SOUVENIR

Indian Value Engineering Society (INVEST)

38th Annual International Conference

6th - 7th January 2023
Hotel Holiday Inn, Mumbai

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Value Engineering
Your
Competitive Edge

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About INVEST

About INVEST

Founded in October 1977, INVEST successfully engages with stakeholders across public, private and non-profit sectors to actively promote value engineering practice and techniques through PACE (Promote, Advocate, Certify, Educate) activities both nationally and internationally. INVEST steps in as your partner who supports you in creating a 'value culture' by improving quality, productivity, profitability, competitiveness, and sustainability. It is the only authorized body in India, affiliated with the Society of American Value Engineers (SAVE International).

Since its inception, INVEST proactively engages with public, private, and non-profit sectors across the country. Founded by renowned industrialists of the time, one amongst them being the late Dr. J. J. Irani, former Managing Director of Tata Steel, as its President, espoused the cause of "Enhancing Value" through a simple but systematic methodology based on universally applicable principles.

INVEST offers its own certification programs, including Student Value Practitioner (SVP), Senior Value Analyst (SVA) for industry professionals and academia and Professional Value Analyst (PVA) for practitioners. Affiliated with the Society of American Value Engineers (SAVE) International, and an authorized partner of Value Methodology Associate (VMA) as well as Certified Value Specialist (CVS), INVEST has all the right tools to fit every industry.

Apart from PACE activities, INVEST also provides consulting services to industry, academia, and government through specific engagements.

INVEST collaborates with stakeholders in private, public and non-profit sectors for:

- Enhancing value of products and services
- Resolving pertinent problems
- Increasing profitability
- Introducing innovations
- Improving operational efficiency
- Revitalising organisation

For more information, visit www.invest.in

About the Conference

Value Engineering,
Your Competitive Edge

Be ProductiVE,
Be CompetitiVE

About the 38th Annual International Conference

Background and Conference Theme

In order to thrive in today's competitive market, every organisation must be able to develop a competitive edge, adapt to market changes and grow. In order to achieve this, it must adopt several tools and techniques geared towards optimum efficiency.

Value Engineering (also known as Value Analysis, Value Methodology or Value Management) has been globally acclaimed for more than 75 years as a methodology for enhancing profitability, efficiency, productivity, quality, etc. at the least possible costs. When applied accurately and consistently, it delivers remarkable results for the above purposes irrespective of product or service nature or organisation. Being creative, adaptable and flexible, it is no longer restricted to industries alone; but is making its mark in government, academia and non-profits as well. This makes it a unique tool for both organisations and professionals who aim to “gain a competitive edge” and achieve ambitious goals in the midst of our new normal.

Time and again, its value has been demonstrated through the large benefits drawn through monetary, non-monetary and social gains across a wide range of sectors. Being creative, adaptable and flexible, it is no longer restricted to industry alone; but is making its mark in government, academia and non-profits as well. This makes it a unique tool for both organisations and professionals who aim to “gain a competitive edge” and achieve ambitious goals in the midst of our new normal.

The conference is bound to be a rewarding experience for individuals and institutions across the globe interested in learning, applying and practicing value engineering to gain a competitive edge across all disciplines.

Aim of the Conference

The 38th Annual International Conference of INVEST aims to serve as a vibrant, multi-disciplinary platform for the confluence of stakeholders from industry, government, academia and civil society for cross-learning through a wide range of Value Engineering applications. It also seeks to facilitate a dialogue for exploring new avenues and exploring solutions for existing and emerging challenges faced by organisations, professionals and students to keep pace with dynamic market scenarios in a neo-normal economy.

Benefits

- Benefit from insights of esteemed national and international speakers
- Participate in stimulating deliberations
- Opportunity to present technical papers based on unique projects, experiences, or learning and Value Methodology.
- Showcase your projects and ideas through posters, exhibits and stalls
- Win individual and institutional awards
- Join special thematic groups
- Access resources for continued practical learning

- Network and exchange ideas with experts in industry, academia and value society

Prizes & Awards

Awards for Papers by Individuals and Teams

Papers with excellent quality in terms of content and technical accuracy will be awarded prizes as follows:

- Prizes for papers in the technical category:
- First Prize: INR 10,000 (Rupees Ten Thousand), Trophy and 1000 USD sponsorship for attending SAVE Value Summit, USA
- Second Prize: INR 7500 (Rupees Seven Thousand Five Hundred), Trophy and 500 USD Sponsorship for attending SJVE conference, Japan
- Third Prize: INR 5,000 (Rupees Five Thousand) and Trophy
- Best Paper in the non-manufacturing category: INR 5,000 and Trophy
- The best paper from other categories: INR 5,000 and Trophy
- The best paper from academia: INR 5,000 and Trophy

Awards for Organisation

- **Handa Golden Key Award**

  For the organisation that demonstrates a realisation of the importance of Value Engineering as a systematic activity and has excelled in successfully deploying this technique to improve the total value of its operations

- **The Vasant Rao Trophy**

  The organisation which is adjudged as the next best based on the criteria for the Handa Golden Key.

- **The Mohta Trophy**

  For the leader of the Value Engineering Team, which, has submitted the best Value Engineering project report of a project or initiative implemented during the preceding year prior to the conference date.

- **Muthiah Kasi Trophy**

  This award is primarily intended to promote innovation in Value Methodology (VM) which will create an example, and learning/opportunities for Value Practitioners and may benefit organizations, government or society at large.

- **KSRM Sastry Award**

  Sponsored by Mr. KSRM Sastry, this trophy, certificate and cash prize is aimed at motivating the Value Practitioners for the best utilization of 'Function and Creativity' to derive the best possible solutions.

- **The Soundram Kannappan Medal**

  For the member who has delivered the highest number of lectures/sessions in a public forum on Value Engineering during the last 2 years.

Committees

Conference Chairman:
Mr. A Naveen Kumar, President, INVEST
VP & Chief Data Officer,
Schneider Electric,
India. Pvt. Ltd.

Patrons:
Mr. A. Naveen Kumar, President, INVEST
Mr. Mike Pearsall, President-SAVE International
Mr. P. S. Reddy, Immediate Past President-INVEST
Mr. S. C. Sarkar, Past President, INVEST

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Mr. Amit Kumar, VP INVEST & Chairman, SZC
Mr. Satinderpal Singh Ahluwalia, Secretary General, INVEST
Mr. Rajan Nagre, Chairman-INVEST Certification Board
Mr. Ajay Sharma, VP - Finance
Mr. Chandrashekar R, VP – Global Affairs, INVEST
Mr. Alok Ghosal, VP – Communication, INVEST
Mr. Sunil Kakkar, Chairman, NZC
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Mr. Vijay Munde, Treasurer, Pune Chapter
Mr. Ravindra Padwal, Member-INVEST Pune Chapter

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Mr. S. S. Ahluwalia, Member ICB
Ms. Anita Lukose, Member ICB
Mr. D. S. Gowaikar, Co-opted Member ICB
Mr. A. K. Mukhopadhyaya, Co-opted Member ICB

Messages of Dignitaries and Guest Speakers

Message from
National President & Chairman, Western Zonal Council

A Naveen Kumar
National President, INVEST
VP & Chief Data Officer, Greater India, Schneider Electric

It gives immense pleasure to welcome you to 38th INVEST International Conference with the theme "Value Engineering – Your Competitive Advantage". After a hiatus of three years, it is great to be organising this conference in the physical format.

During this period, the world has changed. Global economy continues to be tested with Russia's invasion of Ukraine, a sharp slowdown in China, threat of resurgence of Covid, etc. Amidst all these global challenges of surging inflation and interest rates, India has remained resilient.

A Morgan Stanley report predicts India to drive nearly 20 per cent of the world's growth in the coming decade, more than doubling its own GDP—from $3.5 trillion today to over $7.5 trillion by 2031. India enters 'Amrit Kaal', the 25 year long lead up to India@100, a period marked by a transformative journey to development and social progress.

INVEST is now a 45-year-old institution. I envision INVEST@50 as a younger, digitally enabled and agile organisation. As a partner in Nation Building, we vow to evangelise Value Engineering as a strategic tool to convert these challenges and opportunities into sustainable competitive advantage for government and industry at large.

Key leveraging digital with AI/ML enabled analytics to determine impact of rising raw-material costs; collaborating with customers or suppliers to optimize specifications; switching to sustainable technologies including renewable energy, waste reduction and greater use of recycled materials; de-carbonize operations of organisations and countries.

Look forward to meeting you all at the conference to meet, greet and exchange value through insightful presentation of papers by competent value practitioners from across the world.

Wishing you all an inclusive, ambitious, action-oriented, and decisive 2023 beginning with the 38th INVEST conference!

Message from SAVE International

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19 Mantua Road
Mount Royal, NJ 08061 USA
info@value-eng.org
www.value-eng.org

December 21, 2022

On behalf of SAVE International (SAVE), we are honored to welcome you to the 38th Annual International Conference of the Indian Value Engineering Society (INVEST)!

The theme of the conference *"Value Engineering for Competitive Edge"* is very appropriate for many companies and organizations around the world. For more than two years, COVID-19 continues to be a global situation that affects everyone. Long-life known activities, structures and learnings have been reversed. Additionally, the war in Ukraine has given another change in people's personal and professional lives.

In industry, the whole supply-chain-thinking has been put to the test. To be competitive, companies must think about new solutions, new supplier structures and, starting very early, about a change in the requirements of customers.

What other methodology could be better to support companies and organizations in this situation than the Value Methodology (VM)? With all its advantages, like functional thinking, cross-functional teamwork and the systematic approach, VM is the perfect way to work with people and optimize products, processes and services.

SAVE International appreciates all the work done by INVEST to help promote, advocate, certify and educate the world about the VM and its many applications. We hope all of you have a wonderful and successful conference!

Sincerely yours,

Michael Pearsall, P.Eng., CVS, FEC
President, SAVE International

Marc Pauwels, Dr.-Ing., CVS, TVM, FSAVE
Director of Global Affairs, SAVE International

Message from Society of Japanese Value Engineering

December 16,2022

Yuji Suzuki, President
Society of Japanese Value Engineering
6F Sanai Bldg., 1-4-15 Komazawa
Setagaya-ku, Tokyo 154-0012
Phone: +81-3-5430-4488/Fax: +81-3-5430-4431

Mr. A. Naveen Kumar,
Conference Chairman
President, Indian Value Engineering Society (INVEST)

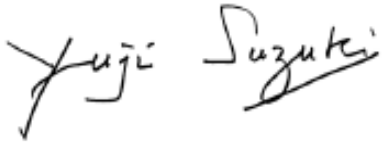
Dear Mr. Kumar,

It is my great honor to extend this message on the occasion of the 38th Annual International Conference of INVEST to be held on January 6th and 7th 2023. On behalf of Society of Japanese Value Engineering (SJVE) Board of Directors and Membership, I express my sincerest congratulations on this great event.

The Conference Theme "Value Engineering Your Competitive Edge" truly reflects the competitive market environment of today. In concurrence with other global challenges of post-Covid, environmental issues and sustainability, I believe Value Engineering can play an important role in overcoming many challenges that we are facing now.

I wish all the best to you, the conference organizing committee, and the attendees and hope the conference will be the most successful event of the coming year for your organization.

Respectfully,



Yuji Suzuki
President, Society of Japanese Value Engineering

(S/U)

Society Of Japanese Value Engineering
公益社団法人 日本バリュー・エンジニアリング協会

Message from President, Society of Japanese Value Engineering

Nurturing the Next Generation to Create Sustainable Value

Yuji Suzuki
President, Society of Japanese Value Engineering (SJVE)
Director-General, National Federation of UNESCO Associations in JAPAN (NFUAJ)

At the Annual General Meeting and the Board of Directors meeting of SJVE on June 17, 2022, I was elected as the 7th President to succeed the former Chairman Tamotsu Saito. I appreciate this opportunity to serve the Society as new president.

Former Chairman Saito has set forth the wonderful theme of "Advancing VE to a new stage in order to create new value for society and solve many social issues" and has been striving to build concepts such as "sustainable value design". In addition, the Tokyo Metropolitan Government is actively working on approaches to the field of education and is working on bold educational reform with a purposeful mindset.

Mr. Saito had a talk session with Mr. Yuichi Kudo, the principal of Kojimachi Junior High School in Chiyoda Ward at that time, and he was convinced that VE-oriented thinking is effective in the field of education as well.

At the National Federation of UNESCO Associations, of which I serve as Director-General, we organized an international event for high school students from Japan, China, and Korea to hold a workshop on SDGs (Sustainable Development Goals) initiatives, with the support of former President Saito, we conducted a trial facilitation session using VE-oriented thinking. It was effective in encouraging discussions and building consensus, and it was found that VE can be applied without discomfort even in such situations.

I myself am not an expert in VE, but through the teachings given by former Chairman Saito and the above-mentioned examples, I have come to understand that VE can be applied not only in the field of manufacturing, but also in any area of expertise.

