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Hyatt Hotel, Kansas City, Missouri

May 5-8, 1991

Theme: “Value from the Heart”

Would you like to present views on your favorite subject? If so and you are willing to share them at the International Conference, prepare a paper. PLEASE CONTACT THE PROCEEDINGS EDITOR BEFORE YOU START TO WRITE TO FIND OUT THE NEW PROCEDURE AND DISCUSS TOPIC SELECTED.

The paper should answer the question: What is the “heart” of ______? You fill in the blank with your subject. The papers will be categorized under one of the eight topics:

Team Building         New Techniques         Behavior
Management Tools      Organization Structure   Educational
Case Studies          Creativity              Opportunities

Preliminary discussion no later than 1 Nov. 1990.

Papers in disc form must be in the hands of the Editor no later than 8 February 1991.

See August Interactions for more details.

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EDITORIAL POLICY: To provide informative, timely and interesting communications pertaining to Value Engineering / Value Analysis and related disciplines. VALUE WORLD enables contributors to express themselves professionally in advancing the art. VALUE WORLD is dedicated to the establishment of a mutual bond among those seeking to better the quality of working life and establish a communications network through which participants can interact for mutual benefit.

The views expressed in VALUE WORLD are neither approved nor disapproved by the Society. They are the expressions of the author(s).

All papers have been edited — frequently condensed — by the editor.
Meeting the Challenge of Establishing Value Engineering in Saudi Arabia

by Dr. A.H. Mansouri, AVS

Dr. A.H. Mansouri, AVS, Associate Professor of Civil Engineering, King Saud University, Riyadh, Saudi Arabia.

Since the mid 1980s, The General Directorate of Military Works (GDMW) of the Ministry of Defense and Aviation, Kingdom of Saudi Arabia, has taken the lead in applying Value Engineering (VE) on all types of military construction, from runways to housing. Early use of VE focused on those projects already designed, but awaiting funding for construction. Since then, emphasis has been given to projects which are in the early stage of design.

The objectives for establishing a VE program were:
- to introduce the use of VE in the ongoing design and construction projects,
- to train the Saudis and have them gain experience on VE applications, and
- to isolate and implement savings in present facilities projects.

The VE Section at GDMW was established with the employment of a U.S. VE consultant. Throughout the first two years, a joint VE team was formed by having the Saudi architects and engineers work side by side with their counterparts from the consultant team. The joint team carried out studies on active projects.

GDMW formed the joint team in anticipation that working together would help deepen comprehension of the concepts and would complement the formal program of VE related courses and training workshops.

Figure 1 illustrates the relationship of the VE office with top GDMW management, project and construction managers, owners and users.

The Challenge

Under the pressure of expansion during the construction boom of the 1970s and early 80s, projects were rushed for design without proper definition of scope and requirements. Thus, exaggeration of requirements,
space and material of construction occurred. Many projects encountered difficulties due to unusually long delays in the delivery schedule. The resulting management discontinuity, inherent in military organizations after long delays, was an obstacle in the attempts to understand the needs and to deal with the out-of-date cost data. Such a situation posed a serious challenge to the VE team, especially in the early phases of data collection and identification of function. As a result, the VE team had to establish project baseline costs and reconfirm the assumed function needs before commencing the analysis of the worth of the various project components.

The Roadblocks

As with any new program, the VE section encountered some roadblocks from its early establishment. These may be identified in three categories and are summarized as:

a. From Within GDMW

Skepticism was expressed by some colleagues in the various GDMW departments, due to a lack of understanding and different perception of the benefits to be gained from VE application. Furthermore, they generally did not recognize the potential for improving overall performance at GDMW.

b. From the A/E Design Consultants

The prevalent attitude of A/E designers is that they do not want to have their work questioned by anyone. They feel that they perform well and have no intention of questioning design decisions they have made. They neither intend to alter their design, consider any alternative solutions, nor entertain any ideas that would modify their work. In addition most designers were no longer associated with their projects, or under contract, as their work was on the shelf for a number of years awaiting construction.

c. From the Owners/Users

The objections to VE applications stem from the following fears:

- VE review could further delay project’s implementation,
- VE review and the required efforts to integrate VE changes in the design require additional cost, effort, and time for implementation,
- above all, the owners and users feel that a reduction in scope due to the prevailing financial trends is imminent. This means to both owners and users that losing more time would mean the loss of some important features in their projects.

The Strategy

With the initial shortage of VE trained personnel in GDMW and in anticipation of the foreseen roadblocks, the top management of GDMW adapted a flexible approach to meet the challenge. This was achieved through:

- getting approvals from the highest authorities in the Kingdom for establishing a VE practice and for training Saudis within GDMW and from other government and private sectors.
- choosing a mature and enthusiastic person to head the VE section,
- selecting a VE consultant that had wide experience in training and applications of VE.
- having experienced VE personnel head the consultant team, and
- involving academicians from Saudi universities to contribute in both the training courses, seminars and in the setup of the VE practice.

Methodology

Establishing the VE office with effective leadership and active VE team led to the introduction of a systematic methodology to review projects and conduct the required VE studies. Such a method was divided into pre-workshop, workshop and post-workshop phases summarized below.

The Pre-workshop Phase

In this phase, the team familiarized itself with the various aspects of the project. Each discipline reviewed the related documents as part of the collective approach to the required tasks and undertook the preparation of cost models, cost/worth, function analysis, energy models . . . etc.

The entire team contributed in the collection of related data regarding materials, costs, systems, and requirements. For that purpose, the team contacted the assigned project manager, construction manager, owners, users, design consultants, . . . etc. Following the traditional VE job plan, the team conducted sessions for the preparation of function analysis, cost/worth, and FAST diagrams.

To overcome the discontinuity of the A/E design consultants and the project and construction managers, the team opted to conduct visits to project sites, and discuss needs with the owners and the users. The visits to the users are now an integrated part of the team’s effort, since they proved to be extremely beneficial in complementing the information gathering. The major accomplishments of the visits were the consolidation of the users’ needs, and the comprehension of functions and requirements. Furthermore, contacting the owner helped identify the priorities of the facilities with relationships to the available funds in the budget.

The visits to the users are now an integrated part of the team’s effort, since they proved to be extremely beneficial in complementing the information gathering.
The Workshop Phase

This phase is performed in accordance with the traditional VE job plan, where the team systematically followed the plan to accomplish the various tasks. The application of the VE job plan took into consideration the training of the Saudis to be able to work as part of a disciplined group as well as within the larger VE team, and to be able to interact properly with the various VE procedures. Specifically, the VE team conducted joint sessions to perform the tasks of creativity, the ranking of ideas, the weighted evaluation process, the life cycle costing . . . etc. The VE proposals were then assembled into a report form for presentation.

The Post-workshop Phase

The post-workshop phase sought to consolidate, and implement the VE proposals in the design documents. Once these were assembled, the team conducted further visits to the users. On such visits the team explained the VE proposals, got their feedback, and updated proposals accordingly for final presentation to GDMW, owners and users.

The post-workshop phase included the development and follow up of implementation plans for the required additional design. In these, the VE team carried out the review and follow-up of the adaptation and implementation of the approved VE proposals in the design. It had been noticed that such a task was critical to the success of VE. GDMW found it necessary to assign this task to the team. It facilitated better understanding of the VE proposals by the A/E design consultants, the project managers, the A/E redesign consultants, and the potential contractors. It further helped avoid any potential roadblocks against the VE proposals within GDMW.

Once the proposals were finally approved, the VE team developed an implementation plan for each project. The plan included among other activities:

- the implementation method to be used; i.e. redesign of bid alternatives, addendums for pricing, or issuance of change order requests to construction contractors,
- the development of a plan for implementation of the VE approved proposals in the design,
- the preparation of the required scope for the implementation of the approved VE proposals in the design documents when the design is the chosen implementation method, and
- the evaluation, follow up, and verification of proper implementation of those proposals in the design.

Furthermore, in this phase, the VE section offered advice to GDMW in establishing VE incentive clauses to be applied on projects during bidding and construction. The advice included the initiation of some incentive clauses as the situation demands, review and evaluation of some proposed incentives and/or alternative proposals from contractors.

Figure 2 is a FAST diagram developed to illustrate the goal of the various tasks assigned to the VE section at GDMW. The diagram outlines the objectives which are: conserving resources, enhancing benefits and optimizing facilities. Furthermore, it outlines the various tasks required to properly conduct VE studies, train Saudis, and expand VE application in the Kingdom.

