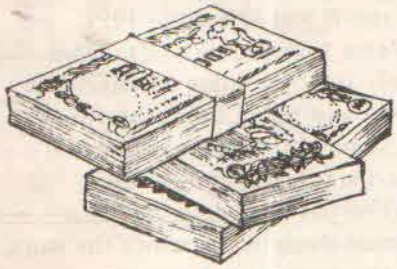
The Value Strategy



Text by Dr. N.H. Atthreya / Illustrations by Nalini

In a recent missile project of the United States, a private aerospace company was scheduled to make a typical, negotiated profit of $ 29 million. The profit was decided as such in the negotiated contract. But, thanks to a technology encompassing Function, Quality, Cost, Creativity—sometimes called FQ2C, for short—the company made an unexpected additional profit of $ 44 million!

The contract of the aerospace company with the U.S. Federal Government included a Value Engineering Change Proposal (VECP) clause. According to this clause any savings made on the project because of a Value Engineering (VE) study was to be shared. The total reported savings generated by the study was $176 million. The Government's share was $132 million and the contractors' $44 million!

Nearer, home, in India last year, a shop-making unit in the Cottage Industry brought about an annual saving of Rs. 45,000 through such a VE study.

An engineering company in the small business sector recently established a saving of Rs. 1.5 lakhs. This saving was brought about by a team of eight people familiar with company procedures in the course of a four-day VE workshop. The savings pivoted around just one item: a pump. With 66% savings on that one piece alone, savings on the total cost of the project worked out to nine percent. The proposed improvement will give the user the same quality, or even enhance it.

Savings are, of course, important; so is the quality of the product. What is even more significant from a long-term point of view, however, is what the team members felt about working with the VE technology. At the end of a four-day workshop, team members expressed some of their opinions in the following words:

"When I heard on the first day that 20:1 savings is possible, I did not believe it. Today I do — very much so."

"As a designer engineer, I thought that others in the team would be wasting their time. They are engineers, but not specialists in pumps; they have not studied the literature the way I have. Yet in four days of intense, observation, application of common-sense and creative thinking, they found things I could not have found in four years."

"I am a non-specialist. I have no expertise in the field. When I was placed on the team and told the VE analysis system is only organized common sense, I smiled in scepticism. I don't smile that way any more. I have watched the method work, and even contributed some new ways of analysis. Together we have done a commendable job in record time."

This is not the first time such an event has happened, or such observations been made. Such scenes are typical and have been happening for many years in many places, here in India and throughout the world.

It all started at the General Electric Company in the United States some 40 years ago. In the early 1940s, during World War II, many important materials were reserved for defence and manufacturers were forced to look for substitutes for parts and materials.

Lawrence D. Miles, a purchasing engineer in the GE headquarters, was assigned the task of "finding, negotiating for and getting" a number of vital items for production of items both for military as well as

The Author: Dr. N.H. Atthreya is a pioneer trainer in this speciality area. Since 1956, he has made VE part of his executive development programme. Since 1970, Professor Atthreya has been arranging the visits of specialists in this field from U.K. and U.S.A. He has worked closely with stalwarts like Harold Tufty, Rudy Kempter, Bob Rossman and Don Parker. He has given several training programmes in this strategy both inter-company and in-company. A member of the Society of American Value Engineers, an associate of Kempter-Rossman International, Dr. Atthreya has presented papers at the international conferences on Value Engineering. He directs in India the Value Foundation (Washington) Correspondence course on Value Analysis.

for civilian consumer products. Frequently, suppliers were already over-extended, and quickly said no, they could not speed up any schedules. In such desperate situations, Miles was forced to turn to basics. "If I can't get the product I'm seeking," he told the suppliers, "then I must get something that will provide the function of that product. How can you provide me with some machine or labour or material that will produce the function I need?"

Time and again, the suppliers looked around to see what was available to provide the necessary function. And again and again, a method or a product was found to do it. Miles also found that many of the substitutes were providing equal or better performance, at less cost.