Against this background, I have been appointed as President this time, and in the future, I will inherit the theme of "Advancing VE to a new stage in order to create new value for society and solve many social issues" advocated by former Chairman Saito, and to continue to evolve VE and nurture the next generation. We intend to work on this with the help of you all.

In September 2015, the United Nations Summit adopted the SDGs, and as development goals for the international community as a whole, 17 comprehensive goals and 169 targets were agreed to be achieved by 2030. Countries around the world are starting to run toward the achievement of the SDGs, and the government, local governments, companies, organizations, etc. are beginning to work diligently on it, albeit with a slight delay in Japan.

However, if we look around the world closely, we can still see various problems such as poverty, discrimination, expansion of war and conflict, and environmental destruction. Of course, emergency support such as food and medical care for living today is important, but it is also necessary to have wisdom and ingenuity to solve these problems from the root, and to continue steady activities to put them into practice.

Above all, education is the foundation for building a peaceful and fair society. Education creates a fortress of peace in people's hearts, becomes a force to break the cycle of poverty, fosters a spirit of respect for culture and nature, and provides hope for tomorrow.

Perhaps due to the effects of SDGs education, young people have recently been saying "NO" against the excessive pursuit of profits and the management stance of prioritizing shareholders. They are beginning to ask for a clear indication of a company's contribution to society and the significance of their existence by asking a question like "What is your company's purpose?" It is said that many companies have no ready answer with this question and getting confused. This is not to say that we should just put up a specious management philosophy. It is meaningless unless each employee can resonate with the company's purpose and implement it in their daily activities.

In the environment surrounding companies, I have heard that the concept of "sustainable investment" which encompasses ESG investment and Impact investment are spreading and the ratio of assets under management is also increasing which is becoming the mainstream nowadays. I am convinced that there is an urgent need to "develop value designers who can create sustainable value," dealing with such a situation.

Message from Chairman, INVEST Certification Board

Rajan Nagre, CVS (Life), FINVEST
Chairman, INVEST Certification Board
Chair Affiliate-SAVE Certification Board

INVEST is hosting first in-person Value Engineering conference in Mumbai, India, post neo-normal due to the COVID 19 Pandemic, which shattered the world on every aspect of life. In such scenario, Value Professionals kept working hard to ensure that the organizations not only survive, but keep growing. Value Engineering, a time-tested technique, has once again proven its value and usefulness to the professionals and organizations during the tough times.

This year, we have received over 80 papers in various categories. This is simply an overwhelming response from individuals and organizations, all waiting to participate and share their success stories in the 38th Annual International Conference hosted by INVEST.

We at INVEST, have executed 2 projects as part of social responsibility. First one is on "Oxygen Supply Management for Hospital". This was done during second wave of Covid 19 Pandemic and majority of recommendations have been implemented by the hospital. The second project is on "Optimizing City Livelihood Centre (CLC) Formation Process". This was undertaken in collaboration with the Directorate of Municipal Administration, Government of Maharashtra. CLC is one of the key interventions of the government for poverty alleviation under the gamut of wider National Urban Livelihood Mission. About 4 million people are estimated to be benefited with this project.

Both the projects have set examples of how Value Methodology can be applied to practically unknown areas even by the freshly trained people, guided by an experienced CVS. And that highlights the importance of Value Engineering Certification programs. These projects have opened up new avenues of healthcare sector, government administration and welfare programmes. Organizations can certainly look beyond products and process and contribute through such projects especially as CSR activities.

INVEST has a pool of Certified Value Specialist (CVS) and Licensed Instructors available not only to conduct training programs, but also to lead and facilitate projects from various sectors.

It goes without saying that this conference with eminent speakers and paper presenters will enrich our knowledge and help expand boundaries for application of Value Methodology shall be a grand success and a memorable event for all participants.

There is a lot to be done for college students, the future pillars of our organizations and society at large. Freshers inducted in any organization having undergone SVP (Student Value Practitioner Program) as part of college curriculum, will help organizations reap benefits at faster pace. Therefore, it is important to educate college students and college faculties in Value Methodology. ICP (INVEST Certification Program) is specially structured to serve this objective. Even the retired professionals and faculty members can become CVS and Licensed Instructors from INVEST, to help achieve this objective.

INVEST Certification Board (ICB) has been quite active in resolving challenges faced by Value Practitioners and making the processes conducive. With this, a growing number of professionals are aspiring for CVS, SAVE and INVEST Certification Programs and dissemination of Value Methodology in India and across the border, as part of PACE (Promote, Advocate, Certify, Educate) activities.

Best Wishes for a “Value Enriching” experience!

Message from Secretary General & VP Administration

Satinderpal Ahluwalia, CVS
Secretary General & VP Administration
Dy GM Manufacturing Excellence – L&T (Retd)

Dear Delegates,

A warm welcome to you all to the 38th Annual International Conference on Value Engineering.

The world has gone through a torrid time where COVID 19 Pandemic took away millions of people and jobs. When the world was indoors in prayers for survival, our VE Team was working on saving people.

Surprised? Let me clarify.

Oxygen supplies were poor, and patients were dying due to shortage of Oxygen. Resources were scarce.

Our Value Engineers worked on “Project Oxygen” by using VE Methodology. More than 45% of the oxygen was getting wasted due to overdose and leakages. Our Value Practitioners succeeded in finding the causes by using Value Methodology and fixing them, thus saving many lives.

Many of us believe our own Myths – example: “VE can be used only in Engineering sector, Products, Processes or Services”. We proved the non-believers wrong. VE was successfully used in medical and social sector.

The Theme for this year is very wisely chosen. “Value Engineering, Your Competitive Edge”

How will Value Engineering play a vital role in Improving the scenario and build your competitive edge?

Why are we employed by an organisation or why are we working in a Business?

For sure, to make money for us and for the stakeholders. Whatever we do, affects the stakeholders. They expect “Value for the Money” that they have Invested with us.

Anything that we do, necessary or unnecessary, has a cost. In our daily activities, we do many things that are unnecessary. Our products are over designed and exceeding the customers expectation. Any cost incurred for Reworking, Wastages, Rejections are built in the cost.

The Question is, Is the Customer ready to pay this Cost?

No Customer would like to pay for the things that they do not need. Therefore, we have to sell at a lower margin. In turn hitting the Bottom Line.

Price = Cost (Necessary & Unnecessary Cost) + Profit

How can we make our products with optimum cost and ensure elimination of all unnecessary cost? How is it that we can get more acceptability for our Products, Processes or Services?

The only way is the VE way. Function is the BUZZ word.

VE Methodology is so designed that it identifies the unwanted or undesired functions and helps in eliminating or reducing such functions. In turn, the cost of Unnecessary Functions gets eliminated and results in reduction in cost.

Help us in achieving this goal by participating and supporting the VE program.

I wish you and your Organisations a great Value Creation Year Ahead.

Message from Guest of Honour

Mahesh M Phadke
VP, Naval Weapon & Engineering Systems
Head, Strategic Systems Complex, Talegaon
Defence IC
L&T Ltd.

My compliments to the Indian Value Engineering Society for organizing the 38th Annual International Conference, held in person. It is very heartening to see the overwhelming response received in terms of the number of entries and papers submitted for presentations during the conference. The work done by INVEST in the area of social responsibility, especially during the pandemic, is exceptionally praise worthy.

L&T has been associated with INVEST for over three decades and has largely benefited from adopting the Value Engineering Methodology, across businesses and locations.

L&T has been a pioneer in the field of Defence and today, L&T Defence is the largest private sector company in the defence domain in India. Thanks to the “Atmanirbhar Bharat” drive of the Government of India, the Defence Industry has evolved and matured to a scale where application of the Value Engineering Methodology can deliver meaningful benefits.

Further, with an eye on international markets and global competition, there will be increasing pressures to be competitive. Adopting the Value Engineering Methodology will be an important factor towards achieving this objective.

Lastly, Value Engineering Methodology, as I see, is in tune with the sustainability initiative for all organizations, with optimum use of resources and material.

My best wishes for the conference and for the new year.

Message from Guest of Honour

Dr Kiran Kulkarni, IAS
Commissioner, Directorate of Municipal Administrator
Mission Director, DAY – National Urban Livelihood Mission, Government of Maharashtra

The 38th Annual International Conference of INVEST has a very interesting background. The entire neo-normal world is struggling to rise above the global issues and at the same time, attempting to brace the emerging ones. The "call for action" is increasingly tilting towards co-operation and synergy between economies and geographies like never before. In this light, the government, at local and national level is compelled to evolve adaptable policies and systems that can stand the test of trying times. And for this, embracing the advancements in technology, adopting innovations and strengthening governance mechanisms is indispensable.

It is in this context that I find Value Methodology very fascinating indeed. I believe that VM is a flexible and effective technique which can be of immense help in the social sector, and government in particular. It can not only help in resolving particular issues, but also in developing holistic and comprehensive framework, precise planning and budgeting, optimising allocation and utilisation of resources, strengthening systems and processes, infusing technology solutions and ensuring sustainability as whole. It can result in massive saving in time and resources, which can be alternatively utilised in priority areas of development. However, the technique is not yet widely accepted and adopted in the government, or for that matter, in the wider social sector. As the result, the opportunity cost of its application is not even known.

In such scenario, INVEST has an important role in promoting the technique in the government, both in the capital intensive as well as service-driven sub-sectors. Given the rich expertise and experience, it can contribute towards transforming the inclusive and sustainable development landscape. The results of collaborative project of the Directorate of Municipal Administration – INVEST undertaken during 2022 for resolving challenges in one of the key interventions of DAY-National Urban Livelihood Mission in Maharashtra, stand out as a testimony for the capabilities of INVEST.

On this background, I hope that the 38th Annual International Conference will serve as a forum to deliberate upon and explore new avenues of application of VM beyond core industry, taking it to the next level for the greater good.

My best wishes for grand success of this unique conference!

Message from Guest of Honour

Paramjit Singh Chadha, CVS
MD, Knorr- Bremse

Dear Delegates,

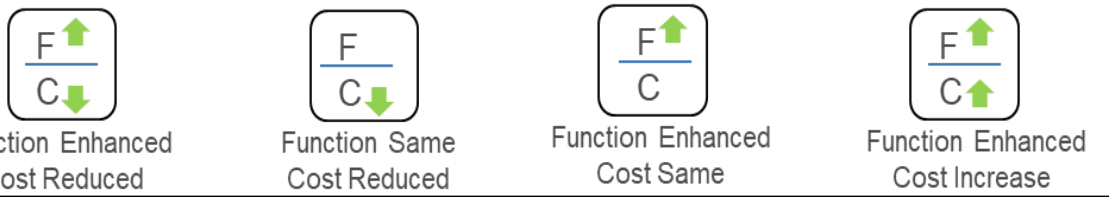
New Year Greetings & a Warm welcome to this Invaluable 38th International Value Engineering Conference.

I have spent almost 4 decades in Automotive industry (still continuing) by facing multiple challenges of achieving the Business Goals for the organisations. The challenges included the economic recessions, Industry degrowth, Pandemics, high taxes & labour issues, many peaks of commodity/Fx increases, supplier issues etc

To balance the growth & profitability, it is important to understand business model. On one side, we have suppliers asking for compensation on various cost elements, and on the other, customers expecting a year- on-year discounts. Business heads have high pressure to maintain the balance by finding the avenues to mitigate the inflation, geo-political, socio-economic challenges and other challenges and generate return on the investment for the promotors.

Yes, we do have some ways to mitigate the cost challenges by using conventual and strategic approaches of doing localisations, make vs buy analysis, Govt incentives, SEZ, Automation, Lean manufacturing, labour cost optimization, etc. The efforts, time and CapEx required in conventional approach is little higher.

So, what is win-win approach? The answer to this is – VAVE methodology for cost saving and or value enhancement. The 4 main VAVE approaches are used in the industry on customer need basis.



One of the favourite approach is the 1st one - Increase function while reducing the cost.

Organisations have understood the importance of VAVE and accordingly Target oriented approach of VAVE methodology is becoming more popular. Global companies have Global VAVE coordinators who are driving the VAVE across the organisations.

Organisations like SAVE and INVEST are a great help in supporting the training with real-life projects leading to good results through the training program.

Wishing you all the best for a Happy, Healthy and Safe New Year !

Apex Council

Name	Designation
A Naveen Kumar	National President
Ajay Sharma	Vice President - Finance & Accounts
Alok Ghosal	Vice President - Communication
Amit Kumar	Vice President - INVEST
P S Reddy	Immediate Past President
Satinderpal Ahluwalia	General Secretary
Rajan Narayan Nagre	Chairman - INVEST Certification Board
Chandrashekar Rangaswamy	Vice President - Global Affairs
A Naveen Kumar	Vice President & Chairman - WZC
Mr Amit Kumar	Vice President & Chairman - SZC
Sunil Kakkar	Vice President & Chairman - NZC
Vishal Badshah	Vice President & Chairman - EZC

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Abstracts

Understanding VALUE in VE and leveraging it for sustained higher Value to Customers and Benefits to the organisation.