The VE Office Achievements

With effective leadership, professional guidance and top management follow up, the VE team fulfilled the following educational and training goals during the first two years of practice:

- trained more than 200 Saudis and expatriate architects and engineers on the application of VE,
- offered formal VE related courses and seminars at GDMW, including VE theory, advanced VE, life cycle costing, budgeting and cost control of projects, . . . etc.
- offered one semester, two credit hours VE course on a graduate level to the Master's degree students of King Saud University, College of Architecture and Planning,
- conducted several 40 hour VE training sessions for architecture and engineers working in various government agencies and in the private sector,
- applied VE on several jobs, achieving large sums of recommended savings.

Table 1 illustrates some of the savings achieved from application of VE on various projects. The table includes the majority of the projects studied in the first two years. The cost of VE application is an estimate proportionately distributed and it is based on the amount of professional fees paid to the VE consultant during the two year period. Part of the fees were allocated for management efforts by the consultant. Only the professional efforts spent by the consultant to conduct VE on those projects were considered. The average return of investment on these projects was S.R. 100.0 savings recommended for every S.R. 0.69 spent. Also the implemented savings in the covered storage project include VECP savings for the S.R. 3,500,000,000.0.

Furthermore, the following benefits resulted from VE applications at GDMW:

- improved communications between GDMW and the various owners/users,
- grouped services of similar nature and eliminated unnecessary duplications,
- integrated some elements thereby contributing to the improvement and the viability of the VE reviewed facilities and enhancing their chances of realization,
- recommended diversion of some of the savings realized in some projects to implement some more critically needed facilities, which would greatly enhance the established functions of some proposed and existing facilities.
Table 1
VE Study Results of Some Projects at GDMW During the First Two Years of VE Practice

<table>
<thead>
<tr>
<th>PROJECT TITLE</th>
<th>INITIAL COST SR.</th>
<th>SAVINGS (SR)</th>
<th>PERCENTAGE OF RECOMMENDED SAVINGS FROM INITIAL COST</th>
<th>PERCENTAGE OF ACCEPTED SAVINGS FROM RECOMMENDED</th>
<th>PERCENTAGE OF IMPLEMENTED SAVINGS FROM INITIAL COST</th>
<th>PERCENTAGE OF IMPLEMENTED SAVINGS FROM INITIAL COST</th>
<th>VE PROGRAM COST IN SR.</th>
<th>VE PROGRAM COST IN PERCENTAGE OF INITIAL COST</th>
<th>VE PROGRAM COST IN PERCENTAGE OF RECOMMENDED SAVINGS</th>
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<tr>
<td>AN AIR BASE SUPPORT FACILITIES</td>
<td>290,000,000</td>
<td>51,300,000</td>
<td>17.64</td>
<td>93.16</td>
<td>44.73</td>
<td>16.35</td>
<td>400,000</td>
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<td>0.78</td>
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<td>51,500,000</td>
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<td>150,000</td>
<td>0.18</td>
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<td>AIR DEFENSE SUPPORT FACILITIES</td>
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<td>49,204,000</td>
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<td>99.58</td>
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<td>139,542,000</td>
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<td>90.01</td>
<td>80.99</td>
<td>10.30</td>
<td>650,000</td>
<td>0.15</td>
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<td>COVERED STORAGE</td>
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<td>4,615,000</td>
<td>36.57</td>
<td>90.01</td>
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<td>100,000</td>
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<td>SUB TOTALS</td>
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<td>536,436,045</td>
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<td>76,385,573</td>
<td>12,287,000</td>
<td>16.08</td>
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<td>150,000</td>
<td>0.18</td>
<td>1.22</td>
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<td>ARMY AVIATION CENTER</td>
<td>186,225,317</td>
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<td>99.58</td>
<td>99.58</td>
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<td>11.89</td>
<td>99.58</td>
<td>99.58</td>
<td>18.30</td>
<td>175,000</td>
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<td>MILITARY GUEST HOUSE</td>
<td>40,194,005</td>
<td>12,173,000</td>
<td>3.97</td>
<td>99.58</td>
<td>99.58</td>
<td>18.30</td>
<td>100,000</td>
<td>0.24</td>
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<td>393,000,000</td>
<td>25,000,000</td>
<td>2.23</td>
<td>16.71</td>
<td>99.58</td>
<td>18.30</td>
<td>875,000</td>
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<td>5,592,000</td>
<td>10.25</td>
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<td>99.58</td>
<td>18.30</td>
<td>100,000</td>
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<td>HANGERS OF SUPPORT FACILITIES</td>
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<td>25,000,000</td>
<td>3.97</td>
<td>99.58</td>
<td>99.58</td>
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<td>650,000</td>
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<td>99.58</td>
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<td>100,000</td>
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<td>9,221,000</td>
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<td>99.58</td>
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<td>0.32</td>
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<td>86.93</td>
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<td>3,325,000</td>
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<td>GRAND TOTALS</td>
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<td>805,113,827</td>
<td>20.25</td>
<td>49.95</td>
<td>53.59</td>
<td>18.30</td>
<td>5,575,000</td>
<td>0.12</td>
<td>0.69</td>
</tr>
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</table>

* SR = SR 3.75
• surveying the construction industry within the Kingdom resulted in the recommendation of the use of some available materials and systems of construction. The recommendation was for both those projects in the early design phases and to replace materials and construction systems proposed in the already designed projects. This generated savings of resources and reduced anticipated time of construction for some projects.

• adapting various designs to local environment conditions, generated significant energy savings, especially, by the adaption and/or recommendation of shading of various elements, the use of internal courtyards, thermal insulations and double skinned external walls,

• recommending the utilization of pre-cast industry available in the local markets for projects with repetitive elements, generated significant savings of resources, reducing projected time of construction and simplifying some of the original designs,

• improved cultural requirements of female privacy in housing units and,

• improved internal circulation in the various proposed housing units.

Such achievements greatly improved the design of various housing units, enhanced their environment as well as satisfied the anticipated functions of those units. Figure 3 illustrates the originally designed and modified plans of some housing units.

For one large project that houses the headquarters of a major department, the VE team recommended the combination of functions for stored water to be also used to store cooling loads for air conditioning. This was in addition to the originally intended use as potable water and for fire fighting. This VE recommendation generated considerable savings and was well received by the owners. It saved the cost of storage space along with operation and maintenance costs which were considerable.

Application Difficulties

In the course of establishing VE practice at GDMW, the VE office is facing some obstacles and difficulties which were not foreseen. They are:

• the instability of the Saudi team, where the turnover is very high,

• difficulties in selling technical ideas and some major VE changes. Several VE proposals in various projects that would save considerable resources have been rejected. Examples of that are:

  1. a VE recommendation to shift the location of a runway a few hundred meters to a flat site. The proposed location in the design passes through hilly areas that can be used as borrow materials to grade the site and reduce the construction cost of the runway. The saving results mainly from:
    • the use of available borrow material within the site,
    • the reduced amount of grading for the VE proposed location of the runway.

  2. another VE recommendation to reduce the thickness of the surface layer for a runway where the projected saving from the redesign of the layer to a reduced functional thickness was considerable. In spite of all that, both VE recommendations were rejected,

• the VE section at GDMW is so far managed by civilians, it might be advisable to have it managed by an enthusiastic VE trained military person to achieve a more stable team of Saudi trained architects and engineers.

In addition, the VE office was experiencing some unanticipated difficulties which arose from dealing with A/E consultants that are executing the integration of the approved VE changes in original designs. Such difficulties were because some projects were already designed and the original A/E design consultants were no longer associated with the projects. This dictated that GDMW assign the integration of the VE changes in the original design to other consultants.

Such assignment created unanticipated difficulties which are the result of:

• lack of understanding the original design by those consultants, 

• lack of training or familiarity with VE, causing misunderstanding and misinterpretation of the approved VE changes, and

• incorrect and/or incomplete design integration of VE changes.

Such situation created design review difficulties resulting in the delay of the integration of the approved VE changes in the design, and in the realization of those reviewed projects.