Later, after the War, the perceptive Miles requested an opportunity to establish a research facility in GE's Central Purchasing Department, in order to study this new function approach. Fortunately, he received active support and endorsement. He then proceeded to develop, refine and utilize what then was first called Value Analysis (VA) and later Value Engineering (VE).

Thus was born this technology.

In 17 years at General Electric, the application of VE/VA created a savings of more than $200 million. For ten years, GE was the primary beneficiary of this technology. The U.S. Government began to learn about the VE technique in the course of a GE contract with the U.S. Navy and in the belief that this method would be valuable for the entire nation, the Government urged GE to make public the VA/VE system.

Leaders like Robert McNamara, former president of the Ford Motor Company, made a major contribution to the propagation of this breakthrough. As President Kennedy's Secretary of the Department of Defence (DoD), McNamara used this tool in many ways and saved a reported $14 billion in five years for DoD. As a result, DoD wrote an incentive clause making Value Engineering an integral part of government contracts on projects above a particular dollar value. To give this new methodology continuing vitality and stimulation, the Society of American Value Engineers (SAVE for short) was formed in 1959.

Value Engineering (VE), Value Analysis (VA), Value Management (VM), and Value Improvement (VI) are some of the terms used to describe this technology. The method has been described as a "formal discipline in which the work (ie. the product, programme, process, or part, etc.) of an organization is studied part by part, according to a specific plan." The better known label of Value Engineering is partially limited by the use of the word "engineering." It is a confusing use of the word, for if you are an engineer, you think you are already performing Value Engineering; if you are not an engineer, you think the term applies to engineers only, and therefore you may not be interested. A person trying to explain Value Engineering thus loses both ways!

The term FQ2C (short for Function-Quality-Cost-Creativity) seems to describe the technology more than the conventional term of Value Engineering or Value Analysis. Yet a still more operational, precise term is needed to cut through the confusion of poor labelling.

But no matter what it is called, the thrust of this technology is aimed at defining the precise function of a specific project or item (what must that specific thing do?) and at determining the proper role or action for which that item is used. The first and crucial question to ask is: what is the function — the role, or the action — of this product, this part, this process, this service?

Second, the technology focuses on quality. Here, the important question is: can we enhance quality or value?

The third question is: in keeping with the quality requirements, what is the lowest cost at which we can attain this function?

Throughout this procedure, we must strive to answer these key questions by using creative thinking about new methods or non-conventional approaches.

The methodology of Value Engineering is taught to a group of neophytes in a workshop lasting for a period of usually four days (40 hours). Inter-disciplinary teams of four or five individuals are selected from all key departments such as marketing, design, purchasing, cost accounting and manufacturing. A VE professional, coordinates the workshop. Each team selects and works on a specific project or product to be analyzed. During the next few days, the team members follow a VE Job Plan. This Plan involves several sequential steps, as follows:

1 : Information Phase. Here, all relevant data about a particular troublesome product/part/process are gathered, organized and analysed.

2 : Functional Phase. Now a few items of poorest value (they cost far more than they should) are identified, and the functions that must be performed by the product are inspected, analysed and classified.