Raman Gopalan, CVS (USA)[1]

In the present times, the whole Business community is under pressure on cost. Input costs are going up and customers are demanding high price reduction. Competition plays havoc in between. More people are turning in for VA/VE/VM.

When we say VA, VE, VM, we emphasise Value first. Also it is always mentioned: Value is for Customer. We say, a customer buys Function and not products. And cost is to the Function delivered and not to parts Worth is the lowest Cost at which the Function can be achieved.

We define: VALUE = FUNCTION / COST

However, mostly the focus is on working around the Function to optimize Cost. The Focus is on Technical FAST and mostly on cost saving/ cost out/ cost elimination/ cost reduction/ cost optimisation.

When we start VE practice and gather all low hanging fruits through VA, the above works. For a big organization it could be 5 years and for SMEs this could be 3 years. After that it reaches a plateau. This is the Valley of death and the initiative stagnates or slowly dies down. WHY?

The fallacy is in our understanding.

If only, we define:

VALUE is proportional to FUNCTION, without bringing in cost, it works differently.

Consider the following: A space rocket jettisoning its stages to go faster& further; A car changes its gear to go faster. What we need to do to go further in our VA/VE/VM practice and how Customer FAST helps in achieving this?

This paper discusses with examples, how to progress from Cost saving to Customer value enhancement, in 3 phases.

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The Importance of “REAL” Teamwork for Successful VA/VE Projects – Practical Approach and Life Examples

Marc Pauwels, Dr-ing, TVM, CVS, FSAVE[1]

Cross-functional teamwork has always been an indispensable part of the Value Methodology. Nowadays, it is becoming increasingly important to jointly master tasks that an individual cannot manage - by optimizing the potential of employees and by intelligently bundling individual talents and skills. Various developments are responsible for this situation, which complement and reinforce each other in their effect. This results in an enormous increase in novel problems and tasks, which require the combined skills of experts from a wide variety of departments and disciplines to deal with. Accordingly, teams are increasingly being used in industry that can react more flexible and develop more comprehensive solutions, especially to novel and complex problems.

As a result of discussions with companies, it can be stated that the terms "team" and "teamwork" have a wide variety of definitions, descriptions, and opinions. Presenting the concept of VA/VE to a company, very often it is said “We are practicing teamwork, this is daily business for us”. But looking behind the scenes, this is not true.

This paper gives an overview over the situation in companies, authorities or institutions and explains the effects of “real” teamwork. This will be underlined by three examples from existing projects.

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Dr. Pauwels holds the European Certificates of Professional for Value Management and Trainer for Value Management as well as the CVS certificate. He is a certified trainer for VM1 – VM3 and the VMF1. In 2018, he became a member of the SAVE College of Fellows.

Value Analysis of OMEGA ACB to gain Competitive Edge in Market

Rajan Lavadiya[1], Paresh G Patil [2]

The world economy is in the midst of transformative change. One of the most visible outcomes of this transformation is the rise of number of dynamic emerging market countries to the realm of the global economy.

Today, VA/VE Methodology Initiative is become game changer in every business. We view the emerging challenges through the prism of economic, environment and social opportunities. Building on our technological strength, we device solutions that sustain - be it investing in cost-competent technologies, Value Engineering products and services, foraying into future friendly products, or fostering a safe and healthy work environment.

At L&T E&A, we drive continuous emphasis on Procurement Optimisation, Value Engineering and Lean Manufacturing and Product Design initiatives to reduce material consumption, enhance customer delight and preserve Mother Nature. We constantly align human capital strategies with business strategies to provide every team with the esteemed value which is the unsaid need of every human being.

This paper speaks about how E&A's ACB gained completive edge in the market using VA/VE Methodology amid volatile market condition. This case study truly demonstrates the power of Value analysis to economize critical processes and have Quantum improvements without compromising its Functionality, Quality

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[1]L&T E&A (A unit of Schneider Electric India Pvt Ltd), 4+ years of experience in various manufacturing processes and mastered in CNC machining, Press working and Brazing Process. He is having well exposure to VA/VE methodology and completed more than 15 projects.

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Value Methodology Study on Passenger Vehicle – Body

Sandip Patil, Sharad Patil, Sandeep Kawale, Nagesh Patil
Tata Technologies

Tata Technologies founded, in 1989, enables ambitious manufacturing companies to design and develop better products through engineering services and the application of information technology.

Passenger vehicles play an increasingly important role in modern transportation and mobility worldwide. It is a highly competitive marketplace in India with customers looking for value for money in their purchasing choices.

A key cost contributor in a passenger car is the aggregate of Car Body. The Body aggregate can be considered to cover the Body Shell (BIW), Closures (doors, hood and tailgate) and the Exteriors (bumpers and fenders). The car body can be considered as the functional backbone of the vehicle. There are multiple factors at play – the body's structural strength, materials, manufacturing processes, post processes like coating / painting and the annual vehicle volumes. Each car body which has been designed balances and manages all these factors as per the overall vehicle requirements. Hence, a car body offers an interesting and promising case for application of Value Methodology.

It was a focus and boundary condition in this study to not fundamentally alter the design philosophy and impact the existing vehicle requirements. This paper takes us through the journey that the team undertook to identify the easier to implement nature of ideas with the use of Value Methodology without impacting on quality, performance and reliability of the vehicle. The cost optimization opportunities brought to the table through this study were easily implementable and appreciated by the customer.

Application of Value Engineering Methodology for - Optimization of CLC Formation Process of City Livelihood Centres in Maharashtra, India

Dr. Sonal Shivagunde, PhD, SVA, VMA;
Jyoti Apte, BE (Mech), VMA

India is one for the fastest growing economies of the world, fuelled by the rapid urbanisation. However, this is also characterised by urban poverty, living low quality of life which is detrimental to overall economic growth. The National Urban Livelihood Mission (NULM), launched in 2013, is a flagship programme of the Government of India (GoI) focused on poverty alleviation. In Maharashtra, it is implemented by the Directorate of Municipal Administration (DMA). Under NULM, forming and sustaining Self Help Groups (SHG) of women federating at area, cluster and city level is an important strategy, having a bearing on all the project components. In order to create an enabling environment for the SHGs, "City Livelihood Centres" (CLC) are being set up in all cities in the country under NULM.

In case of Maharashtra, DMA faced several challenges in setting up and sustaining the CLCs, impacting other result areas of NULM in the state. In order to resolve the challenges, DMA and Indian Value Engineering Society (INVEST) initiated a project in January 2022 for applying Value Methodology (VM) for identifying the issues and streamlining the process for faster formation of CLCs. A six-member muti-disciplinary team with 2 members from NULM was first subjected to Value Methodology VMT-3 training. This project team trained and led by ICB Chairman Mr. Rajan Nagre, went beyond project scope and proposed solutions for sustainability. With help of Value Methodology study, DMA could form 219 CLC in the record break 5 weeks' time against 44 CLCs formed in 7 years.

This project has several policy implications with potential for scaling up to the national level. It is the only project of its kind in India so far taken up by the government. The paper elaborates on the dedicated efforts by the project team, methodology adopted, process followed, implementation and its outcome.

Key words: Urban Poverty, Self Help Groups, City Livelihood Centres, Sustainability, Solutions, Policy, Value Methodology

Value Methodology Study on Passenger Vehicle – Chassis

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TATA Technologies Limited, Pune

Tata Technologies founded, in 1989, enables ambitious manufacturing companies to design and develop better products through engineering services and the application of information technology.

Passenger vehicles play an increasingly important role in modern transportation and mobility worldwide. It is a highly competitive marketplace in India with customers looking for value for money in their purchasing choices.

A key cost contributor and functionally critical aggregate in a passenger car is the Chassis system. The Chassis aggregate can be considered to cover the front and rear suspension arrangement, Steering system, wheels and tyres. The Chassis aggregate plays a functionally important role in the handling and behavior of the vehicle. Each chassis system is uniquely designed and influenced by the overall vehicle requirements. The vehicle handling and ride quality are unique and an identity of the vehicle. Various factors like the manufacturing process and technology involved play an important role when considering any optimization opportunities. Hence, the Chassis system of a passenger vehicle offers a promising case for application of Value Methodology.

It was a focus and boundary condition in this study to not fundamentally alter the design philosophy and impact the existing vehicle requirements. This paper takes us through the journey that the team undertook to apply Value Methodology to come up with ideas without impacting on quality, performance and reliability of the vehicle. The cost optimization opportunities brought to the table through this study were easily implementable and appreciated by the customer.

Value Analysis of Battery Box Assembly

Vijay Mundhe, VMA
John Deere Global Value Engineering team

In agriculture machine, the battery box is fabricated structural component mounted on agriculture machines which helps to accommodate battery & associated components. The objective is to optimize weight and cost without compromising functions.

The cost reduction without affecting perceived quality & meet structural load requirement is challenging task and most important factor for any engineering organization. Multifunctional value engineering team make it easy using value methodology techniques.

This case study is a classic example wherein FAST technique helped to identify right functions and later generate alternate cost-effective proposals to achieve the desired results.

Keywords: Battery box assembly, design optimization, VAVE

Value Analysis of Heat Shield

Sagar Chandrakant Powar, BE (Mech)
John Deere Global Value Engineering Team

This project is related to Agricultural machine. With current practice it is observed that, when machine is in working condition, heat gets generate from engine & flows towards driver side. This impacts to driver to perform the operation. during summertime its more uncomfortable to operator/driver to drive the machine due to excess heat.

'Heat shield' is part of agricultural machine and gets install on base structure. When machine is working on field, this part act as a firewall & plays vital role to protect the operator from heat generated from engine. It comprises of fabricated structure + heat resistance & sealing material.

The objective of this project is Improve aesthetic value, part count reduction & reduce cost without affecting perceived quality. Multifunctional value engineering team make it easy using value methodology techniques.

This case study is a classic example wherein FAST technique helped to identify right functions and later generate alternate cost-effective proposals to achieve the desired results.

Keywords: Heat shield structure, design optimization, VAVE

Application of Value analysis on Diesel Engine- EGR system

Uttam Keripale
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In diesel engines, it is highly desirable to reduce the amount of NOx in the exhaust gas. One efficient way for ensuring this is by Exhaust Gas Re-circulation (EGR). The design optimization of system which carries exhaust gases from Exhaust manifold play important role on pressure drop, EGR mixing and vibration failure of carrying parts.

This work provides a simulative comparison of different EGR systems designs and mounting structure for EGR valve and high temperature recirculated exhaust gas passages. The thermal behavior of a new EGR valve, installed on engine, was examined to identify effective thermal and structural loads on it, during its working condition.

The project study discussed in this paper involves Functions and non-dimensional cost associated with it at child parts level for exhaust system of the engine. Current VMF project is more focus on Performance & Cost competitive. Aim of this project is to develop weight & cost-effective system that meets the test standards & regulation. The design is optimized in such a way that the cost reduction & performance are achieved without affecting the function and quality of the performance and without compromising benefits to the customer.

By adopting FAST Technique, we have identified the scope of project on which VE approach is applied. By this approach, we have generated ideas in creativity phase & after the evaluation with cross functional team, we have seen 5% weight increase & 20% cost reduction approx. In this project the best feasible selection of material from the available alternatives has been explored. The tangible benefits like part count reduction etc. It resulted to improve value of assembly without deviating performance, standards & quality aspect.

Key words: Innovation, Design optimization, EGR System

Value Analysis of Fender support structure

Kunal Joshi , BE (Production Engineering), VMA
John Deere India Pvt. Ltd

In agriculture machine structures, the fender support is fabricated structural component mounted on agriculture machines which helps to locate the fender on the machine. Fender assembly in turn swivels with the front axle knuckles to prevent mud getting splashed on operator station windshield.

The objective of this analysis is to optimize cost without affecting the functional and quality requirement. Value methodology techniques are utilized to arrive at solution to achieve the target. Multifunctional team was involved to discuss functions, prioritize functions, generate ideas, and arrive at solution which is feasible and acceptable.

This case study is a classic example wherein FAST technique helped to identify right functions and later generate alternate cost-effective proposals to achieve the desired results.

Keywords: Fender support structure, cost reduction, VAVE

Value Analysis of Hydraulic Tank Support Bracket.

Rohit Bhinge, BE (Mech)
John Deere India Pvt. Ltd

In some variant of lawn mower hydraulic oil is used for transmission and lift system. The tank is located in between the transmission and mounted on vertical member of the frame. Earlier tank had flanges in the tank itself for mounting on the frame. But in newly designed tank those flanges are removed so mounting is the challenge. The objective is to develop new ideas for mounting of tank without disturbing the tank position and it should make any scratch like marks on the tank. This case study is a good example wherein FAST technique helped to identify right functions and later generate alternate cost-effective proposals to achieve the desired results.

Value Analysis of Front Axle Support

Sowmya Kovvuri, BE (Mech)
John Deere India Pvt. Ltd

In agriculture machine structures, the Front axle support is fabricated structural component mounted on agriculture machines which helps to accommodate all the support weight at front part of tractor and for mounting engine auxiliaries. The objective is to optimize weight and cost without compromising functions.