Lessons Learned & Conclusions

Establishing a VE program under professional guidance and enthusiastic management support can successfully:

• improve awareness and communications with owners, users and A/E design consultants regarding VE objectives, thereby minimizing roadblocks,

• meet the challenges of developing compatible cost data systems and collecting missing data,

• VE review of projects in the early stages of design, consolidates requirements, provides the required functional spaces and services, therefore eliminates potential duplications, speeds up design process and enhances implementation of VE proposals,

• the review of already designed facilities eliminates duplications of similar elements, spaces and services, improves functions, enhances quality of systems, saves energy, and contributes in the adaptation of those facilities to local environments to meet cultural requirements.
**FIG. 3c**

ORIGINAL DESIGN GROUND FLOOR
ENLISTED MEN HOUSING (4 BR)

**FIG. 3c**

ORIGINAL DESIGN FIRST FLOOR
ENLISTED MEN HOUSING (4 BR)

**FIG. 3d**

PROPOSED VE DESIGN GROUND
ENLISTED MEN HOUSING (4 BR)

**FIG. 3d**

PROPOSED VE DESIGN FIRST FLOOR
ENLISTED MEN HOUSING (4 BR)
FIG. 3e
ORIGINAL DESIGN GROUND FLOOR
ENLISTED MEN HOUSING (3 BR)

FIG. 3f
PROPOSED VE DESIGN GROUND FLOOR
ENLISTED MEN HOUSING (3 BR)

FIG. 3e
ORIGINAL DESIGN FIRST FLOOR
ENLISTED MEN HOUSING (3 BR)

FIG. 3f
PROPOSED VE DESIGN FIRST FLOOR
ENLISTED MEN HOUSING (3 BR)
• contribute in surveying the construction market, identify locally available construction materials, systems and capabilities, thereby recommending some for potential use which would generate savings of resources,

• finally, the implementation of VE changes in design should be executed by A/E entities that have some training, awareness and/or knowledge of VE.

References

Integrated Value Engineering Team

by Farid F. Mansour, PE

Farid F. Mansour, PE is VE Manager of the United Engineers and Constructors, Inc. He has both an MS and MSc degree, is a Certified Cost Engineer, and an AVS working toward being a CVS.

Introduction

The construction industry has derived great benefit from the application of Value Engineering in the last two decades. The job plan and implementation of VE techniques in the construction industry are similar to manufacturing, where VE was developed and first implemented. However, personal style and approaches to the work may differ to suit the project circumstances, the nature of the work, the organizational structures, and the depth of involvement among the concerned parties.

Traditionally, Value Analysis has been performed by an “Independent Team.” For example, by personnel from another company, division, or department not associated with the project team.

This introduces a new approach called the “Integrated Value Engineering Team.” It has been used at United Engineers & Constructors Inc. (UE&C) and found to be very effective. It is also suitable to the structure of the company, and the nature of engineering/construction activities.

UE&C Overview

United Engineers & Constructors Inc., a subsidiary of Raytheon Company, is one of the five largest U.S. engineering and construction companies. The major fields of application are: power (nuclear, fossil, and resource recovery); metal producing; chemicals; bioengineering and pharmaceuticals; petroleum; mining; aerospace; electronics; manufacturing; research laboratories; and government facilities.

A typical project may include some portion or all of the following services: feasibility studies; preliminary engineering, detailed engineering and design; procurement, construction management, contracting; testing and start-up; maintenance and operations services. Additionally, the company provides support services such as: licensing and permitting; quality control; planning and scheduling; estimating; project controls; and VE.

UE&C Organization

The company consists of five operating divisions, each functioning as an independent profit center with centralized support divisions to serve the whole company, as shown in Figure 1.

Each operating division is further subdivided into specialized departments (industry groups) that receive central support by chief engineers and manpower management. Typically, each department (industry group) has several projects in progress at the same time, as depicted in Figure 2. The projects (especially the large ones) are managed individually by a project manager, who is responsible to the client for project execution and essentially operates the project team as a completely independent entity.

Figure 3 shows typical project organization based on engineering disciplines. The chief engineers interface to provide technical guidance, assure high quality work, and coordinate manpower allocations among various projects. The lead engineers on each project are the technical experts for that discipline and lead the project effort in their responsible area.

The Resistance to Value Analysis

At UE&C, the introduction of the VE concept was met, at first, with typical resistance. Lead engineers, relying on their extensive experience, the qualification of the technical discipline staff, and overview by chief engineers, believed that the project’s engineering and design were already “satisfactory” and did not require additional scrutiny or enhancement.

Accordingly, the project team considered a VE study as a waste of time and an unnecessary cost. Some
individuals viewed it as a criticism of their technical capabilities and an encroachment on their pride in their work. The purpose and acceptance of VE activities were certainly questioned during the introduction of the concept. This situation was turned around by implementing the “Integrated Team Approach.”

Value Engineering Manpower

VE at UE&C is considered a technical support service provided by the Project Controls and Services (PC&S) Division to all the operating divisions. Accordingly, the VE Manager is a member of the PC&S Division.

The concentration of Technical Specialists in Civil/Structural, Mechanical, Process, Electrical, Instrumentation and Control, etc., occurs mostly in the operating divisions; other specialists in procurement, estimating, QA/QC, etc., are concentrated in the support departments; and construction managers are available through affiliate companies.

To assemble a VE Team, the VE Manager may contact the chief engineers in different divisions, and support department managers, to provide him with personnel available at the time. The VE Manager selects the appropriate personnel according to the nature of the study.

It is worthy to note that it is not practical to establish and maintain a pre-assembled VE team due to the great diversity of the projects, the nature of the technical requirements, and the sporadic flow of the VE study workload.

Integrated Value Engineering Team

I devised the “Integrated Value Engineering Team” concept after careful consideration of the UE&C organizational structure and the nature of the work. The approach was utilized recently in several VE studies with very successful results. The following paragraphs describe how the VE teams were chosen and assembled.

After the project identifies a requirement for a VE study case (design area)2 to be analyzed, the Project Manager contacts the VE Manager. The VE Manager develops a work plan and the schedule, outlines the composition of the team, and defines the responsibility of the team members.

With the “integrated” approach, the VE team is composed of some members from within and outside of the project, department, or division.

Typical appropriate candidates from within the project include: (1) the lead engineer (discipline supervisor), who is responsible for the engineering and design of the design area under study; (2) the lead engineer assistant or one of the discipline team, if the lead engineer himself is not available; and (3) the project estimator, who is familiar with the project in general, and the cost data relevant to VE analysis.

The VE team candidate from outside the project/division should be completely unfamiliar with the project, with no prior involvement in any matters related to the project. Needless to say, this requirement should be additive to high technical capability.

Outsider VE team members are usually drawn from other projects, departments, or divisions, through the interface of the VE Manager with the chief engineers and the managers of the support departments. Figure 4 shows the relation of VE team to the project management and company organization.

The following is an example of a typical integrated VE team for an underground piping study case:

- VE Manager (outsider)
- Piping/Mechanical Lead Engineer (Project Team)
- Civil/Structural Engineers (Project Team)
- Estimator (Project Team)
- 2 Piping/Mechanical Engineers (Outsiders)
- 1 Civil/Structural Engineer (Outsider)

Team Independency

Since some of the VE team members are drawn from the personnel who work on the project, it may seem that the team would lose its independence. However, this impression has proven incorrect. Figure 4 expresses the chain of command for VE team (heavy lines) and the relationship with the company organization (dotted lines). The independence is maintained and enforced through the following understanding and commitments:

1. The VE team works under the directives of a VE Manager who reports to an independent division (PC&S); see Figure 1. This structure gives the VE Manager the authority to resist any interference.

2. The Project Manager recognizes and agrees that VE is an independent service, and for it to be effective, he cannot place any leverage on the VE Manager and his team. The Project Manager's intention is to get good results, so he should support the VE effort and format.

3. A company policy/position is available with clear instructions given to the project management and project personnel with respect to the intent, execution, and independence of VE Team investigations, findings or recommendations.

4. After completion of the VE study, the Project Manager receives the VE Report and has the right to review, comment, debate, modify, or accepts the report recommendations, before any implementation. This enables the project to take a “wait and see” position while greatly reducing the temptation to interfere in the VE effort.

Advantages of Integrated Team

This approach generates the following benefits and advantages:

1. The participation of the Lead Engineer helps in providing the VE team with complete and correct information to identify the scope of work,
describe the job and the design criteria under review. The project lead engineers also assist in defining the required function, and the process of functional analysis.

2. Since the lead engineers (Specialists) were familiar with this type of work, they contributed in establishing the proper criteria in the evaluation stage.

