, he has succeeded.

70. Shouldn't all engineers become VE's?

No. All engineers should take some techniques and approaches from the VE system and use them--the same as they learn and use organizing from management, budgeting from accounting, patent practice from patent lawyers, etc. This doesn't mean that the engineer has become a patent counsel nor that patent counsels are not now needed.

71. How does a VE determine what to do?

He doesn't. How does an accountant determine what to do? How does a lawyer determine what to do? Does he say, "I want to do some accounting--what can I do it on" or "I want to process a legal case--who can we sue?" Certainly not. A basic need exists in the business, so the accountant is hired--told to make up the records necessary to serve the need. A debtor's bill is long overdue. A need is seen for legal action to clear it up. The lawyer is assigned and does it. The same with VE. A management needs lower costs on, A product, B process, C contract, D research project, than its present resources get for it. It staffs the amount of VE that is needed to eliminate the need.

72. Isn't VE a crutch for poor training and lack of experience?

No.

73. If I had 100 engineers working on a design job and saw they were going to be unable to get designs with the required cost levels, wouldn't I just hire a dozen more engineers?

No.

74. Wouldn't varied work assignments under competent people in the long run teach a man VE?

No .

75. Since the objectives of VE are not new and most of the techniques are not new, why do you say VE is new?

The objectives of the DC-6 are the same as the jetliner, most of the parts are nearly identical--why do we say the jetliner is new? It has a few parts that are new... some parts that are modified, so the overall "system" is new, and it accomplishes a new order of magnitude of the desired function.

76. Is VE evolution or revolution?

Evolution.

77. Does VE obsolete cost considerations that have always been used in engineering?

Generally no. There is only one great truth. It all fits together. We know parts of it here and there. We use part truth until we know more truth. VE adds new truth for the engineer... usually supplements the truth he already has... sometimes replaces less complete truth.

78. The VE I've seen results in "horse sense" constructions and solutions. Why do we have to have VE's to get common sense used?

"Common sense" is uncommon and hard to come by. We are psychological individuals. Our studies take the line of our feelings, beliefs,

and ideas. Many objective alternatives are not developed at all. All of those which are developed are further colored by our experience, our attitudes, our fears, or our hopes. The results are not objective solutions.

79. How would I apply VE to a service like a tax collection office?

Name and understand functions precisely. Divide into "use" and "esteem" type. Divide into basic and second degree. Create alternatives for evaluation of each function separately; i. e.,

- (1) use functions - collect taxes, give receipt.
- (2) esteem functions - provide convenience (to customer).
- (3) In accomplishing each use function, what basic and what second degree functions are required?
- (4) In accomplishing the esteem function, what basic and second degree functions are required? Evaluate each separately by comparison.

80. Does VA apply to the preparation of food in a restaurant?

Yes.

81. Is shutting down an idle machine when it is not being used VA?

No.

82. Where should VA report in an organization?

To the lowest manager accountable for earnings.

83. What is the difference between producibility and VE?

VE is an overall system which determines who must do what and when and how much to meet proper economic objectives.

Producibility, I would say, is knowledge and technique for utilizing machine and process resources efficiently.

84. How much time is there to do VE?

There is no time to do any work that is not needed. If better costs are not needed, don't do it. But if anything is needed and not done-- it extracts its price anyhow. Then we pay for it in lost business and lost profits and the business line goes down hill.

85. When would we really start VE on a product?

If lower costs are needed--today--whether it is in production or in prototype or in management committee as a package of functions the customer wants which they expect to provide in a new product or service.

86. What are the main organizational drawbacks?

Newness. Any business staffs itself to accomplish the tasks it believes it has, basically in the manner the individual managers have seen it done by others--with small deviations. There has always been the need to meet high performance objectives. There has never before been the need to meet such high economic objectives. Business has not been staffed to do it. The drawback is that everyone thinks getting good enough costs is his job--although he will usually agree that he has often not been able to accomplish it--He says, "Who is this stranger?" He feels, "How will he affect me?"