The cost reduction without affecting perceived quality & meet structural load requirement is challenging task and most important factor for any engineering organization. Multifunctional value engineering team make it easy using value methodology techniques.

This case study is a classic example wherein FAST technique helped to identify right functions and later generate alternate cost-effective proposals to achieve the desired results.

Keywords: Front Axle Support, design optimization, VAVE

Application of Value Methodology in Terminal Block of HVAC Air Conditioner

Jannet Fernandes and Akhilesh Kumarasamy
Trane Technologies

With the surging inflation every year, the organization is afflicted to provide the same cost and function of the products released in the market. In most of the scenarios, the organization are pushed to pass the inflation to their consumers, due to which the product consumption rate goes down. In such strenuous situation is where Value Engineering comes in handy to reduce the making cost of a product keeping the function unchanged; thereby reducing the inflation impact on the consumers which in turn would have minimum impact on the product consumption rate.

In this paper, we discuss on application of Value Methodology in terminal block assembly that helped us to identify that the over designed component. With additional component whose importance was very minimal to meet the function. The new Terminal Block design helped us in fetching a cost savings of $32 per assembly that is about 20% from current assembly.

Keywords: HVAC; Air conditioner; Terminal block; Control box; Electrical connector

De coupled Oil Sump Mounting Cost Reduction through VM

Mr. Ashish Sharma, Mr. Jagdish Jadhav[2], Mr. Prashant Das[3]

The oil sump contains the engine oil required for lubrication. The oil is extracted from it by an oil pump and conveyed into the engine block's oil ducts via the oil filter. The oil then flows back into the oil sump from the lubrication points. The oil sump is generally bolted below the crank mechanism on the crankcase.

Due to its thin wall structure in combination with high structure-borne excitation by engine block, the oil sump is a major contributor to the overall powertrain sound emission, particularly during idling and full load acceleration. The amount of oil sump noise depends on many factors like – 1. Bottom end design (e.g. structural oil sump for stiffening), 2. Oil pan design (e.g., higher wall thickness), 3. Material of the oil sump (cast iron, aluminium, plastic, sheet metal, MPM) 4. Connection of sump to the engine (e.g. decoupled oil pan).

In TML engine, decoupled oil sump was designed to reduce the amount of oil sump noise. This improved the NVH, however cost of oil sump mounting was escalated many fold. Existing design of oil sump mounting costs 10x times higher than usual bolted fitment. Using value methodology approach multiple ideas were generated. Cost of the Oil sump mounting was reduced by 50% without affecting the NVH performance.

Turbocharger Oil Reservoir - Cost Reduction through Value Methodology

Mr. Ashish Sharma[1], Mr. Jagdish Jadhav[2], Mr. Prashant Das[3]

Lubrication is essential for turbochargers. Turbo rotates at extremely high speeds at high operating temperatures and pressure. Parts that constantly rub against each other can eventually lead to turbocharger failure. Lubricating oil does a vital job, cooling the shaft and the bearings and providing the right amount of lubrication.

In VGT type turbochargers, turbo shaft reaches high RPM quickly after engine start-up. The lubrication oil is provided to turbocharger from the main oil gallery through long-running lube pipes which will lead to delay in oil reaching to turbocharger after start-up. A short delay in oil reaching turbocharger can lead to pre mature bearing failure.

To address this concern, Oil reservoir was added in the lubrication circuit. This reservoir also serves as a T Joint (One input and 2 output). Existing oil reservoir is made up of stainless steel investment casting. The cost of the component is too high to justify the function it serves. Using Value methodology various alternatives were generated which will reduce the cost of the part by 70% without compromising the function served.

Keywords: - Turbocharger, VGT, Oil reservoir, Lubrication.

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Value Analysis case study on MU Contactors

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STR Production Engineering
Schneider Electric India Pvt Ltd, Ahmednagar

We, at Electrical Standard Products, manufacture comprehensive range of switchgear products which mainly caters the agricultural market. The offerings include starters and controllers for single phase and three phase submersible pumps. These products have built a delicate bond with farmers by serving them with consistent quality performance for last six decades. Agriculture sector being a silent customer market there are enormous constraints on the changes influencing appearance along with performance and gives a limited room for value engineering when it comes to the Agri products. Therefore, the straightforward methods of value engineering like elimination of components, change in product or aesthetics are interdicted. These challenges continuously motivate us to put our efforts in improving manufacturing processes of our products for meeting market requirements.

Based on feedback received from marketing during Product Portfolio Management workshop MU Contactor has been selected for value analysis due to high sales and lower profit margin product. Our team has conducted detailed assessment of manufacturing processes to identify scope to realize potential quick win cost improvements.

This paper demonstrates a case study of VA approach applied to reduce manufacturing cost of MU Contactor without compromising its functionality and quality. We have delivered substantial delights to our management and customers in terms of material cost, manufacturing cost and lead time.

Keywords: Value Engineering, Function Analysis, Cost Reduction

Value Analysis of Heat Shield

Sagar Chandrakant Powar, BE(Mech)
John Deere India Pvt. Ltd

This project is related to Agricultural machine. With current practice it is observed that, when machine is in working condition, heat gets generate from engine & flows towards driver side. This impacts to driver to perform the operation. during summertime its more uncomfortable to operator/driver to drive the machine due to excess heat.

'Heat shield' is part of agricultural machine and gets install on base structure. When machine is working on field, this part act as a firewall & plays vital role to protect the operator from heat generated from engine. It comprises of fabricated structure + heat resistance & sealing material.

The objective of this project is Improve aesthetic value, part count reduction & reduce cost without affecting perceived quality. Multifunctional value engineering team make it easy using value methodology techniques.

This case study is a classic example wherein FAST technique helped to identify right functions and later generate alternate cost-effective proposals to achieve the desired results.

Keywords: Heat shield structure, design optimization, VAVE

VE Study on Packaging of Conveyor Cord

Rajesh Kumar, Mukul Biswas & Nikhil Prakash
Usha Martin Limited, Ranchi

Customer satisfaction is a goal that we strive to earn. Our VE study started with a customer complaint related to packaging of conveyor cord, one of the product of Usha Martin Ltd. In the complaint, customer asked for the solution of defected flange of wooden reel they received. It was creating problem/production loss in the further process of Conveyor cord belt manufacturing at our customer end. For us, it was a challenge to strengthen the wooden reel keeping the cost of packaging low so that it would not break during transportation.

This paper is about the reduction of the overall cost of packaging and improving the performance by customizing the wooden reel design by applying VE techniques. Wooden pallet also redesigned according to wooden reel. After implementation of VE recommendation, all the customer complaints were resolved and in the process customer was also satisfied. At the same time our packaging cost was reduced by 15%.

Keywords: Packaging, Customer complaint, Customer satisfaction, Cost saving, Wooden reel, Wooden pallet, Value Engineering (VE)

Development of Environmental Engineering Scheme for BOD upgradation of Coke Plant I-TSM

Dr. Priyanka Saha, Kaushik Mukhopadhyay, Dharmendra Kumar, Virendra Singh
Tata Steel, India, Jamshedpur

In every iron & steel industry water use for many processes and after treatment water contaminated with many chemicals. Before discharge to the environment proper treatment of the wastewater is essential. Therefore, in every steel industry proper chemical treatment followed by suitable engineering scheme is essential for implementing the process.

The BOD Plant-I of Coke Plant, Tata Steel Meramandali (TSM) designed treatment capacity is 45 m^3/h. However, currently about 25 m^3/h raw effluent is being treated in BOD plant and the remaining 20 m^3/h untreated raw effluent is bypassed and used for coke quenching purpose. Currently, if the total raw effluent of 45 m^3/h is taken for treatment, then the discharge quality mainly cyanide could not be maintained. After Coke dry quenching (CDQ) commissioning, BOD plant required to treat the designed effluent load (45 m^3/h) as no effluent can be used for coke quenching.

The purpose of the study is developing innovative technology which give value to the environmental engineering process and able to upgrade the BOD Plant I to the design flow (65 m^3/h) with desired discharge effluent quality. Initially lab scale experiment has been carried out for feasibility check of the proposed process and from the study it has been established that ferrous sulphate process suitable for pre-treatment of the biological process in order to improve the value engineering performance of the BOD Plant I to the expected level with designed effluent load. This pretreatment process is very helpful to reduce the toxic cyanide load ~70% before biological process. Full scale plant trial has been carried out with temporary engineering infrastructure for treating the full effluent load as per design which showed that discharge water quality meets the permissible limit. After successful trial complete engineering scheme of civil, structural, instrumentation, electrical, mechanical has been prepared for the proposed treatment process. BOD I of Coke Plant TSM team have benefited from proposed environmental engineering scheme and currently this project is in engineering stage for full implementation.

Value Analysis of Brass Brake Pipe Union/ Connector

Durgesh Utpat
Tech Mahindra, Hinjewadi, Pune

A new design for largest truck maker industry across US in which the material changes by help of technological advancement also new design of components are more reliable In order to effectively do this, various approaches in specific areas of focus are discussed in this Value Engineering is an effective tool. Various approaches in specific areas of focus are discussed in this - Functional analysis is a major part of design process to conceptualize the architecture and refine the new design with same functional requirement in-line with current one.

This undertaken project presents the fundamental of Value Engineering that can be implemented in “BRASS BRAKE PIPE UNION/ CONNECTOR” VE study. Presently a union/connector is being used to connect 2 brake pipes at marriage point (example at cab to chassis connection point). This union is made up of brass, a high-cost material. Value study enabled design of steel female coupling which ultimately eliminated the need to brass union/connector. The value study solution helped to reduce assembly time by 8 to10% at single location and 25% of time for multiple locations, compared to present design. This is over and above cost benefit. The success story is narrated in this paper.

Wastewater Treatment for BOD upgradation at Coke Plant I-TSM

Dr. Priyanka Saha, Kaushik Mukhopadhyay, Dharmendra Kumar, Virendra Singh
Tata Steel, India, Jamshedpur

In every iron and steel industry water use for many processes and after treatment water contaminated with many chemicals. Before discharge to the environment proper treatment of the wastewater is essential. The BOD Plant-I of Coke Plant, Tata Steel Meramandali (TSM) designed treatment capacity is 65 m^3/h. As per design, 45 m^3/h raw effluent mixed with 20 m^3/h dilution water in adjustment tank and treated in biological unit. However, currently about 25 m^3/h raw effluent is being treated in BOD plant with 25 m^3/h dilution water and the remaining 20 m^3/h untreated raw effluent is bypassed and used for coke quenching purpose. Currently, if the total raw effluent of 45 m^3/h is taken for treatment, then the discharge quality could not be maintained. After Coke dry quenching (CDQ) commissioning, BOD plant required to treat the designed effluent load (45 m^3/h) as no effluent can be used for coke quenching. The purpose of the study is upgradation of BOD Plant I to the design flow (65 m^3/h) with desired discharge effluent quality. Ferrous sulphate process has been selected as pre-treatment of the biological process in order to improve the treatment performance of the BOD Plant I to the expected level with designed effluent load. This pretreatment process is very helpful to reduce the toxic cyanide load ~70% before biological process. Full scale plant trial has been carried out for treating the full effluent load which showed that discharge water quality meets the permissible limit with designed effluent load. BOD I of Coke Plant TSM team have benefited from this trial and currently this project is in engineering stage for full implementation.

Value Analysis case study of MCCB Spreader Links

Anand Tiwari[1], Nidhi Bhatewara[2], Savan Patel[3],

In Switchgear business, the market attractiveness has been shifted towards availability of more features and better quality of products at a competitive price. This would eventually help in increasing our market share in this segment. In order to sustain & increase the market-share in Switchgear business, we need to focus on meeting customer expectations (eg. Better quality, competitive price of product). The following case study, from L&T Electrical & Automation, a unit of Schneider Electric India Private Limited shows how VA approach has not only increased economic growth of company by significant reduction in manufacturing cost but also goes a step ahead in meeting customer expectations. For Value Analysis, MCCB Spreader Links had been selected. Company has succeeded to meet various management and customer expectations such as, reduction in manufacturing cost, reduced use of precious metal, competitive price of product. The manufacturing cost has been reduced significantly due to reduction in Copper consumption.

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Value Analysis of CNG systems in Passenger Vehicles

Sandip Gholkar[1] ,Nishant Virmani [2]

In India, fuel economy is a crucial parameter & an important point considered in the buying decision by the customers for a vehicle. With the increasing prices of the fuel use of alternate fuels like CNG & blended fuels in on a high, which leads to design of new systems & an opportunity to revisit the scope for optimisation keeping the current & upcoming government regulation in mind.

With fierce competition and ever-increasing pressure on car prices, optimisation of design is important to remain competitive. The VAVE team is formed with the mission to identify value analysis opportunities without affecting quality, performance and durability.