3. The participation of the Lead Engineer on the project team in the process of VA gives him the advantage of insight into the VE process. Moreover, this participation fostered the Lead Engineer's own self-belief and support of the final report and the VE recommendations.

4. The participation of the project personnel in the VE analysis associates their names with the VE report. This allows them to share in the credit for the savings, and encourages them to implement the recommendations.

5. The participation of the project members in the VE studies makes them ambassadors of the VE concept in their daily project activities and helps make other project personnel aware of the virtues of VE. This creates a VE culture in the company.

6. The participating personnel benefit from on-the-job (free) VE training.

7. The integrated VE team approach helps the transition from resistance to VE activity to acceptance, even beyond to some degree of endorsement.

**Results In Savings**

The approach outlined above not only worked but worked well, and produced very impressive savings.

The table below depicts samples of potential savings in different studies.

<table>
<thead>
<tr>
<th>Case Study</th>
<th>Description</th>
<th>Saving ($)</th>
<th>Saving (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Pipeline</td>
<td>3,816,000</td>
<td>43</td>
</tr>
<tr>
<td>2</td>
<td>Switchyard</td>
<td>3,150,000</td>
<td>48</td>
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<tr>
<td>3</td>
<td>Pump station</td>
<td>386,000</td>
<td>12</td>
</tr>
<tr>
<td>4</td>
<td>Foundation</td>
<td>2,200,000</td>
<td>40</td>
</tr>
<tr>
<td>5</td>
<td>Electrical work</td>
<td>275,000</td>
<td>24</td>
</tr>
</tbody>
</table>

**Conclusion**

I devised an approach to the integrated but independent VE Team. In this approach the team is composed of some of the project personnel (lead engineers) and outsider specialists. The team has complete independence and authority to perform the required VE analysis without any interference from project personnel or project management. This approach proved not only suitable to the type of work performed by an engineering and construction company such as United Engineers & Constructors Inc. (UE&CC) but also produced significant savings and acceptance of VE.

**References**

1. Through long experience, competent technically, and licensed as a professional engineer.

2. A study case or design area is a portion of the project which can be identified through the discipline boundaries (structural, mechanical, electrical, etc.) or through physical identification (Building A, piping package, switchyard, etc.).
"Spelunker’s Corner"
A Call for Help!!!

by Keith R. Thorson, CVS

Mr. Thorson is the former Manager of VE for the Hughes Aircraft Company Maverick Program. Since his retirement from Hughes he has become a VE Consultant and has continued his contribution to the contractual area of the Electronic Industry Assn. Value Management Group.

A NEW RESOURCE FOR SPELUNKERS —
A COMPENDIUM OF VECP-RELATED DEVIATIONS & AGENCY SUPPLEMENTS.

Two prime elements for a successful Value Engineering Change Proposal (VECP) action are 1) good communication between contractor and customer and 2) the availability of pertinent information on how best to proceed.

During the March meeting of the Electronic Industries Association (EIA) Value Management Group (VMG) in Tucson the local Hughes Air Force Plant Representative Office Commandant, Col. Alexander, reviewed some areas where his staff assisted the contractor and the Government contracting agency in processing VECPs. A question from the floor relative to his office's ability to know of and pass on information on agency supplements affecting VECPs raised a broader issue and resulted in the initiation of a plan to develop a new resource.

Most “Spelunkers” are (or should be) familiar with the EIA-VMG’s Bulletin No. 7, “A Compendium of Contested Value Engineering Cases.” The new compendium will be another useful tool, in this case for seeking available or potentially useful innovative ideas to expand the opportunity for finding incentivized value-enhancement targets. Where policy has been expanded or precedents set by others, the tendency of buying offices to stifle good ideas can be reduced. When the channels for VECP acceptance are greased the contractors are more prone to accept more risk/make stronger private fund investments. This is not to say that all deviations should apply to all situations; reasonableness and credibility still must be nurtured. However, unless you, the contractor, are aware of the opportunities in deviation precedents, you'll be unable to give the customer all of the available ideas you might conceive for VECPs.

When the channels for VECP acceptance are greased the contractors are more prone to accept more risk/make stronger private fund investments.

The EIA-VMG agreed that the concept was worth further development and that they were the logical collators of such a data base. Several action items evolved:

1. Develop a method for the collection of data from the EIA-VMG attendee agencies and companies. The method selected will be reviewed at the June Minneapolis meeting.

2. Research government procurement principals to determine if elements of the data bank already exist.

3. Publicize the search in Value Digest and Value World so that potential sources can help. THAT’S WHERE YOU COME IN, READERS?

What kind of data are we seeking?

1. Agency (e.g. USAF, Army, Navy, etc.) Supplemental Instructions as authorized in FAR 48.102(g).
   EXAMPLE: USAF Reg 172 which authorizes the extension of sharing bases to include all units "ordered" during the sharing period.

2. Agency one-time or limited-time deviations to the existing regulations, usually with the intent to try something new before going for a final FAR case.
EXAMPLE: Army Material Command's FAR Case 86-186 which allows acquisition-type incentives for what otherwise would be collateral savings.

3. Individual contract deviations approved to allow a benefit to the government through a VECP that would otherwise have been "unacceptable" under the then-current FAR/DAR/ASPR clauses.

EXAMPLE: Addition of a "VALUE ENGINEERING BASELINE" to the configuration management special provision (J27) of ASD contract AF3365778-C-0468. PO0151.

4. Procurement policy letters from major buying commands which take special note of unique-to-VE policies.


The EIA-VMG needs your help to collect the data for this Compendium; many of you work in either a buying function of the government or in a VE function in industry and are aware of those deviations that have been introduced within your "turf." All of the materials that I believe would be useful are also available through the "Freedom of Information Act" but we must know what to order. As an incentive, I will personally guarantee to any substantive contributor a copy of the initial Compendium and assistance in distribution list for updates.

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I am delighted to share with you today's opening festivities. My most important task is to commend you for your interest and support for value management shown by your attendance at this 30th international conference. I am also pleased to welcome you to Baltimore which is, by motto "the city that reads."

I am certain that all you readers are familiar with Dickens' famous line "It was the best of times, it was the worst of times." This sentiment is as appropriate for today's reality as it was in the time of the French Revolution. We are, as a people, confronted with major concerns...worthy to be named "worst of times." We are also in one of the richest and most heuristic times in history, worthy of the "best of times." Let's look first at a few of these issues.

Our environment, literally the world in which we live, is in jeopardy. It may be that we are nearing the point where we will have produced and reproduced ourselves out of fresh air to breathe or sufficient room in which to breathe it. Our realm of productive capacity, once so revered, is now becoming a nightmare within an atmosphere deteriorated by heat and effluents. Other scenes in the nightmare show us being flooded by a sea of waste that we haven't learned to use, recycle, minimize or prevent.

Along with such bad news, however, there are glimmerings of good news. Such observances as Earth Day yesterday demonstrate a growing awareness of the problems and the will, along with developing technology, to do something about them. By some kind of providence, the very measures that will positively affect specific ecological problems are worth doing anyway, have other benefits and can be cost-effective. For example, more efficient use of energy and accelerating the transition to solar, wind, hydro and biomass energy sources would directly reduce the greenhouse effect. At the same time, these measures would also reduce fuel bills, urban smog, acid rain, oil spills and toxic wastes. Similarly if we stop deforestation and accelerate reforestation, we would at the same time protect lumber, pulp and other forest resources; reduce soil erosion, flooding and drought; moderate temperatures; and preserve many endangered species. Such examples as these demonstrate that present ecological problems - though very real and ominous - are not inevitable. These are now becoming understood as matter of choice rather than matters of destiny.

A different facet of the "worst of times" vignette involves the fact that just as many in the technical and economic arenas of our nation are becoming aware of the every-increasing world roles of other nations, they are finding themselves quagmired in rigid organization structures and confounded management philosophies and practices that maintain high cycle times and painfully slow incorporation of new technology. Such tragedies as the plight of the rust belt continue to take their toll in economic, social, political and human costs as we struggle to translate ideas into useful economic reality. We continue to demonstrate the persistent human capacity to build bureaucratic, top-down, locked-in organizations with little or no empowerment for a large percentage of the people within them. At the top of too many organizations we still see managers who are not leaders. Worldwide, we are seeing massive change and people struggling to obtain greater control over their own destinies. But where is the prototype of enlightened leadership for such societies to look to?