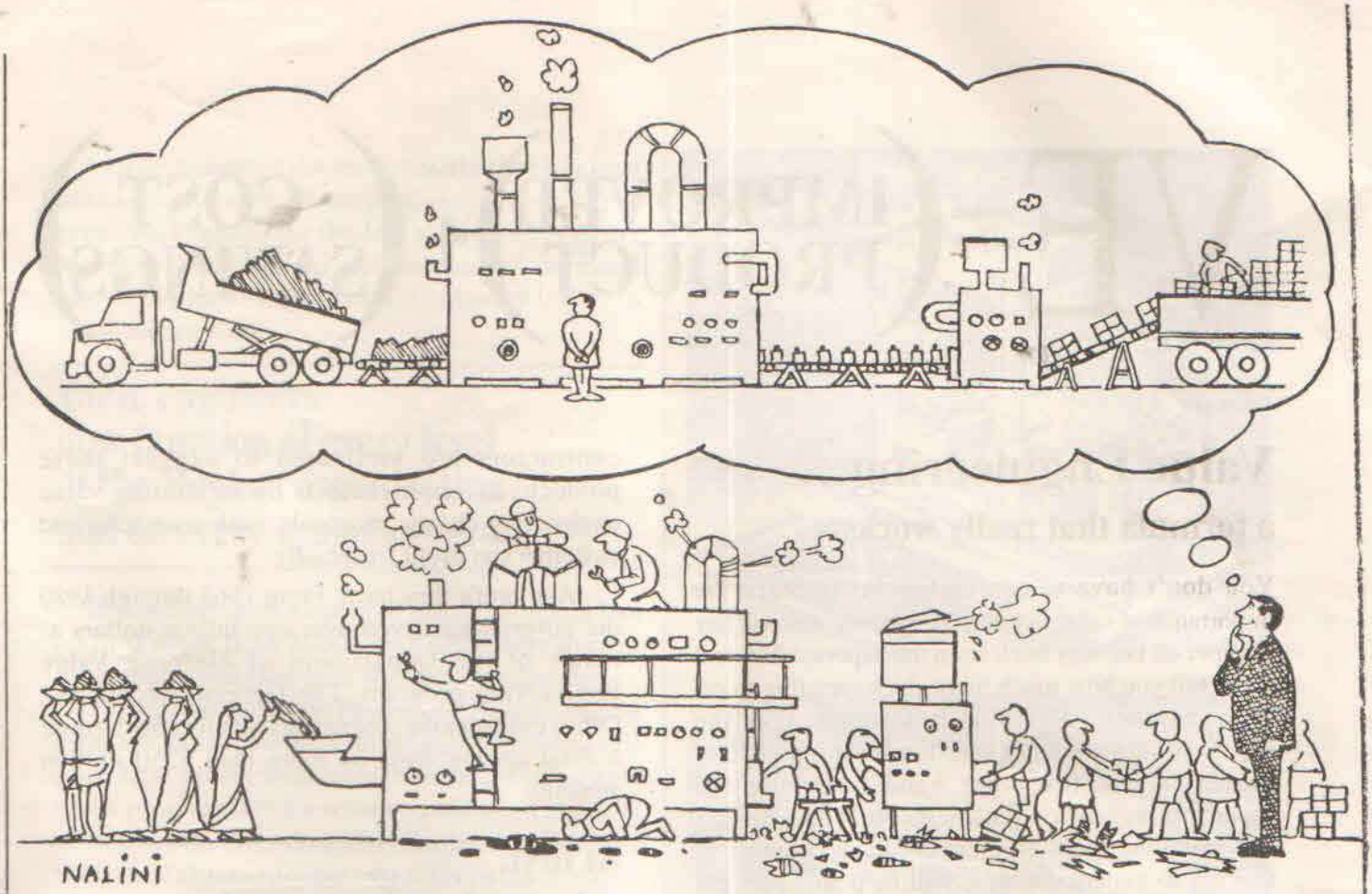
3 : Creative Phase. A probing, far-reaching collection of solutions, probable and improbable, is gathered in an effort to generate ideas to perform the functions identified for the poor value items.

4 : Judicial Analysis Phase. The ideas generated in the Creative Phase are now evaluated in a practical, pragmatic and analytical mode. Several ideas are selected and ranked in order of importance.

5 : Development Phase. The best creative and practical ideas are now refined by the team and brought into shape. The cost factor is added here and applied to reality. This is a consolidation of what the team thinks.

6 : Presentation. The proposed changes are put in final form to be presented to the management decision makers. This proposal describes two or three ideas for performing the function of the original basic and very expensive item with a workable alternative of better value.

7 : Implementation and Follow-Up Phase. After the ideas have been



accepted by the management, the changes are implemented, monitored and followed through.

While developing an idea is important, selling it to key management is equally important. It has been noted that a sizeable percentage of the proposals does not see the light of day — only about 50% of the valuable VE ideas generated in the team workshop are accepted by management. Thus another crucial step should be introduced as a new phase:

8 : The Master Phase: In terms of salesmanship and communications. Take one new idea from the list of ideas that were initially turned down by management, and with additional sophisticated fine-tuning analysis and description, shape and present it in such a way that management can understand it and implement it.