In this paper, we have described the concept of VAVE, its job plan and the effective implementation through a case study. The case study discussed in this paper involves Value analysis of CNG System used in the passenger Vehicles. Aim of this project is to develop cost effective CNG system that meets the requirements and delivers the value to the customer. The design is optimized in such a way that the part count, process, cost & weight are reduced without affecting the function and quality of the cars and also without compromising benefits to the customer. The best feasible solution from the available alternatives are chosen from the feasibility ranking table.

Keywords: Compressed Natural Gas (CNG), Pressure Gauge, Value Analysis, Value Engineering, Passenger Vehicles.

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Value Analysis of Fuel Management System in Passenger Vehicle

Sandip Gholkar[1], Nishant Virmani[2] , Ganpati Kamble[3] , Anil D[4], Ravindra Padwal[5]

Fuel Management is a critical system in the automobiles as it's a safety critical item, filling the fuel, storage in a controlled tank, delivering it to the engine at the required pressure & flow are the crucial functions to be catered in order to design the fuel system. It's also driven by regulatory requirements pertaining to the vehicle safety & hydrocarbon emissions.

With fierce competition and ever increasing pressure on car prices, optimisation of design is important to remain competitive. The VAVE team is formed with the mission to identify value analysis opportunities without affecting quality, performance and durability.

In this paper, we have described the concept of VAVE, its job plan and the effective implementation through a case study. The case study discussed in this paper involves Value analysis of Fuel Storage & Fuel Delivery System used in the Sports Utility Vehicles. Aim of this project is to develop cost effective system that meets the requirements and delivers the value to the customer. The design is optimized in such a way that the part count, process, cost & weight are reduced without affecting the function and quality of the cars and also without compromising benefits to the customer. The best feasible solution from the available alternatives are chosen from the feasibility ranking table.

Keywords: Fuel Delivery Module (FDM), Fuel Tank, Single Bowl, Active, Passive, Saddle type tank, Value Analysis, Value Engineering, Passenger Vehicles.

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Value Analysis of RCCB

Aditya Jadhav, Ketan Deshpande
Electrical & Automation, LCM Engineering

Residual current operated circuit breaker is a human safety device which can be installed for domestic/residential use, medical equipment, industrial distributions & outdoor electrical equipment. For cost optimisation on identified product it become important to use value analysis methodology. We have applied all the required tools and completed the cost optimisation. We have changed surface treatment of identified components and eliminated overdesign component also process optimisation is there for cost saving. As a result of which we have got saving & product improvement also.

Value Engineering Project on Manufacturing of Cored Wire

JAMIPOL set-up Cored Wire Plant during Fy'19 and started production of Cored Wire with an objective of Customer Value Creation through higher recovery and reduced delivered cost of product.

The company decided to explore Value Engineering (VE) methodology for reducing overall delivered cost of Cored Wire. Value methodology was applied for increasing the Cored Wire Mill throughput and also reducing the costs of production, packaging and delivery.

Cross functional team was constituted to deliberate on methods to reduce the overall cost of delivery of material to Customers. VE Workshop was conducted, and the team developed FAST diagram, Function Analysis to generate ideas / levers to reduce cost. Team identified bottlenecks in production and implemented ideas to improve the productivity without affecting product quality. Value based buying of raw material, optimization of operational parameters, improved packaging and cost-effective transportation helped in reducing the overall delivered cost of Cored Wire.

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Value Engineering Study of Hydraulic Valves

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Value methodology has great impact in today's competitive world where product performances at ideal value is major challenge to beat competition. Value Methodology is the best technique to obtain maximum output from calculated, focused efforts which further helps organizations to sustain & grow in respective market.

This technical paper gives more insights about effective implementation of Value methodology in Hydraulic Valve products to improve product performances, to simplify complex manufacturing processes & optimize the product cost to improve profitability.

Value methodology tools & data analysis techniques helped to restructure the product information in right direction. Functional Cost worth analysis study helped to identify basic and supporting functions of the product and then high value gap functions are taken ahead for the idea generations, which resulted in improved performance of Hydraulic Valve product at optimized cost without impacting the product size, shape & customer application requirements. Principally, Value Methodology helped Danfoss Organization to sustain in existing businesses and cater respective market segment in big way.

Application of Value Methodology in Roof Top HVAC Air Conditioner Control Box

Suresh Kumar P and Sheethal Rao
Trane Technologies

Often while developing a new product, due to stringent timelines, Engineering might end up overdesigning their system by padding their safety measures. This will add up to the complexity of the system while impacting the manufacturing time and possibly will also increase the number of components to be managed by the materials team and take up valuable space in the warehouse. Identifying such designs and ensuring optimized and simplified product being delivered to the customer helps the organization to reduce the complexity of the design and adds to the bottom level margin expansion.

In this paper we talk about how we applied Value Methodology in “Electrical subsystem for Rooftop and Outdoor Platforms” to identify potential value addition opportunities and how that resulted in identifying components which were utilized for providing certain functionality which was inbuilt in another component of the existing system. This work resulted in simplifying the system design and fetching a cost savings of 10 parts from the assembly line and helped reduce cycle time in Electrical Subsystem assembly line by 60-90 seconds.

Keywords: HVAC; Air conditioner; Fuse Block; Fuse; Control box; Value Methodology

Application of Value Methodology to Optimize Marine Genset Logistics Operations.

Shiva Pashi, Mohamed Ali & Mujibur Rahman
Trane Technologies

Marine generator sets are manufactured by Thermo King in the USA and some of these units are shipped in non-reusable crates to various dealers in North America. While global shipping costs rose during the pandemic and are expected to rise in the coming years, the price of wooden crates has also increased by about 20% year-on-year.

Designing a packaging system to transport a product at an optimal cost over the life cycle is a challenge for all businesses worldwide. This article will explain how the VAVE Methodology can be used to redesign the current shipping crate in a competitive and sustainable way without sacrificing customer functional expectations.

This approach reduces the cost of wooden crates by 93%, increased the freight load per container by 16%, eliminates or reduces the need to dispose of used crates and considerably reduces greenhouse gas emissions.

Keywords: Marine Generator set; Wooden Crates; Value Methodology

Value Enrichment of Def Tank Mountings

Digambar Nagpurkar
Tech Mahindra

A leading truck manufacturer of North America, effectively deploying its strategy aimed to increase customer benefits by increasing modularity to achieve speed to market and lower product cost. At the same time there are challenges like increasing material cost & rising overheads. Use of Value Methodology has demonstrated effective way to deal with those challenges and improved scope for innovations.

“VALUE ENRICHMENT OF DEF TANK MOUNTINGS” project was selected for Value Study. DEF tank (Diesel Exhaust Fluid), conventionally known as Urea Tank. DEF tank plays a vital role in controlling the carbon emissions. The present arrangements of DEF tank mountings are in a conventional way having over weight construction and high cost which leads to opportunity for VAVE-Cost reduction. With the help of technological advancement of a steel springs strap and suitable design optimization in mounting brackets, we are able to reduce the weight by 50% and cost by 20%, conforming all the required functional and durability conditions. It is said that “what gets measured, gets done, and when measured in correct manner; things tend to improve. We experienced this while using Value Methodology job plan to identify and improve value which resulted in product cost reduction, assembly time reduction, increase in profit, improvement in quality and performance which ultimately enhanced customer satisfaction. It’s a nice example of how systematic Value study can result in multiple benefits to the customer.

Value Enrichment of Hood Hinges

Mohan Wadile, Tech Mahindra

A leading truck manufacturer of North America, effectively deploying its strategy aimed to increase customer benefits by increasing modularity to achieve speed to market and lower product cost. At the same time there are challenges like increasing material cost & rising overheads. Use of Value Methodology has demonstrated effective way to deal with those challenges and improved scope for innovations.

"Value Enrichment of Hood Hinges" project was selected for Value Study. Hood hinge (conventionally known as bonnet) which maintains the healthy function of the hood and keeps the hood aligned so that it can close properly and protect the engine compartment. It is said that "what gets measured, gets done, and when measured in correct manner; things tend to improve. We experienced this while using Value Methodology job plan to identify and improve value which resulted in product cost reduction, assembly time reduction, increase in profit, improvement in quality and performance which ultimately enhanced customer satisfaction. It's a nice example of how systematic Value study can result in multiple benefits to the customer.

VA/VE Study on Hydropower Equipment – Global Teamwork during the Pandemic

Sebastian Meindl[1], Pierre Duflon[2]

This paper reports in form of a case study about a very comprehensive value study regarding Hydro Power equipment for plants in the range of 20MW. The approach of the company providing this equipment is to sell “Water to Wire”, what means, that a huge scope of equipment from hydraulic, mechanical, electrical, and electronical components have to be considered in the value study. Furthermore, the value creating chain of this supplier is spread over different locations globally and is influencing the manufacturing cost as well. All these topics are challenging in themselves and lead to a new dimension when combined. The Value Methodology with its key features “cross functional teamwork”, “function thinking” and “wholistic approach” is an appropriate approach to achieve some demanding project goals: significant reduction in manufacturing cost, definition of common design guidelines and enhanced communication and cooperation within the company and its global premises.

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[1]Sebastian Meindl is co-president of Krehl & Partner in Germany, the leading Value Management Consultant Company in Germany. Since his start with VA/VE/VM, Sebastian Meindl performed hundreds of VM-related studies in Germany, whole Europe, USA, Mexico, India, and the far east. In parallel to his work and since more than 20 years, Sebastian Meindl is engaged in the VDI [Association of German Engineers] as the Vice President for the VA/VE Section. Sebastian Meindl holds the European Certificates of Professional for Value Management and Trainer for Value Management and the German Certificate Wertanalytiker VDI as well as the international certificate CVS®. He was co-author of the SAVE International VM Guide, part of SAVE International Tiger Teams and is currently part of the SAVE International Education Committee.

[2]Pierre Duflon is vice-president Global Sales & Business Development for the Compact Hydro division of Andritz Hydro, one of the leading equipment manufacturers for hydropower generation with Headquarter in Austria and presence in more than sixty countries. After graduating from the Swiss Institute of Technology in Lausanne as a Hydraulic and Fluid Mechanics Engineer in 1992, Pierre Duflon immediately started his career with Andritz Hydro in Switzerland and moved over the years to Austria, France and Canada, also evolving through the small hydro business from engineering to project management, regional management and global responsibilities. In his today’s function, the product development and optimization play a significant role, in conjugation with the market feed-back and expectations.

Application of Value analysis on Diesel Engine- EGR system

Uttam Keripale, John Deere India PVT Ltd

In diesel engines, it is highly desirable to reduce the amount of NOx in the exhaust gas. One efficient way for ensuring this is by Exhaust Gas Re-circulation (EGR). The design optimization of system which carries exhaust gases from Exhaust manifold play important role on pressure drop, EGR mixing and vibration failure of carrying parts.

This work provides a simulative comparison of different EGR systems designs and mounting structure for EGR valve and high temperature recirculated exhaust gas passages. In this work, the thermal behavior of a new EGR valve, installed on engine, was examined to identify effective thermal and structural loads on it, during its working condition.

The project study discussed in this paper involves Functions and non-dimensional cost associated with it at child parts level for exhaust system of the engine. Current VMF project is more focus on Performance & Cost competitive. Aim of this project is to develop weight & cost-effective system that meets the test standards & regulation. The design is optimized in such a way that the cost reduction & performance are achieved without affecting the function and quality of the performance and without compromising benefits to the customer.

By adopting FAST Technique, we have identified the scope of project on which VE approach is applied. By this approach, we have generated ideas in creativity phase & after the evaluation with cross functional team, we have seen 5% weight increase & 20% cost reduction approx. In this project the best feasible selection of material from the available alternatives has been explored. The tangible benefits like part count reduction etc. It resulted to improve value of assembly without deviating performance, standards & quality aspect.