Running the risk of sounding too much like a pollyanna, I think we can see again at least some bright glimmerings of resolutions to these problems. Peter Drucker, among others, has identified the onset of the era of information-based organizations. There are some shining exemplars of organizations that are making the
changes necessary to empower people and improve productivity. Emerging organization designs are flatter and more responsive to both internal and external pressures. Bureaucracy is beginning to give way to 
adhocracy with flexible group membership and more effective use of human resources. Strategic plans are being generated to provide for development of new cost-effective products and services. In dramatic exemplary companies, we see leaders who are truly leading . . . who, rather than push workers, pull them by providing work that is stimulating, challenging, meaningful and even fun. Ghandi once said "We must be the change we wish to see in the world." As we observe historic calls for change in such places as Eastern Europe, Asia, and the emerging nations of the third world; we must continue to provide evidence of the viability of the models we value and continue to provide evidence of leadership qualities such as expertise, commitment, and integrity. We have exemplars of such models that should be publicized and celebrated.

The "worst of times" picture contains many other brush strokes. One that especially concerns me as a professor at a fine state university is our continuing national inability to develop sufficient skilled human resources needed to address the problems we’ve been listing. Enrollment trends in many of the key science and technology fields show a continually widening gap between demand and supply. By the year 2000, this gap may result in extremely critical shortages of people who understand and can logically investigate the natural biological and physical sciences underlying the problems we face - must less, people with such technical skills who can work independently with others.

But just as with the other "worsts," we can find some evidences of the "bests." I am frequently struck by the excitement, the raw abilities, the hope and the positive aspirations of our young people. Collectively, our university students comprise a powerful intellectual set of raw materials that in the right surround, with the right support and guidance, may emerge from their all-night toga parties with serious solutions to our most pressing problems. I am also struck by the extent to which some of our industrial organizations are stepping up to the need to become involved in developing this resource . . . developing partnerships with the academy and demonstrating the realization that the priorities of education must be shared by all. While certainly at the germinal stages, the beginnings of academic and industrial allegiances are a very good sign.

Now, given this parsimonious look at the backdrop of our present activity, what is the nature of the game plan? What role does a professional society such as SAVE have in the overall picture? The title of this year’s conference is “Winning ideas through value.” Whether read as a verb or an adjective, the focus is clearly on winning. But we must be clear about the nature of the game we’re playing. In the past, the game has been one of “I win, you lose” - known also as zero-sum game. We must realize that in “I win, you lose” situations, no one can really win because ultimately we all lose. We can’t solve problems of air pollution by sticking the bad air in someone else’s atmosphere.

So the game we must play, indeed we must win, is a non-zero sum game. Fortunately such ideas are not new to members of organizations like SAVE. Running the risk of a very bad paraphrase, "What’s good for value engineering is good for society." Many of the tenets that SAVE has continually tried to nurture across time are central to supporting movement toward the hoped-for end of the best-worst of times dimension. Our emphasis on problem-finding, on systematic development of solutions and especially on developing collaborative relationships are key elements in the solutions to our present dilemmas. For over a quarter of a century, members of SAVE have been talking about the development of interdependent teams using the job plan with its convergent and divergent approaches including FAST to frame, investigate, speculate, analyze, evaluate - to implement and review improvements. Whether we knew it then or not, the things that Larry Miles and the other pioneers were calling for are now viewed as absolute necessities. Value engineers have many of the essential skills and techniques necessary to resolve our urgent social and technological problems. This may be viewed as a relatively well kept secret, but the word is getting around. We cannot be benchwarmers - we need to be right out there in the center of the field with other important parts of the solution.

There’s a worst of times element here too. I’m afraid some of us have been mispronouncing the vowel and think we’re talking about whining ideas . . . like, ‘I just don’t get management support,” or “it’s too late to do anything,” or “nobody listens to us.” Other whiners even suggest our techniques just aren’t valued enough to make a difference. Fortunately, the best of times factors outweigh the negative whiners. In the Society we have been fortunate to have had the leadership of a large number of capable, concerned and committed people. I’d like to take a moment to thank our outgoing President, Tom, and the members of the board for their continuing efforts to further the cause and spread the good news. I’m sure we’ll continue to be in good hands with the in-coming President, Hal Tufty, and our new Board. Beyond this central leadership we are also blessed with effective and creative people at the regional and chapter levels who by their talent and labor continue development and dissemination of the Society’s message.

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In the Society we have been fortunate to have had the leadership of a large number of capable, concerned and committed people.

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Perhaps one of these sneakiest SAVE supporters is Jim Vogl - his exceptional good work is seen every quarter in Value World, a periodical that not only performs the usual communications functions, but has become - under Jim’s tutelage, a very respectable journal - one in which we can all be proud. Most of you are carrying some more results of Jim’s tireless
efforts - the Proceedings - so beautifully edited and professionally displayed. Fortunate as we have all been to receive these products of countless hours, few of us have had the opportunity to thank Jim for his expertise and his caring - thank you Jim.

And now we get to the conference itself - what's the game plan here? There are no colorful X's and O's, vectors and arcs like Coach Madden uses to explain plays in football, but I do hope we'll develop good strategies and execute the plays well. Good conference plays include:

1. Making best use of the technical sessions - this means more than active listening . . . it means taking the ideas presented and finding ways to use them in our own thinking and our own practice. Developing our own game plans means selecting sessions to examine new applications or to hear new ways of understanding aspects of the work we're already involved in. Whether the sessions are called industry or construction or management - look for the universals that apply across products and processes. Today's speakers will provide a wealth of information regarding new ways to weave VE principles into the fabric of the way we do business.

2. Another important play is the networking activity. In VE we know about the importance of heterogeneous interaction and we're tremendously fortunate to be able to share ideas with a wide range of other interested people. Diversity is a major strength of effective groups and we mustn't neglect the chance to build relationships with members from different companies, different countries, different ages, and different experiences.

3. The exhibitors represent another important resource in a strategic conference game plan. Make sure you see who they are and what they can provide. Ask them all the tough questions you've been trying to answer - see what support they can provide.

I think you'll be impressed.

Finally, I would like to spend a few moments looking at our game from two very different points of view - from the Conessions of a Reluctant Messiah and from a children's fairy tale.

In The Phantom Tollbooth, the children's story written by Norman Juster, Milo is on a journey to the Kingdom of Wisdom. On his way, Milo stopped at Expectations - the place where you must always go before you get to where you're going. Of course, some people never get beyond expectations, or they get stuck in the Doldrums. The Doldrums are where nothing happens and nothing ever changes. People who don't think often get stuck in the Doldrums. On his way to the Kingdom of Wisdom, Milo passes through the island of Conclusion. "It's such an easy trip to make to the island of Conclusion - most people have been there hundreds of times. Everytime you decide something without having a good reason, you jump to Conclusions - whether you like it or not." says Milo. Throughout his journey he meets with such interesting creatures as the demon of insincerity who doesn't mean what he says or does; and the Terrible Trivium, the demon of petty tasks and worthless jobs, the monster of habit. The Terrible Trivium tells Milo, "If you only do the easy and useless jobs, you'll never have to worry about the important ones which are so difficult. You won't have the time for there is always something to do to keep you from what you really should be doing. You'll never have to think again and you can become a monster of habit too." But Milo meets the Princesses of Rhyme and Reason who tell him, "It's not just learning that is important. It's learning what to do with what you learn that matters. You may not see it but whatever we learn has a purpose and whatever we do affects everything and everyone else, if even in the tiniest way. What you learn today will help you discover all the wonderful secrets of tomorrow."

Along his journey Milo also ran across the Mathematician who explained that "... one of the nicest things about mathematics, or anything you might care to learn, is that many of the things which can never be, often are. You see, it's very much like your trying to reach the Land of Infinity. You know that it's there, but you just don't know where just because you never reach it, doesn't mean it's not worth looking for." I think that's really what the game plan is about - the interest and drive to keep trying, to keep learning, to keep growing. In his book titled Illusions - subtitled Confessions of a Reluctant Messiah, Richard Bach writes a parable about some crystalline-type creatures who lived on the bottom of a river that had a very swift current. Each creature in its own manner clung tightly to the twigs and rocks of the river bottom, for clinging was their way of life and resisting the current was that each had learned from birth.