The technology of value analysis is slowly becoming recognized in many countries of the world. One of the leading nations is Japan, a country that quickly noted this methodology as an opportunity for superior production. Japan has now more companies with full-fledged VE/VM programmers than any other country, including the United States. The electronics company, Hitachi, alone has 240 full-time value engineers on its staff. Much of the spectacular success of Japanese companies is due to three basic commitments from the top management: 1) support and involvement, 2) company-wide education and training, and 3) a policy for continued support.

India has been slow to train professionals in this technology, but is showing signs of catching up. The Indian Value Engineering Society (INVAVE), founded in 1978, conducts annual conferences and brings out a quarterly journal, "INVEST." Several organizations in the industrial, governmental and defence sectors — for example, MICO, L&T, Mahendra & Mahendra Tractor Division and the Indian Army — have understood and incorporated this technology in many ways, making sizeable savings every year.

Value Engineering/ Value Management is very promising technology. It has brought many benefits to units large and small. Although it may not look glamorous at all, it brings the much needed technique of "plain common sense" into the operations of industry and government and private concerns. What is most significant is that the sequence, the system and the strategy of this technology works. It brings out the best in people by using a confidence-building and creative process that results in the generation of valuable ideas for solving stubborn and often unidentified problems.

Value Engineering is an appropriate technology for India, the key ingredient being intelligent and creative human power. The facilities for learning and applying this methodology are available in this country. We should make such a technology a national priority. Instead of looking back for reasons why we have not yet done so, I would like to sing in the words of poet Mahakavi Bharati:

"Weep not for days past and deed undone;
The rest of eternity is all before you."

VE=(IMPROVED PRODUCT)+(COST SAVINGS)

Value Engineering...
a formula that really works.

You don't have to search too far to learn the importance of value in today's economy. Just ask any shopper on her way back from the supermarket, and she'll tell you how much more she's spending to get less and less. Which is not to say that the supermarkets are to blame for the high cost of groceries. On the other hand, anything the supermarkets can do to cut their cost of operations – like installing more efficient checkout counters or moving to generic labels – will help shoppers put more food on the table.

The smart supermarket approach to provide bigger bargains at smaller costs also applies to the defense industry.

At a time when cutting budgets and improving productivity are two important national concerns, defense agencies need to get all the value they can from the products they buy. This is the *raison d'être* of value engineering – the discipline responsible for producing lower cost and higher performance levels in a program after a contract is awarded.

Armed services buyers began including value engineering as a contract requirement in 1959. They recognized they could best encourage contractors to find cost-cutting measures in program by offering companies a percentage of the savings realized. This "share-the wealth" philosophy was based on the rationale that new technologies, improved production processes and more efficient administrative practices often emerge after a project is already underway. If contractors are motivated to suggest these productivity improvements by submitting value engineering change proposals, both contractor and customer can profit financially.

And profit they have. From 1963 through 1980 the government saved over one billion dollars as result of the Department of Defense Value Engineering program. The General Accounting Office estimates the program potentially could reduce federal agency costs by more than $250 million annually.

At first, value engineering seemed to impose a psychological barrier between customer and contractor.

After all, contract negotiation was supposed to be an adversary situation. It seemed too good to be true that anything could benefit both sides and result in mutual profit. Also, other people feared that value engineering changes might be interpreted as indictments of the customer or the original designers, rather than product reinforcement with technical and administrative improvements. Now, however, nearly all upper-level personnel in the services and defence companies are convinced that value engineering is a way to encourage the introduction of new technology. Not a fix for poor design or inefficient program management.

But not all the improvements involve injecting advanced equipment. Such elements as software and documentation are often candidates for savings. One missile program saved $100,000 from a value engineering suggestion to consolidate five independent but overlapping reports into one. That program was at Hughes Aircraft Company.

As with others in the industry, Hughes has long been committed to a strong value engineering program. As a result, for the last six years the Army Materiel Development and Readiness Command has recognized Hughes as the industry leader in value engineering.

Value engineers now function at every level of the Hughes organization... and on every major program.