Key words: Innovation, Design optimization, EGR System

Sustainable Value Analysis on Electric Expansion Valve

Suryakumar K, VMA
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Danfoss technologies that empower the world of tomorrow to build a better future. Energy efficient technologies empower smart communities and industries to create healthier and more comfortable climates in our buildings and homes and to supply more food with less waste. Danfoss is a privately help group with more than 40,000 dedicated employees worldwide, 95 factory sites in more than 20 countries and Worldwide sales in more than 100 countries

Danfoss Climate Solutions (DCS) is on a mission to lead the way to a greener future, providing integrated, energy-efficient heating and cooling solutions to enable sustainable development in buildings, cold chains, industrial applications, and infrastructure. Backed by advanced components, systems, and software, DCS is engineering tomorrow's HVACR technology with a focus on Environment & Sustainability

Electric Expansion Valves (ETS) is a series of electric expansion valves for precise liquid injection in evaporators for air conditioning and refrigeration applications. These valves are designed bi-polar to provide precise flow regulation. They have a piston with linear positioning design in Products, through applying Value engineering Methodology to gain competitive advantage in the market

Keywords: Circularity, Cost Analysis, Decarbonization, Energy Efficiency, Low Carbon Product, Sustainability, Value Engineering, Variable Cost

Sustainable Value Analysis on Electric Expansion Valve

Suryakumar K, Vasanth K,
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Danfoss technologies that empower the world of tomorrow to build a better future. Energy efficient technologies empower smart communities and industries to create healthier and more comfortable climates in our buildings and homes and to supply more food with less waste. Danfoss is a privately help group with more than 40,000 dedicated employees worldwide, 95 factory sites in more than 20 countries and Worldwide sales in more than 100 countries

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Keywords: Circularity, Cost Analysis, Decarbonization, Energy Efficiency, Low Carbon Product, Sustainability, Value Engineering, Variable Cost

Value Analysis of Sectional Mobile Valve

Bharanidharan N.[1] Saravanan R [2]

Danfoss technologies that empower the world of tomorrow to build a better future. Energy efficient technologies empower smart communities and industries to create healthier and more comfortable climates in our buildings and homes and to supply more food with less waste. Danfoss is a privately help group with more than 40,000 dedicated employees worldwide, 95 factory sites in more than 20 countries and Worldwide sales in more than 100 countries

Danfoss Power Solution is world class provider of mobile hydraulic & electrification products. From propulsion and steering, to work function and power management, we are committed to improve machine performance. Sectional Mobile Valve (SMA) is a CAN [Controller Area Network] - enabled electrohydraulic mobile valve that enables manufacturers to deliver a whole new level of machine performance and operator productivity

It features onboard electronics and advanced software algorithms, the valve provides more flexible configuration, more immediate communication, and more precise control to end customer applications. SMA feature independent metering, which uses two spools to control the supply and return flow for a single bi-directional actuator. The valve can control both In-flow, Out-flow and pressure simultaneously on a service. Objective of this project is to improve the product value and contribution margin by applying value engineering methodology, tear-down analysis, cost analysis to gain competitive advantage in the market.

This paper presents about value analysis performed on valve to improve its performance and to optimize contribution margin on each part.

Keywords: Contribution Margin, Cost Analysis, Cost Savings, Idea Generation, Teardown analysis, Value Analysi

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Value Study & Benchmarking of Electronic Ignition Unit

Nithosh Narayanan[1] , Ramprasad K.[2]

Danfoss Climate Solutions (DCS) is on a mission to lead the way to a greener future, providing integrated, energy-efficient heating and cooling solutions to enable sustainable development in buildings, cold chains, industrial applications, and infrastructure.

Backed by advanced components, systems, and software, DCS is engineering tomorrow's Burner Component technology with a focus on Environment & Sustainability

Electronic Ignition Unit (EBI), An electronic ignition system is a type of ignition system that works electronic circuits, usually by transistors. The transistors that support generating high voltage sparks which can burn the oil and that can be converted into flame used for different purposes. Our new approach has been implemented in this forefront product. Objective of this project is to design the electronic architecture which is less complexity in terms of component count yet produce same output in Products, through applying value engineering methodology to gain competitive advantage in the market

This paper presents about Value Analysis with a benchmarking approach to rise the productivity and Understand the Complexity of the circuit for cost improvement in Danfoss products.

Keywords: Benchmarking, Complexity Reductio, Contribution Margin, Cost Analysis, Market Competitiveness, Design-Idea Generation, Teardown analysis, Value Engineering

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Value Study on Automatic Bypass Control Valve

Bala Chakkaravarthy [1] Jareesh Jose[2]

Danfoss Climate Solutions is on a mission to lead the way to a greener future, providing integrated, energy-efficient heating and cooling solutions to enable sustainable development in buildings, cold chains, industrial applications, and infrastructure. The Objective of this project is to improve the product value and contribution margin by applying value engineering methodology, competitors benchmarking, tear-down analysis, cost analysis to gain competitive advantage in the market.

Automatic Bypass Control Valve is a self-acting constant flow control valve, primarily used either to maintain minimum flow rates through the gas boiler or to control the differential pressure in a domestic central heating system. It automatically opens and closes depending on system load. When the radiator thermostats are open and calling for heat, the valve remains closed, allowing the full boiler/pump output to circulate; as radiator thermostats start to close so the valve opens to allow a flow through the by-pass. The Automatic by-pass control valve must be adjusted at the time of installation to suit the central heating system. It will protect most domestic boilers against low flow rates and valve can be installed at any altitude.

Keywords: Competitive Benchmarking, Contribution Margin, Cost Analysis, Cost Savings, Idea Generation, Teardown analysis, Value Engineering

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Value Study on Motorized Control Valve

Suhail Akthar
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Danfoss Drives provide a complete solution in industrial drive, HVAC drives to improve the up-time for variable speed control electric motor. Objective of this project is to improve the product value and contribution margin by applying value engineering methodology, tear-down analysis, cost analysis to gain competitive advantage in the market

Motorized Control Valves [MCV] are valves used to control temperature by fully or partially opening or closing in response to signals received from controllers that compare a "setpoint" to a "process variable" whose value is provided by sensors that monitor changes in such conditions. The opening or closing of control valves is usually done automatically by electrical actuators, which are in District Heating mainly used to control the opening or closing of the valve based on electric signals.

This paper presents value analysis study performed on MCV to improve its cost, performance and achieve improved market share

Keywords: Contribution Margin, Cost Analysis, Cost Savings, Idea Generation, Teardown analysis, Value Engineering

Design Optimization and Profitability Improvement on Gear Pump using Value Methodology

Rahul S Gujar[1]

Danfoss power solutions is leading manufacturer of industrial and mobile hydraulics products with leading application know-how, and sustainable innovation. We set out to become our customers' preferred decarbonization partner, with a focus on long-term value creation for our customers.

Gear pump used in agriculture are commodity products with a lot of local competition. Customers are always putting pressure on prices, and with commodity prices rising, keeping pump costs low enough to compete in the market is always a challenge. Several cost-reduction initiatives have already been implemented in manufacturing over the last three to four years. However, there was still need for cost improvements.

This paper describes application of structured value methodology for design optimization of gear pump used in agricultural products. The step-by-step approach, Function cost worth analysis helped to identify functions for value improvement. Ideas were generated for selected high value gap functions. Proposals were developed based on ideas selected during evaluation phase. Value engineering study resulted in cost optimization leading to more competitive product and helped improve profitability.

Project is in implementation phase. Value methodology has not only helped us to optimize design but also helped to reduce inventory, package dimensions, losses. This also helped in simplifying assembly process & reduce carbon foot prints.

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[1] BE(Mech),VMA, over 19 years of professional experience in product design, NPD, Value engineering, Value analysis, and cost reduction. Working at Danfoss India Innovation Center, Pune

Application of Value Engineering principles on Equalizer of Auto Operator

Siva Muthuvel[1]

The Auto operator is an Electromechanical automatic door controller. Equalizer assembly in Auto operator is a prime unit which converts rotary motion from Motor into Linear motion to the closer upon actuation. Ever since the launch, Equalizer design comprehends high number of components to achieve a function majorly due to manufacturing process challenges. More the components more the efforts are required from factory. The rising market prices in RM, material shortage issues & increase in challenges from supply chain demanded an opportunity to scope for alternative economical design.

We adopted Value methodology tools and techniques to identify the high value functions for current design and generated VAVE ideas which results in achieving same function by using less components through modern manufacturing methods. This change resulted following additional benefits:

- Reduction in no. of components from 11 to 3
- Reduction in assembly steps

In this paper we will be presenting how innovative techniques were used to combine various secondary functions & also reduction in function cost for Auto operator's Equalizer assembly. After employing Value Engineering Principles, the new design is robust, ease the supply chain, compliant for an economical manufacturing process, reduces efforts from factory & also yields commercial benefits to the organization.

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Application of Value Engineering Principles to Packaging of Cylindrical Lock

Mr. Sudhir Singh*

Cylindrical lock product series in Allegion commercial locks portfolio is a certified product, which offers about 31 functions with 5 lever designs and 10 finishes.

Packaging of these products launched couple of decades ago which remains unchanged till now. With the current dynamics in the market to be more resilient towards cost-effective and sustainable packaging, we have a dire need to optimize / redesign product's packaging. We adopted the Value Methodology tools and techniques for this initiative and generated VAVE ideas without changing the functions of packaging like Attract Customers & Protect Product, while reducing the amount of plastic and paper used for production of packaging materials.

In this paper we will be presenting how innovative techniques were used to bring below mentioned values in packaging by employing Value Engineering Principles:

- Redesigned eco-friendly packaging by replacing current non sustainable Insta-foam packaging.
- Reduction in the carbon footprint of packaging components and will be easy to dispose because of biodegradability.
- Enhance the customer experience in terms of handling and unboxing
- Inventory reduction and cycle time reduction at assembly line.
- Yield the cost savings to the organization.

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Application of Value Engineering Principles to Packaging of Exit Devices

Jabin George,[1] Ramkumar Arumugam[2],

Exit devices in Allegion Portfolio are leading manufacturers of Safety devices such as Panic and Fire rated Exit devices, Door Closers and Door Trims since the early 1900's.

Since the product offers several variants, there was complexity in terms of the packaging design, which called for multiple packaging for these variants. With the current dynamics in the market to be more resilient towards cost-effective and sustainable packaging, we have a dire need to optimize / redesign product's packaging. We adopted the Value methodology tools and techniques for this initiative and generated VAVE ideas without changing the functions like Protect Product, Attract Customer and Ease Handling, while optimizing the packaging materials.

In this paper we will be presenting how innovative techniques were used to bring below mentioned values in packaging by employing Value Engineering Principles:

- Redesigning the packaging to standardize across all of Exit Devices in Allegion portfolio.
- This will reduce the number of packaging components and enhance the customer experience in terms of handling, unboxing, and disposing of packaging.
- Inventory reduction and cycle time reduction at assembly line.
- Yield the cost savings to the organization.

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Application of Value analysis/Value engineering principles to Electric Strikes.

Dhanvi Datta J M[1], Akhil Simon[2]

Electric Strikes are electromechanical door locking devices that work in conjunction with cylindrical locks, mortise locks or rim exit devices. Allegion offers a series of Electric Strikes for medium & heavy-duty applications, and in various configurations.

These products were launched years before and remain unchanged until today. However, the global supply shortage issues dictated the need to revisit the design to optimize this product to meet the current market demands.

The technical paper explains the successful implementation of Value Analysis / Value Engineering Methodology to improve the device by identifying the high-cost functions through FAST diagram. We came up with alternative design, process and materials to match the existing function and performance of the product.

Utilizing the VAVE methodology we were also able to get following benefits:

- Address supply shortage issue
- Modular faceplate design to adapt to multiple door-frame thickness.
- Ease of conversion between fail-safe and fail secure versions by the customer instead of device replacement.

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Application of VAVE Methodologies and Principles to Dogging Sub System in Falcon Exit Device

Manohara Devendrappa[1], Ramkumar Arumugam[2]

Dogging assembly is a sub system used in exit devices which holds the latch bolt retracted, removing the need to turn the lever or push the panic bar to retract the latch and open the door. Falcon exit device have multiple versions of dogging sub-assemblies and this resulted in the problem of field replaceability of dogging, which was tedious and time consuming. There was a business need to commonise and make a modular design.

This technical paper highlights the successful approach and application of VAVE methodologies to Dogging sub-assembly of Falcon exit device. This paper provides details of effort to make common sub assembly between different variant by comparing the technical FAST diagram of different variants and with this comparison, adapted low-cost functions to the common sub assembly. This resulted in reducing BOM cost, Stock Keeping Units (SKU's) reduction, Ease of assembly, Modular design, and Backward compatibility by meeting the product performance requirements and financial benefits without compromising the quality and functionality of the product. And by this common sub assembly, the customer got benefits on easy of switching from one configuration to the other &vice versa without removing the entire device from the door.

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Application of VAVE Principles to Handle Electronic Component Obsolescence in Lock Keypad

Ashik P M [1], Sujith Kumar Reddy[2]

Allegion introduced an electro-mechanical smart lock with best features that enables you to connect to your home from anywhere with relevant connectivity technology. It can be paired with mobile apps to grant access to trusted friends and family with customized access codes.

The robust electronics hardware is designed with multiple components from different manufacturers. When the component manufacturer adapts to a new technology, it is common that the existing components are declared as end of life. It is important for the product companies to redesign the product to handle the component obsolescence.

This technical paper highlights how the 8 Phases of VMA Job plan is used effectively to identify the alternate components and other VAVE opportunities in the product to handle electronic component obsolescence. The functional analysis of each component helped the team to generate various design / cost optimization ideas, keeping in mind the application / customer usage. Function Cost & Function Worth analysis in the Function Phase resulted in bringing up ideas for reducing the value gap.

The paper also explains about how the savings generated from the VAVE ideas has helped in reducing/nullifying the investment incurred with the redesign of product to handle the component obsolescence. This would help the organization to reduce/nullify the cost on sustaining the design/ product and retain existing performance and functionality.

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Application of Value Analysis Principles to Schlage KTL & KPL Locks Lever Catch Mechanism

Aditya Raj Singh*

For more than 100 years, Schlage has offered durable door hardware in a range of unique style combinations to express any personality. In the Electromechanical lock segment, KPL is KeyPad Lever and KTL is Keyless Touch Lever. These locks use a latch for securing the door and a Lever for retraction. They can be opened by entering the user access code on keypads. The Levers are held on to locks by lever Catch mechanism.