But one creature said at last, "I am tired of clinging. I shall let go and let the current take me where it will. Clinging I shall die of boredom." The others all laughed at such a foolish idea and said he would be killed much quicker by being smashed against the big rocks than by boredom. But the one took a deep breath and let go. And he was tumbled and smashed by the current across the rocks - yet in time, as the creature refused to cling again the current lifted him free from the bottom and he was bruised no more. And the one carried by the current said, "The river delights to lift us free, if only we dare let go. Our true work is this voyage, this adventure."

That's the game plan . . . the importance is the journey, the adventure itself that we can all experience in different ways. We simply cannot keep clinging because the problems are too large to ignore, the opportunities too important to leave unattended, and the skills of our society too powerful not to be used. The trip to Wisdom is not an easy one, but the adventure is too great not to try. With the tools of VE in our kit bags we can journey almost anywhere - even to the wonderful secrets of tomorrow.

Bon Voyage - have a great trip.
Value Engineering and Just-In-Time

by Paul C. McCusker

Paul C. McCusker is self employed as a VA and VE consultant to the manufacturing industry. He spent five years with The C.M. Kemp Mfg. Co. as a project engineer and twenty-six years in the power tool industry with Black & Decker in various positions including Value Analyst, Purchasing Engineer, Purchasing Manager and Technical Training Manager. He is a member and past president of the Chesapeake Chapter of SAVE.

The last issue of Value World® contained an article on the MO CAN DO Chapter’s project, initiated at the 1989 International SAVE Conference, to apply VE to the 1991 Conference which they will host. The project generated a listing of things that attendees would like at the Conference. Under the heading Sessions/Speakers was the subject “Explanation of how VE relates to TQM, JIT, and other techniques.”

The ability of VE to assimilate, and use in a complementary way, other value enhancing techniques has been demonstrated in a number of cases. The feature article in the same issue of Value World® referenced above indicates that there is a tremendous potential in linking VE and Design for Assembly; as high as 65% reduction in assembly labor and a similar reduction in part count.

The ability of VE to assimilate, and use in a complementary way, other value enhancing techniques has been demonstrated in a number of cases.

This same subject was covered in a Technical Session at the 1990 Conference. There is a powerful synergism created when VE and DFA are melded. These two references suggest that any product oriented VE Workshop that does not introduce DFA to the participants would not be up with the times.

The fit between VE and JIT has not been emphasized to the same degree as the DFA connection. This may be because VE started out in a Purchasing environment and evolved into VE under the influence of Engineering. While JIT applies to the total manufacturing operation, purchasing plays an ever expanding role in JIT due to the outsourcing of materials and services. Of course, out of necessity, the JIT concept also demands a link to TQC since the security blanket of inventory no longer exists. But this is another subject.

The logical connection between VE and JIT was brought out during a VE Workstudy conducted at the Motors Division of Pacific Scientific, Rockford, IL. In discussing the concept of value, the usual distinctions were made between use, esteem, cost and exchange value. Normally the thrust of the discussion centers on use value, which is easily linked to function, and esteem value which itself is functionally linked to aesthetics. At this point Mr. Patrick J. Dulin, Vice President of Stepper and Brushless Product, suggested that VE should also consider the value of Time and Place. What could be more natural given today’s emphasis on demand/pull inventory systems and total quality control.

JIT is all about the value of time and place. Every buyer can tell horror stories of the vendor with the great price but non-delivery; or that never-never land called “In Transit” where the many urgent shipments seem to end up. There is no doubt that time and place need to be considered in a VE Workstudy. The question is where do they best fit in the job plan or FAST diagram? Well, if we accept that these really are value concepts, i.e., time value and place value, then we should be able to associate a cost with them. Cost shows up in two places in the job plan; first, in the Information Phase, to answer the question “What does it cost?” and second, in the Development Phase, to answer the question “What will the alternative cost?”

JIT is all about the value of time and place.
Cost information on purchased items should include freight, inventory charges and any cost related to damages or quality in general. I know of an instance where a manufacturer could justify setting up in-house manufacturing with a one year payback based on a combination of eliminating freight and improving quality. Often it takes some real digging to ferret out the actual cost. Raising the issues of time and place vis-a-vis inventory and quality can often uncover opportunities.

With all of the mergers and buyouts today there may be new technology or processes available at sister plants that offer mutual cost advantages. It is not uncommon to have corporate contracts for certain materials. Most contract suppliers will extend the cost advantage for material shipped to custom fabricators. With material price nailed down, the negotiations would then center on available shop time and value added.

One of the major considerations in JIT is the size or quantity of each supplier delivery. While it is ideal to have all suppliers located within a 50 mile radius and making daily deliveries, this is seldom the real world. As an alternative, there is an opportunity to VE the mode of transportation, the shipping containers, a joint effort with another company in the area, FOB point or, in short, any aspect of material handling from the source to the assembly line. Since JIT is a really dynamic system, the functions of paperwork should be reviewed. The ability to have a supplier read demand from the customers system could free the buyers for more important things including VA.

While most of the above relates to the purchasing aspects of JIT, there is much in the way of manufacturing that can benefit from considering the values of time and place. Reduction of set-up time is an integral part of the JIT plan. Ideally, the manufacturing engineer and the designer work in concert on this problem. High quality finishes today allow the use of prefinished materials that hold up during manufacturing operations. In a similar way, the use of high strength or prehardened steels can drastically revise the manufacturing schedule.

In summary then, a very real case can be made for including JIT to enhance the results of a VE workstudy. A logical bridge between the two techniques can be the introduction of the concept of Time and Place values.

References

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Value Analysis: Universal Applicability, Limited Usage

by Ginger Willingham, CVS

Ginger Willingham, CVS is the Vice President - Marketing of Value Engineering International, Inc. She is SAVE's Director of Conferences and has served on the Board of Directors for many years as Regional Vice President as well as held offices in the Dallas/Fort Worth Chapter.

Introduction

Several years ago I started work on a new job in an engineering firm. My position was “one-girl office,” which really isn’t a position but describes quite well what my duties involved: typing, filing, bookkeeping, receptionist, accounts payable, accounts receivable, payroll, purchasing, insurance processing, and on and on. After only a few short weeks on the job in this totally new environment, I was asked to look into the purchase of dictating equipment. The firm had never used dictating equipment before, and the president felt it was time to improve our efficiency by eliminating the need for handwritten letters and reports.

I called several vendors and received prices, marched into the President’s office with “my recommendation,” and feeling very proud of my resourcefulness, and he asked me one question: “Why this system?” Naturally I responded, “Because it’s the least expensive!” That was when I received my first introduction to the principles of Value Analysis/Value Engineering.

VA in Administrative Management

For the next several years I continued learning not only about the principles, but the application of the value methodology, and have used it extensively in the day to day operations and management of the firm... for everything from purchasing equipment to hiring personnel.

Vendor Selection

When an organization determines the need to purchase equipment of any kind, the first step should be to define the function of the equipment. For example, consider the process of upgrading an entire computer system.

For several years the company was using a mini-computer for technical applications, and personal computers for word processing and some simple accounting functions. Approximately 50% of the company's personnel had access, and the capability, to work with the existing computer system. The ultimate goal, over a period, was defined as “automate office” (essentially all functions — including technical applications, word processing and all accounting). It was decided to accomplish this goal in multiple phases, the first of which would result in placement of the “core system.”

Before quotations for the equipment were solicited, an extensive “information phase” was undertaken. This involved numerous interviews by the company's computer systems coordinator with virtually all personnel in the firm, but more intensively with the managers/supervisors. Detailed lists of functions to be performed by the new computer system were developed, and ultimately prioritized. In concert with this, the resulting improvements in products delivered and personnel efficiency were paramount considerations.

As quotations were solicited, the firm's top managers began evaluating the prioritized functions and the costs related thereto, to keep the upgrade to a manageable cost and still retain the primary functions desired. During the evaluation, items such as financing, personnel training, “down time,” and the transition process had to be considered, in addition to what to purchase and how much to spend. The result was a system which:

• had the capability to handle more than twice the volume and a multitude of additional programs than the previous system

• was user friendly, accessible to and used by more than 90% of the company's personnel

• improved the flexibility and appearance of documents produced
• improved employee efficiency
• decreased annual operating and maintenance costs

The same type of process has been applied within the company for purchase of a telephone system, copier machine, facsimile machine and all other major equipment.

**Personnel Hiring**

When a firm considers hiring an individual for employment, numerous factors influence the selection. First and foremost, of course, is the position available and the duties associated therewith - the firm's need. Obviously the prospective employee's work history/background are of primary importance.