To develop such a cadre of talent, Hughes has trained more than 2000 value engineers in company-sponsored classes in the past two decades.

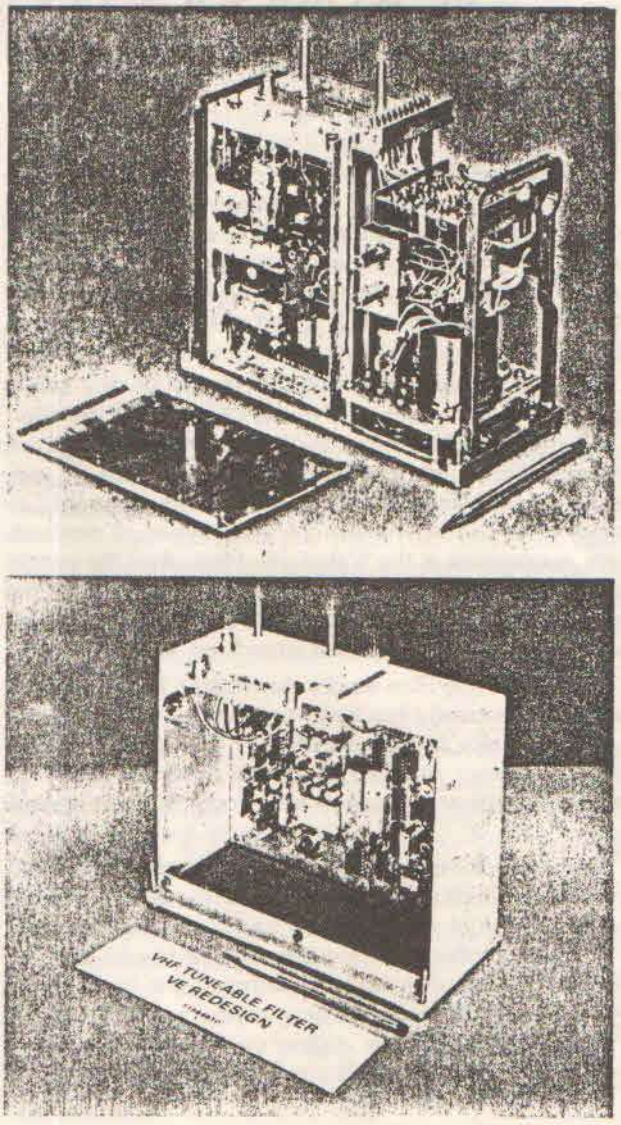
During that time, the Hughes value engineering program has produced a total savings of $400 million! That's more than enough to fund a brand new major program. With a return on investment to the customer of greater than 10:1, Hughes has firmly established the economic attractiveness of value engineering.

Dollars alone don't tell the whole story. There are other benefits.

Reduced use of materials, more reliable systems, improved performance, for example, make value engineering a tribute to industrial innovation.

As a benefit to the end user, one value engineering change implemented on the Hughes F-15 radar program replaced a 64-bit chip with a bipolar random access memory device. This switch in microelectronics brought about an 82 percent increase in reliability, a 58 percent reduction in weight and a $12.5 million life-cycle cost reduction for the radar signal processor.

For the contractor, the profit gained from value engineering savings is only part of the payoff. The more long-term gain is the experience the company accumulates when looking for — and discovering — improvements in productivity. Ultimately, the beneficiary is the taxpayer — who gets more product for less money.



Value engineering, VE, saves costs and improves product performance — a fact attested to in these before and after-VE photos of a component of the U.S. Roland mobile air defense system. The photos reveal how VE transformed the bulky, largely mechanical unit, top, to the relatively simple lightweight unit shown below — improvements largely attributable to recent advancements in integrated circuit technology.

A VE change proposal resulted in the elimination of a large servo motor and a gear train. The number of parts was reduced from 113 to 13. Power consumption was reduced by 37 percent. Unit weight was trimmed from eight to three pounds. These improvements resulted in reducing unit cost by a factor of four while unit reliability was increased by a factor of three.

Total government savings: $1.3 million in production costs plus $140 thousand annually in operating and support costs.