This technical paper speaks about successful application of VAVE principles and methodologies on the lever catch mechanism. This mechanism is common between Schlage Keypad Lever (KPL) and Schlage Keyless Touch Lever (KTL) locks. VAVE workshop on Lever Catch mechanism has helped us to better understand the functions of mechanism, get an optimal design to improve the cost margin. By VAVE methodology we identified number of ideas, and we were able to bring the function cost down near to the Function Worth

Based on the functional analysis, the complex design of lever catch mechanism was simplified. This was successful in reducing 5-part assembly to 1 part thus saving assembly time by eliminating one subassembly step in the factory. This saves around $200,000 for the company.

Thus, VAVE methodology was once again effectively utilized in optimizing the design, retaining the function 'Retain Component' and bring the cost down near to the function worth.

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*BE (Mech), VMA, 6 years of professional experience in the field of Product design, Value Engineering and Value Analysis in safety and security systems and automotive domains, working with Allegion India Private Limited, Bengaluru.

Application of Customer Oriented FAST diagram in E-lock Inside Housing

Aditya Raj Singh[1], Alias Babu [2], Chetan V[3]

Schlage introduced their first keyless electromechanical lock to the market 8 years ago. Schlage believes that keyless is more convenient, more secure, and better in keeping with the needs of our modern on-the-go lifestyles. This lock provides easy, key-free access, so people with active lifestyles and busy schedules can simplify their day. This lock can store 19 unique access codes.

The rising Zinc or Zamak (Zinc Alloy) price was influencing the cost of the current Zamak Housing of E-lock. This is a critical component in the lock with multiple functions and is directly handled by the customer during the installation and changing batteries. This motivated us to do functional analysis from the perspective of a customer and we thereby generated the "Customer oriented FAST diagram". This approach helped us to identify some functions which were hidden during the conventional functional analysis. Moreover, the detailed "Value gap analysis" gave us a clear direction on the functions to be targeted to reduce the cost. These two key applications of the Value methodology helped the team to generate solid cost saving ideas during the creative phase. The cost was reduced by 40% with this function-based approach.

Without the application of VAVE methodology, the team would have focused on the component & not the functions. This would generate only the material optimization ideas. Those ideas would give a cost reduction of maximum 10%. However, the team focused on the functions and was able to split the major functions of current housing into two components – Plastic part took care of the Retain component function and metal part took care of Withstand load function. This approach of splitting the functions have opened a lot of other opportunities in Zinc components in our portfolio.

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Application of Value Engineering principles to electronic Lock

Prabhat Kumar Yadav [1], Sachin Chandra Shetty[2]

The paper speaks about the Electronic lock workshop which resulted in the introduction of a refreshed hospitality product, which not only significantly improved the Product and cost margin of the lock but also improved the quality to meet the design specifications and test requirements as per European standards (EN1634-1, EN179, EN12209) through the effective application of VAVE principles. This will serve to increase Allegion's competitive advantage in the Hospitality and commercial European lock market.

In the current project, VAVE methodology is used effectively, and we have followed all the 8 phases as per the job plan. Hence, team decided to incorporate value engineering principles/process on these locks as it was easy to implement the process and use function base approach to get ideas and to reach the requires target. This approach used tools like function analysis and pareto chart comparison along with the VM recommended tools such as FAST diagrams (Technical and customer) and function cost worth analysis.

Using the information derived from the above activities, the team was able to identify opportunities to facelift the product and eliminate multiple SKUs:

- Help us to supply the product faster to the market and met customer demand
- Number of components reduction "from 11 to 4 "aided us to reduce assembly time and ease of assembly in plant
- Reduction in the number of inventories helped us to save inventory cost
- Easy to assemble product by customer and this also helped us in reduction of assembly steps and time
- Simplified design aided us to easy use of mechanical override function
- Highly secure product in European product line, even after doing the VAVE we were able to retain the product EN standard.

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Application of Value Analysis / Value Engineering principles to the Inspection Process

Suresh J.*

VAVE Principles and methodologies are gaining more traction into world of security where the VAVE community has effectively applied the principles to products of all platforms to reap the increased margin benefits, retain market shares by enhancing/retaining the product quality to meet customer expectations in terms cost &industry standards.

The PPAP Approvals has always been a bottle neck in the NPD, VAVE and sustenance projects primarily because of the tremendous workload with the metrology team of quality department. This indeed is one of the “long pole in the tent” when it come it project launch timeline and certainly had an impact on the revenue of the company as it shoots up the project launch time often.

This technical paper speaks about a unique effort where the team has successfully applied VAVE principles and methodologies by analyzing the inspection process of components in Metrology Lab, where the poor value functions identified directed us to the possibility of eliminating non-value-added activities, thereby not only improving the plant efficiency but also brought down the project launch time.

This VAVE workshop has resulted in optimizing the performance of the metrology team across our organization which not only improved the timeline to deliver the inspection reports significantly but also amplified the quality and reduced product/Project launch Cycle time through the effective application of VAVE principles.

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*ME (Manufacturing Management), BE (Mech), VMA, 17 years of professional experience in the field of Product design and development, Value Engineering, and Value analysis, working with Allegion India Private Limited, Bengaluru.

Application of VAVE Principles on Manufacturing process of Cylinder housing

Madhu H S[1], Suresh J[2]

VAVE Principles and methodologies are gaining more traction into world of security where the VAVE community has effectively applied the principles to products of all platforms to reap the increased margin benefits, retain market shares by enhancing/retaining the product quality to meet customer expectations in terms cost &industry standards.

This technical paper speaks about a unique effort where the team has successfully applied VAVE principles and methodologies by analyzing the manufacturing process of a specific subassembly, where we saw a possibility of eliminating non-value-added activities thereby not only improving the plant efficiency but also expanding the profit margin.

This VAVE workshop has resulted in optimizing the product performance which not only improved the cost margin of the lock significantly but also amplified the quality and eliminated the Fall-out rates to meet the design specifications and test requirements through the effective application of VAVE principles.

The effort was fruitful, and the new design inspired by VAVE methodology could build more comprehensive product structure with optimal cost and competitive enough to retain/increase the market share. Thereby would increase Allegion's competitive advantage.

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Design of Space Saving Motor Starter Feeder in L&T E&A's "T-ERA" range of Low Voltage Switchboards

Vivek Sasi*

L&T Electrical & Automation is one of the leading manufacturers of Low Voltage (LV) Switchboards in India. LV Switchboards are metal enclosures that houses switchgear, controlgear and metering & monitoring equipment in a power distribution system of industries like oil & gas, power, cement, metals etc. LV Switchboards are installed and operated inside an electrical substation of the industry. In a greenfield project, the footprint/size of a switchboard is one the driving factors that determines the size, cost, and time for construction of a substation.

This value engineering case study establishes how motor starters in a LV switchboard were re-designed to reduce the footprint/size of the switchboard to meet the stringent space requirement in one of our prestigious international projects.

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*Senior Manager -R&D, a certified Associate Value Specialist, holds a bachelor's degree in Electrical & Electronics Engineering and a master's in Business, has 11 years of experience in R&D of LV Switchgear and Switchboards and also drives CSR activities for the organization and is currently posted in L&T E&A (a Schneider Electric India Company), Coimbatore, Tamil Nadu

Suspension Lower Control Arm: Design & Material optimisation via systematic VAVE approach and reduction in development & validation time by banking on digital simulations, accelerated test methods and road to rig simulations.

Team Tata Motors, PVBU Pune

Indian automotive market is very cost competitive. All automotive OEMs facing stringent challenges to reduce cost, development time and ensure durability and safety of components. Case study explained in this paper details about VAVE methodology of front suspension control arm of the car. The existing Suspension control arm is made of Ultra high strength sheet metal which was imported from Swedan. Hence, control arm was having higher cost, involved import duty and high cycle time for raw material procurement. So there was challenge of design control arm using Indigenous HSS material (easily commercially available in India) with no or minor tooling change in existing tools and implement new design in production in shortest time.

Team looked at challenge of cost reduction using VAVE methodology and illustrated shortest product development time by using new road to rig- test methodology.

Suspension Control arm are usually validated on vehicle level to simulate exact conditions during service. This type of validation requires long testing time and cost. Automotive OEMs are facing aggressive challenges to minimize product development time to capture the market with new launches and get the returns on investment early. This methodology can be deployed across many vehicle programs to optimize cost (horizontally deployment for other test aggregates also).

Value Engineering Study for Capex Optimization for Blast Furnace Coke Yield Improvement at Tata Steel Kalinganagar

Rajani Kanta Khuntia (Leader and Author), Dayanand Pathak, Manoranjan Das Amit Prakash, P R Veeresh

The project of Blast Furnace (BF) Coke yield reduction was conceived in June 2022. The aim of the project was to improve yield of the BF coke. In order to optimize capex of the project, this was taken as a project for value study. Detailed Function analysis, Technical FAST diagram, Function resource matrix were preprepared for Bill of Quantity (BoQ) items such as Mechanical, Electrical, Civil & Structural to identify the value eroding function. Function based idea generation was done as a part of Value Methodology Job plan. Post idea generation, feasibility check with different stake holders, the feasible ideas were clubbed to different options for evaluation to ensure that the proposed solution should create better value in the system. Post evaluation and management approval, the proposed option was developed for implementation.

As a result of value study there is significant reduction in capex by Rs. 3.95 Cr. (6% of total cost) along with other benefits such as power saving of 10.5 KWHr and significant reduction in carbon footprint and noise.

Value Study of Conveyor Smart Guard System

Vishal Rammilan Singh (Team Leader and Author), Sandip Kumar Chakraborty, Deeptak Chatterjee, Manish Kumar Pandey

In present day, monitoring Safety near moving machines has become a real challenge and in specific to conveyors which are operating at different heights is even tougher. Often in Plant nearby conveyors, after maintenance/Troubleshooting activity conveyor guard is left open (By mistake or intentionally). This causes safety breach, but it is not addressed as there is no detection system for it. Whenever some maintenance people visit these sites, they are exposed to potential hazards and may get entangled or entrapped in moving conveyor.

In order to address the above issues, this was taken as a project for value study. Detailed Function analysis, Technical FAST diagram, Function resource matrix were preprepared for key contributing items to identify the value eroding function. Function based idea generation was done as a part of Value Methodology Job plan. Post idea generation, feasibility check with different stake holders, the feasible ideas were clubbed to different options for evaluation to ensure that the proposed solution should create better value in the system. Post evaluation and management approval, the proposed option was developed for implementation.

As an outcome of the value study, team proposed a solution to make Conveyor guard capable of detecting any safety breach anywhere throughout its length and alert necessary system for prompt action. This will even alert about improperly placed Conveyor guard so to ensure safety in true sense. Intention of this solution is to improve Safety compliance in responsible Barricading nearby conveyors and reducing exposure of Potential hazards. Following is simplified configuration drawing to explain one segment of Conveyor smart guard system. This smart barricading system can be replicated near any construction site for improving the compliance of safety rules & regulations.

Value Engineering Study for Gaseous Product Pipeline Network Optimization

Anup Kumar Ghosh (Team Leader), Subrata Dey, Joydratha Nath, Prabhakar Srivastava, Bhaskar Roy, Abhimanyu Kumar Singh, Rishav Swain

Tata Steel is setting up an Air Separation Unit (ASU) of capacity 1800TPD at Jamshedpur for production of industrial gases (Oxygen, Nitrogen and Argon) and Dry Compressed Air for supply to various consumers inside Tata Steel Works to meet the present demands. To connect the gaseous product outlets of ASU with existing industrial gas grid at Tata Steel Jamshedpur Works, overhead yard pipelines would be laid inside the premises.

Problem Statement/Challenges:

The overhead pipeline network length which was initially proposed by FMD was approximately **4.2 kms** with structural work of **720 MT with civil quantity of approx**.**2800 Cum.** The pipelines, therefore, would have been supported through entirely new structural towers, trestles and racks along periphery of TSJ boundary to avoid interfacing with existing facility.

Construction of civil foundations to support the structural towers and trestles is a time taking and lengthy process which involves activities like subsurface utilities detection, six-party clearance, trial trenching, permitted depth layer-wise excavation and then core civil concreting related jobs. Initially, the number of foundations were high and it was assessed that construction activity of so many foundations even if work is commenced on multiple fronts simultaneously, would have extended the project timeline and cost considerably.

Vital sub-surface utilities network of pipelines and electrical cables in and around TSL Works is of unprecedented measure. Its prior detection through detectors before excavation is not foolproof as the detector machines have their own limitations. If civil foundation locations would foul with such utility network, it would require re-engineering of the network partially or wholly. This in turn would increase project timeline and cost.

Erection of new supporting structures near already congested existing structures inside the Works premises could have been a mammoth task as there is little space for man & machine movement and approach. With very limited approach space for machine at multiple locations, maximum work could have been carried out manually only. It again would have extended the project timeline.