However, many other elements influence the final decision as to whether or not the candidate is truly a contender for the job - some firm needs, some firm "wants." Figure No. 1 is an evaluation matrix actually used to fill a secretarial position (the specific candidates' names have been eliminated. The "test scores" indicated in the lower right corner of the "Idea" block represent typing speed, and score achieved on a spelling, grammar and word usage test. Candidates "A" and "C" had almost identical rating scores; however, Candidate "C" scored higher on the tests administered. Although Candidate "C" appeared from all the scoring and testing to be better qualified, Candidate "A" was hired and turned out to be a valuable asset to the company.

While the evaluation matrix is an excellent tool in the hiring process, it is not to be construed as a decision-maker. Once the matrix is complete, there are certainly other factors to be considered, such as the personal impression made during the interview, and references from prior employers. These are subjective elements which, when combined with the matrix evaluation, have a strong influence on the ultimate selection of an employee.

The use of this tool in the hiring process provides a much more objective and reliable procedure for evaluation of prospective employees. Consequently, if used properly, a company should end with employees who are more dependable and better suited to the position being filled, as well as a lower than average turnover rate.

**Marketing**

The primary function of a proposal is to "obtain contract." In composing a proposal, many different elements must be addressed:

• what services the firm will perform (lead study; teach students; conduct audit; analyze system; produce report)
• how the firm will perform the services
• who within the firm will perform the services, and why they're qualified
• how much experience the firm has in similar services
• what the cost to the client will be

Although these are the primary elements contained in a proposal, there are secondary factors as well:

• the content of the cover letter
• public relations type promotional material (unrelated to specific scope of services being proposed)
• the packaging of the proposal itself - Do you bind it? Do you cover it with plastic?
• the professionalism with which the proposal is assembled.

Obviously the secondary factors provide aesthetic functions, which can have tremendous value in a marketing approach. On the other hand, the same aesthetic elements may lead a client to believe the proposer is "frivolous." In the development of a brochure or a statement of qualifications to introduce yourself to a prospective client, the aesthetics play a primary function (impress client). When the client asks for a specific proposal, aesthetics may become secondary, if not totally unnecessary. Knowing your customer's wants and needs is imperative in knowing what to include - and how to package it - when you send that customer a proposal!

**Corporate Planning/Organization**

The VE job plan provides an excellent methodology for corporate planning. When the officers meet to discuss long term goals and strategy to accomplish those goals, the process should not be one of a "select few" determining the fate of the firm as a whole. Corporate-wide meetings should be scheduled periodically to obtain input from all personnel. Each individual supervisor should have regular meetings with the people reporting to him or her. All of this information, once collected, would then be presented by the top managers at the Corporate Planning Meeting; in addition, certain top management information, which is vital to the continued operation of the company, is integrated with the personnel feedback.

Specific steps taken in corporate planning, as they relate to the VE job plan, have been described as follows:

1. **Information Phase**
   A. Review input from personnel (add computers; add telephones; improve [company] brochure; decrease hours; increase salary)
   B. Review financial/operations data (increase hours; increase salary)
   C. Review past year's corporate accomplishments
   D. Define corporate strengths and weaknesses
      - financial
      - administrative
      - marketing
      - computer/management information
      - specific departments' functions
      - human resources
   E. Define corporation's present standing, as related to all of the above items
   F. Define corporation's desired standing next year, i.e. establish goals
<table>
<thead>
<tr>
<th>NO.</th>
<th>IDEA</th>
<th>TEST RESULTS</th>
<th>WT</th>
<th>5</th>
<th>5</th>
<th>5</th>
<th>5</th>
<th>5</th>
<th>4</th>
<th>3</th>
<th>3</th>
<th>TOTAL</th>
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<tr>
<td>72/20</td>
<td>CANDIDATE A</td>
<td></td>
<td>5</td>
<td>E</td>
<td>E</td>
<td>E</td>
<td>E</td>
<td>E</td>
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<td>E</td>
<td>114</td>
<td>1</td>
</tr>
<tr>
<td>65/21</td>
<td>CANDIDATE B</td>
<td></td>
<td>5</td>
<td>E</td>
<td>E</td>
<td>E</td>
<td>E</td>
<td>E</td>
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<td>E</td>
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<tr>
<td>74/21</td>
<td>CANDIDATE C</td>
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<td>5</td>
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<td>E</td>
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<td>113</td>
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<tr>
<td>73/22</td>
<td>CANDIDATE D</td>
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<td>E</td>
<td>E</td>
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<td>E</td>
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<td>E</td>
<td>103</td>
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<table>
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<tr>
<th>VALUE</th>
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<th>T3</th>
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<tbody>
<tr>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

Figure 1
2. **Speculation Phase**

Brainstorming session: generate ideas for conversion of weaknesses into strengths and potential steps for attaining next year's desired standing.

3. **Analysis Phase**

Discussion of roadblocks associated with reaching goals and action needed to achieve those goals; specific items in each area of corporation (refer to item 1-D above) are addressed.

4. **Development Phase**

Each of the team members (managers) accept specific task assignments related to his/her area of responsibility in the corporation. These include, but are not necessarily limited to, such things as:

- development of written marketing plan
- discussions with specific personnel regarding performance and productivity
- development of distinctive role descriptions, company-wide
- improvement and/or streamlining of certain administrative procedures or processes
- follow-up with particular clients regarding specific upcoming assignments
- formation of pertinent steps to expand work with specific client(s)
- improvement of financial operation procedures
- establishment of formal communications procedures

5. **Presentation**

A. Subsequent meetings are held to review and discuss the results of each team member's task assignments.

B. New and/or revised procedures and processes, influencing not only the team members but the remaining personnel, are firmly defined and agreed upon.

C. A company-wide meeting is held to review the results of the Corporate Planning Meeting, future strategy, and specific effects on individuals' roles, as well as the company's future goals.

6. **Implementation/Follow-Up**

Regularly scheduled meetings are held within departments among the original team members (managers) and, less frequently but also at regular intervals, on an individual basis between managers and employees. These meetings provide the basis for continuous follow-up of individual and team actions accomplished to achieve the goals previously defined. In addition, the results of the meetings provide a foundation for measurement of performance of both individual employees, and the company as a whole.

In many respects, this approach is much the same as customer-oriented VE. In this corporation, the employees - from the top down - are the customer. If the needs and wants of both the employees and the employer are met, the result will be a successful and profitable corporation.

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**Value Analysis in the Legal System**

Probably the single biggest lesson I have learned over the last ten and a half years is that VA is applicable to virtually anything to which one wishes to apply the methodology. An analogy I enjoyed, when trying to explain the process to an attorney one time, was the comparison of the job plan to the process he pursued through our legal system:

<table>
<thead>
<tr>
<th>VE Job Plan</th>
<th>Legal Process</th>
</tr>
</thead>
<tbody>
<tr>
<td>Information Phase</td>
<td>Discovery Process; depositions</td>
</tr>
<tr>
<td>Speculation Phase</td>
<td>Research; looking up precedents; considering what opposing counsel will present</td>
</tr>
<tr>
<td>Analysis Phase</td>
<td>Application of precedents to case at hand; counter arguments to opposing counsel's case</td>
</tr>
<tr>
<td>Development Phase</td>
<td>Development of case presentation; which precedents to use in court; what defense/prosecution to present</td>
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<tr>
<td>Presentation Phase</td>
<td>Hearing/Trial</td>
</tr>
<tr>
<td>Implementation Phase</td>
<td>Verdict</td>
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<tr>
<td>Follow-Up Phase</td>
<td>Freedom - Sentencing - Probation</td>
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</tbody>
</table>

**Perception**

The most difficult challenge I have encountered, particularly in recent years, is that the use of VE/VA is extremely difficult to promote. There are probably a multitude of reasons for this. However, my personal feeling is that our culture is the biggest roadblock. Although the U.S. government is the single largest user of the VA methodology, it certainly does not promote the use of VE. When was the last time you saw a news report about the millions of dollars saved on a project because VE was applied? When have you ever heard the term value engineering or value analysis when defense budgets are being discussed? Certainly there have been attempts made to increase the use of VE, such as the Circular A-131 (issued by the Office of Management & Budget, Office of Federal Procurement Policy) which requires VE in all federal departments and agencies. But shoving something down someone's throat is not the same as "promoting" the benefits and use of that something. With actions such as this, the "nature of the beast" dictates that a rebellious reaction - or no action at all - is bound to occur. Figure No. 2 is a chart which only substantiates the lack of activity within federal agencies since the OMB circular was issued in January, 1988.