87. If VE is really feasible, why isn't it done as a planning function before the fact, not as a control function after?

We can't start yesterday. If it's an existing product--and better economic objectives are needed--start now. If it's a new product or service, start far before the fact.

88. What makes VE unique? Why a separate discipline? Why not just a part of engineering like any of the other dozens of engineering work areas?

Unnecessary cost must be prevented or removed where it normally grows. Some of it comes from management actions, some from engineering, some from manufacturing, some from marketing, some from purchasing. Engineering can't come to grips with and remove the cause--when it's in other areas. They can when the deficiency is in their own area.

89. Is the task of getting lots better costs technical or "people"?

People.

90. Doesn't VE increase the risk factor?

No - it lessens it.

91. Why do you put so much emphasis on the job plan?

It's a simple plan. It gets results. When significant parts of it are omitted, results are drastically cut or eliminated.

92. Isn't good creative thinking VE?

No.

93. Are value standards practicable?

Yes.

94. What is a value standard?

Generally considered to be a relationship between a function and cost - expressed in dollars.

95. Where do we get value standards?

At the present time, so far as I know, we make them ourselves.

96. Is VA applicable to a small company?

Certainly is if they need more earnings.

97. How do we best sell VE to top management?

They would only be interested if:

1. They have a cost problem,
2. They recognize it as an important problem,
3. Somehow enough understanding is communicated so that they believe that this is the efficient way to end the problem.

98. Why does it matter what the precise name of a product function is?

It doesn't. What matters is the precise and applicable thinking process that tends to relegate habits, in-house processes, in-place ways of doing things to the lesser place of importance where they belong and promote thinking on the basis of functional needs and wants of the customer.

99. Now I want to ask some questions.

Why is it so hard for us to accept the reality that specialization in the field of getting wanted functions for lower cost is practicable?

We may work at keeping healthy the best we know how. Still when we have an accident, a broken bone, or an illness, we call the doctor with specialized knowledge, approaches, and skills. We don't quibble about whether he "belongs" in our system of life.

We try to follow the law and still at times we know better answers come from calling in legal counsel.

We fertilize our soil. Still at times the results are not good enough and we do call the specialization of the soil specialist to bring improvement.

Some of the answers I've often heard are:

"Because so many already give so much attention to it."
But "attention" doesn't necessarily get results. It's not the "attention" given to golf that counts--it's knowing exactly how to make each shot and doing it that way.

"How could we have overlooked anything as good as you say this is for this long if it were that good?"
We used the horse for 1000 years. Technologies, like civilizations and products "grow".

"I don't see anything 'sharp' or 'brilliant' in the techniques which would do so much better than we've done before.

Sam Snead appears to swing very easily--and to do little that we wouldn't do. But he knows how to do it, to do everything right, and he's doing it.

"I guess it's because we are told that it can be learned in two weeks, so we know there's not much to it. A man can't learn much in two weeks. It takes four to six years for medicine--or law--four years for accounting, four or five for engineering. I guess it seems like quackery--'just move the VA wand over and back and everything will be different'."

VE is a "something for something" approach. We have to decide to do it, to learn how, to staff it, to do it, and to pay for it--then we get the benefits. VE contains some elements--some "wire"--that the system needs when better economic objectives are important. The effect is usually surprising. How extensive was "electronic" training at the time of World War I?

"I see so much of what we have already been doing--in this VE--I get the feeling that it's a motivating scheme of some fellows trying to make a name for themselves by doing what we've always done--but calling it something different"

To the eagle, the DC-3 does resemble the jetliner--but their results are nonetheless very different.

100. Is VE permanent or passing?

Permanent. As technology began expanding about the turn of the century, new functions and new products were being created so fast that expertness in competitive cost did not matter that much.

From now on, however, with so many relatively "matured" products, lack of expertness in Value Engineering may well nullify a company's expertness in management, sales, engineering, manufacturing, or purchasing, and be the reason for its mediocre success or failure.