I can't help but believe that the approach taken by the Society of Japanese Value Engineering, with involvement being more on a company than an individual basis, is what we in the U.S. should be attempting. Japanese industry started the trend toward the use of VE in Japan, and 17 representatives of manufacturing companies founded SJVE in 1965. By 1980 SJVE became authorized by the Japanese government (Ministry of International Trade and Industry) as a fully independent, incorporated society ... a government accredited professional organization.

Why has SAVE, which has been around for almost 40 years, not been recognized and promulgated by the U.S. government? Many would argue that the Japanese industrial position when this occurred was such that
Recap of Answers to OFPP’s September 19, 1988, VE Questionnaire.

As noted above, these replies below do not include the Department of Defense which reported its best VE activities in a February 28, 1989 letter to Senator Nunn and Representative Aspin, as chairmen of their chamber’s Armed Services Committee.

<table>
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<tr>
<th></th>
<th>GSA</th>
<th>DOE</th>
<th>Interior</th>
<th>State</th>
<th>Comm.</th>
<th>VA</th>
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<td>20,726.8</td>
<td>12,000</td>
<td>4,100</td>
<td>0</td>
<td>9,950</td>
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<td>2,597</td>
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<td><strong>8 or more hrs.</strong></td>
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<td>17</td>
<td>22</td>
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<td>0</td>
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<td><strong>FY ’88</strong></td>
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<tr>
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<td>382</td>
<td>6</td>
<td>0</td>
<td>0</td>
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<td>8</td>
<td>0</td>
<td>1</td>
<td>17</td>
<td>19</td>
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<tr>
<td><strong>Accepted</strong></td>
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<td>142</td>
<td>5</td>
<td>0</td>
<td>0</td>
<td>73</td>
<td>48</td>
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<tr>
<td><strong>In-House</strong></td>
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<td>22</td>
<td>7</td>
<td>0</td>
<td>1</td>
<td>7</td>
<td>18</td>
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</tbody>
</table>

Figure 2

the “time was right” for the way VE was adopted in that country. However, most of what I read in newspapers today would indicate to me that the “time is right” for the U.S. government to take a much closer look at SAVE as a professional society, to spend more time publicizing the benefits of VE/VA and the Society’s efforts, and to thereby create an atmosphere of “want” among U.S. corporations for the methodology. Should this occur, it only stands to reason that our colleges and universities would then clamor to teach the methodology, to provide the resources needed by U.S. industry. Under-publicized congressional hearings, do little or nothing to promote use of this exceptional technique.

**Conclusion**

We all know that many people are automatically turned off by the term “engineering” when we discuss this process that we know is so beneficial. So, perhaps we should return to the use of “value analysis” — the original terminology used by Larry Miles — rather than “value engineering.”

In addition, the thrust in industry today deals with productivity improvement, total quality management, the “search for excellence.” Is it not reasonable to consider VA as a tool for achieving these goals? Many people in the value community say yes, that VA/VE is a process in and of itself, and that productivity or quality improvement should be considered a sub-function of VA. I say no, that productivity improvement, quality management and excellence are the *results* of proper application of the VA techniques. Optimization of resources - hardware, software, human, financial - is a *result* of VA. Promotion of the VA/VE techniques in this light will certainly enhance acceptance of the universal applicability of the methodology . . . and perhaps “value analysis” will become the buzzword in U.S. industry.

**References**

Credibility is taking a licking these days.
No doubt about it.
For example:

Who among us has not been congratulated recently for "almost" winning a free trip, a house, automobile or a seaside lot in Arizona?

If not, you must have an awfully rural mail address or an unlisted phone number.

During the past year, either Melvin Shimakowski or me (or another named person), has won a grand new luxury automobile a dozen times or so. Think of it! It has been an either/or case; a 50-50 chance, if you will, that Melvin or me has won.

Guess who always wins? Lucky Melvin, I can tell you that.

These great pronouncements of near serendipity usually occur by a stirring phone call arousing my slumber about 10:00 P.M. or by a frugal bulk rate mailing. I guess they have lots of autos to give away.

With wisdom learned, I now know how to cope with the prospect of dashed hopes and being a perennial second best.

Not being a greedy person, I normally respond in this manner: "Thank you, but I do not need another car. Please give it to Melvin Shimakowski with my blessing, as a brotherly gesture from me." The caller interrupts - "But Mr. King, wouldn't you like to drive an Alpheo Romo."

"Please," I respond. "I surrender my opportunity to Melvin. My parents taught me to be humble, giving me access only to a 1953 Dodge and only then on a Saturday night. I would not want to overindulge."

Generally this great act of benevolence leaves them speechless for a moment, at which time I graciously hang up the phone.

Well, my misgivings about credibility transcend into the VE profession as well.

Increasingly one hears of certain individuals passing themselves off as knowledgeable in VE — when in reality they are not. Even wisps of claims to being a Certified Value Specialist, when in fact the claimant often has no knowledge of the recognized body involved with the certification process.

The driver of false claims of course is the individual's pursuit of work, or personal enhancement, particularly from clients wanting Value Engineering services or an employer seeking a Certified Value Specialist.

Misguided, intentionally or unintentionally, the result is the same; they exaggerate their offering.

Now, I know we all need to eat.

But, I can sense it is frustrating for the VE professionals who have advanced the profession, made it what it is, introduced the concept to users, and have non-believers cut themselves in for a piece of the action by false offerings.

If a customer wants an economic study done, then that's one thing; if the customer wants a low cost quality job performed, that could be the same thing. But if the customer is asking for VALUE ENGINEERING services he/she should be getting VE in a recognizable form or methodology; if indeed the client knows what VE is or should be. There are many ways to skin this cat and still comply with the spirit of VE.

VE is a "how to" methodology, or process — not a result. Likewise, trigonometry is not a protractor, although both can define an angle.

The good side of all of these churnings is that VE is being increasingly associated with some really nifty things, and being asked for. Helping users get a "good dose" of VE becomes very important for the career VE professional.

Regarding those individuals who say they use VE all the time, but call it something else, foregoing a functional approach and a systematic following of a job plan, I will reference Alfred E. Smith's classic quote:

"No matter how thin you slice it, it's still baloney." A
PRESS RELEASE

MARTIN TECHNOLOGIES
New Tungsten Manufacturing Process
Cuts Costs, Improves Quality

Tungsten has always been a material that presented special manufacturing challenges. New powdered metals technology offers a new way to meet those challenges with a process which improves product quality and manufacturing efficiency thus reducing cost.

Due to the nature of the material, the high sintered temperatures needed (2,700 degrees), and the high strengths required, the size of the tungsten powder particles must be very small, between 2 and 4 microns in diameter. There are significant problems inherent in working with such small particles: (1) The material does not flow. (2) The alloying elements tend to agglomerate during the mixing process. The result is a material which is extremely difficult to use.

The tungsten industry's traditional answer to these problems has been to go through a series of lubricating, milling and reblending operations to allow the powder to flow and be more homogeneous in mixing. All tungsten products, from munitions parts to counterweights in watches, are normally formed using these conventional processing techniques. However, to sinter the material to its full density, the lubricant — usually a wax — must be removed. This is done in a vacuum furnace at relatively low temperatures. While heating removes the wax, it leaves a carbon by-product.

This impurity is particularly detrimental in the case of the M-74 grenade body. Martin technologies located in Huntsville, Alabama, recently undertook the manufacture of the grenade and resolution of the problem for the U.S. military.

Applying powder flow technology to tungsten:

As a powdered metals manufacturer, Martin was not bound by the conventional thinking of the tungsten industry. Using its knowledge of powder flow technology, the company worked to develop a new technique to form P/M tungsten into the proper shape without using the wax lubricant. They experimented with particle distributions, sintering cycles, and feeder mechanism configurations.

The real breakthrough was a revolutionary feeder mechanism that places a consistent volume of powder over the die cavity. In developing it, they had to overcome two problems: (1) The mechanism had to be tight enough to prevent the powder particles from jamming up the system. (2) The mechanism also had to prevent the powder from densifying due to machine vibration before being loaded into the die cavity. These problems were solved by using a system of slides and shutters.

This new technique has a direct effect on the cost of manufacturing the product, eliminating three to four manufacturing steps. It also provides a material with better consistency and higher purity, with no residual carbon.