Also, there was a parallel run of oxygen pipe along HT cable gallery of approx. 0.9 km which was not complying the TSL safety requirement.

Approach and outcome: In order to resolve the above challenges and optimise the route, this was taken as a project for value study. Detailed Function analysis, Technical FAST diagram, Function resource matrix were preprepared for Bill of Quantity (BoQ) to identify the value eroding function. Function based idea generation was done as a part of Value Methodology Job plan. Post idea generation, feasibility check with different stake holders such as FMD, logistic, safety & security, C & S of D & E, the feasible ideas were clubbed to different options for evaluation to ensure that the proposed solution should create better value in the system. Post evaluation and management approval, the proposed option was developed for implementation.

The most viable, cost effective and safe option was to locate a shorter route for the network. After multiple site visits with all stakeholders and plant area owners, a shorter route of length approx. **2.7km** was taken into consideration in compression with earlier FMD proposal w.r.t cost effectiveness, construction & maintenance feasibility. In this proposal, the least nos. of civil foundation and new towers/trestles have been taken in design and utilised the maximum nos. of existing supporting structure/bridge with minor modification wherever required without compromising the integrity and stability of the pipeline network and existing structure.

As a result of this value study, overall cost of the scheme has reduced significantly to 50% wr.r.t. baseline.

Value study for optimisation of BOQs (Civil, Electrical & Piping) for CR Downstream Processing Facility at Tata Steel Kalinganagar

Vikash Kumar (Leader and Author), Sanjeev Pawar, Arnab Sinha, Puspendu Moitra, Rohit Rajaram Kanojia, Deepak Kumar Samal

Tata steel is setting up Cold rolled downstream Facility in Kalinganagar, to process i.e., Slitting, and cutting high tensile coated and annealed coil of CRM. These processing facilities will enhance competitiveness & flexibility to customize and address multiple segment needs. This processing facilities are highly automatic, so it requires involvement of many automatic machines and thus impact on the overall budget of the project. So, cost optimization through Bill of Quantity (BOQ) optimization will be one important tool to reduce cost without compromising the value of Product.

In order to optimize BoQ of the project, this was taken as a project for value study. Detailed Function analysis, FAST diagram, Function resource matrix were preprepared for Bill of Quantity (BoQ) items such as Civil, Electrical and piping to identify the value eroding function. Function based idea generation was done as a part of Value Methodology Job Plan. Post idea generation, feasibility check with different stake holders, the feasible ideas were clubbed to different options for evaluation to ensure that the proposed solution should create better value in the system through optimization of BoQ. Post evaluation and management approval, the proposed options were developed for implementation.

As an outcome of value study, team explored the option of Electric Control Room (ECR) location to reduce distance between Source and Load end so that cable qty gets minimised without any compromise in safety, quality, productivity. In piping, team have reduced unnecessary length of dry compressed air pipeline in the bay and while optimizing Civil BOQ we have reduced floor thickness of finished good storage bay along with usage of alternate materials i.e., FRC instead of conventional concrete and Reinforcement bar. This has resulted in Capex saving of Rs. 4 Crs. Along with other intangible benefits.

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Value Study of Pressure Transducer for Mill Stand Roll Force Measurement System

Ajit Singh (Leader and Author), Sumit Ganguly, Souvik Pramanik

The country's first tinplate manufacturer, TCIL since its inception in the year 1920 is India's leading tinplate producer & it offers consistently high quality of products that meet the most stringent requirements of customers.

TCIL is currently operating @ 380 kTPA and as a part of continual growth and to retain its leadership position in Indian market, TCIL is planning to enhance its capacity through inhouse improvements & Growth projects in two phases of expansion of 300 kTPA each to reach a capacity of ~ 1000 kTPA.

The major facilities for first phase of expansion will be standalone Pickling line, Tandem Cold Mill, Continuous Annealing Line, Double Cold Reduction Mill / Temper Mill, Electrolytic Tinning Line, Coil Inspection Line & Coil Shearing Line.

In order to optimize cost of the project, this was taken as a project for value study. Detailed Function analysis, FAST diagram, Function resource matrix were preprepared for Cost items such as Process instrumentation & Controls to identify the value eroding function. Function based idea generation was done as a part of Value Methodology Job Plan. Post idea generation, feasibility check with different stake holders, the feasible ideas were clubbed to different options for evaluation to ensure that the proposed solution should create better value in the system through optimization of Cost. Post evaluation and management approval, the proposed options were developed for implementation.

The Mill stand Roll force measurement is used in the outer loop of Gauge control and Mill modulus calculation (Mill Stretch) during commissioning.

At TCIL the Tandem Cold Mill is designed for batch operation, hence the functionality of Mill Roll force measurement can be accomplished by using Pressure transducer instead of Load cell. The change in component shall have no effect on functioning of the Mill with savings on Load cell system components capital & spare cost.

At exit of Tandan cold mill, 2 Nos Thickness gauge are provided for validation of Exit Coil thickness and online calibration of either of the Thickness gauge during Mill Operation in a Continuous Tandem Cold Mill. At TCIL the Tandem Cold Mill is designed for Batch operation. Opportunity for Thickness gauge calibration can be used during Mill stand Roll change & Coil change-over period. The Coil Thickness validation for Product certification is used from Electrolytic tinning line. The removal of 1 Nos. Thickness gauge from Exit of Tandem Cold Mill shall not impact functionality of Mill in any manner.

Value Study for Iron Ore Grinding Building of Pellet Plant

Debashish Chakraborty (Principal Author), Prabhjit Singh Tatter, Suresh Pothireddy, Avik Das, Kalicharan Tyagi, Manoj Gunzalo Raj V

Construction sector is capital intensive and plays a major role in developing economy. Capital projects are often not delivered at the lowest possible cost, nor do they deliver maximum value. Pellet Plant is a capital-intensive construction project on pelletizing process. Pelletizing is an agglomeration process which converts very fine-grained iron ore into balls of a certain diameter range (normally 8mm to 20 mm), also known as pellets. These pellets are suitable for blast furnace and direct reduction processes. Iron ore grinding is one of the main sub-processes where grinding of Iron Ore fines is carried out by Ball Mills. This project has been selected based on the observations of existing Iron ore grinding plant where frequent maintenance problem occurs.

In order to mitigate above challenges and reduce capex of the project, this was taken as a project for value study. Detailed Function analysis, Technical FAST diagram, Function resource matrix were preprepared for Bill of Quantity (BoQ) items such as Mechanical, Civil & Structural to identify the value eroding functions. Function based idea generation was done as a part of Value Methodology Job Plan. Post idea generation, feasibility check with different stake holders, the feasible ideas were clubbed to different options for evaluation to ensure that the proposed solution should create better value in the system. Post evaluation and management approval, the proposed option was developed for implementation.

As an outcome of value study, team proposed to install new set of conveyors to elevate material at desired level to feed to Ball Mill in place of existing bucket elevators. This has resulted in reduction in capex by 51% of the total capex and 66% in the total lifecycle operating cost without compromising with the basic purpose.

Value Analysis of Power Contactor

Akshay Akolkar [1] Jayraj Patare[2]

Productivity and competitiveness go hand in hand. To help our business succeed, it's important to maintain and develop a competitive edge over other options our customers could choose.

In Switchgear business, the market attractiveness has been shifted towards availability of more features and better quality of products at a competitive price. This would eventually help in increasing our market share in this segment.

In order to sustain & increase the market-share in Switchgear business with this competitive and productive edge, we need to focus on:

A) Meeting customer expectations (e.g. **Competitive price**, Best quality with on time delivery by focusing on **Productivity**)

B) Economic growth of company by utilizing increased revenue from customer services

Electrical and Automation group, a part of Schneider Electric India Pvt. Ltd shows how VA approach has helped to flourish business by eliminating, optimizing the usage of high value commodities and reduce manufacturing cost significantly without affecting the product function.

For Value Analysis, Power Contactor had been selected due to lower profit margin. Company has succeeded to meet various management and customer expectations such as, reduction in manufacturing cost, reduced use of precious metals, eliminated the dependency of electronic items, substitutes developed in supply chain crises for achieving the highest productivity. The manufacturing cost has been reduced significantly with implementing mentioned VA approaches.

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*He holds bachelor's degree in Mechanical Engineering and is certified Value Methodology Associate (VMA) with professional experience of more than 9 years in field of New Product Development, Manufacturing process & Assembly Engineering. He has implemented 35 VA/VE projects and is involved in further 18 projects in Controlgear. Works at Schneider Electric India Pvt. Ltd.

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Value Engineering & Cost optimization of 36kV GIS Mechanism

Samrat Chandrakant Sakhare [1], Rajesh Kumar Behura [2]

Keeping in the mind the continuous increase of competition in medium voltage switchgear market, it is necessary to have a switchgear with minimum cost and high reliability. During this CORONA pandemic situation their surge in cost of import which in end is cutting profit margins of industries. It has become a necessity to either cut down a feature or reduce production cost which will enable manufacturing industries to survive in such dynamic market. cutting down a feature is no option, hence Value engineering in switchgear sector is an only option which needs to be adapted.

Switchgear market is dynamic, here expectations are increasing daily with constant or non-significant increase in cost of switchgear. Demand for switchgear has also increased in many fold. So value engineering or cost optimization increases chance of industry to endure and make profit out of volatile market condition Due to low cost with competitors, compact in size, low maintenance cost, less floor area, mid-range of current and voltage capability; sealed Gas Insulation Switchgear (GIS) and fixed circuit breaker is becoming prior choice for secondary distribution. Value Engineering or Cost optimization of GIS will be of key importance to switchgear manufacturing industry. Keeping every feature of GIS intact and reducing overall cost for maximizing profit is main objective. Costing less than that of competitors and with all equivalent or additional features will likely to make GIS a first and foremost choice to distribution utilities. To achieve the same we have done the Value engineering in GIS mechanism.

Keywords: GIS, GIS Mechanism, Medium Voltage, Reliability, Dynamic Market, Secondary Distribution, Value Engineering, Cost Optimization, Switchgear, Utilities

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Value Analysis of Electronic Power Assist Steering System (EPAS) in Tata Intra Model

Arpita Mishra[1] , Ranbir Kumar[2]

Value engineering is executed throughout product development and is generally examined with new products. With the cooperation of a cross-functional team and using product review and analysis as a foundation, the focus is on cutting costs, improving function, or even doing both. The current business environment is highly challenging, as constant market pressure to lower product prices, improve product development, and lower production costs compels organisations to stay competitive. Value Analysis & Value Engineering (VAVE) methodologies are crucial for reducing product costs, which enables businesses to hold onto market share and maintain profitability.

For Value analysis, we have considered the project based on Electronic Power Assist Steering System (EPAS). Using Value methodology, EPAS Steering column assembly has been has been modified without any change in its basic function. The technical requirements for EPAS system to give required steering angle & steering effort in the vehicle as per specification. Thus, resulted in a good amount of cost saving to the organization.

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[1](Senior Manager- Tata Motors, Pantnagar), joined in 2019 as GET & currently working in Assembly Line and is a core member of Plant VAVE Team. She is a certified Value Methodology Associate (VMA) by SAVE International.

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Value Analysis of Hydraulic Piston Pump

Chaitanya Girme*

Axial Piston pump is one of the key products of Danfoss' Hydrostatic portfolio. This pump is used extensively in mobile applications such as Skid Steer Loaders, Compactors, Trenchers, Truck mounted lifts etc. To grow the market worldwide, specifically the market sensitive for pricing for hydraulic products, we consistently seek to optimize cost & higher value product availability through Value Management.

Multi-disciplinary team members analyzed overall pump portfolio to have most optimized product design & efficient manufacturing processes to add value to the customer & business. While pursuing above objective, we aim to maintain or improve the current performance & reliability of the product.

This technical paper discusses the use of value analysis tools to reduce warranty costs and simplify the assembly process. The paper gives an overview of how VA tools have assisted in identifying key pain areas by analyzing the functions of critical parts. Using Function Cost Worth Analysis, multiple value gaps that were previously ignored were identified. A phase wise VA study approach assisted the team in improving profitability while lowering inventory and warranty costs.

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*Certified Value Methodology Associate, holds bachelor's degree in Mechanical Engineering and having 15 years of professional experience in the fields of Existing & New Product Engineering, VAVE in multiple Products such as Geroler-Geroter hydraulic motors, Gear pumps, Cylinders, Fluid Conveyance products & Piston pumps. Works at Danfoss India Innovation Center, Pune

Value Improvement by introducing Hydroformed Chassis in Intra Platform

Ranbir Kumar [1], Ashwinder Singh[2]

In today's technology driven and ever-changing competitive business environment, organisations are focusing more on continuous improvement & adoption of new process technologies. To sustain market leadership, companies are becoming more customer oriented and continuously striving to improve vehicle ownership experience & providing value for money product to the customer.

Value engineering is the evaluation of new as well as existing products during the design phase to reduce costs and improve functionality in order to offer better value product. The value of a product is defined as the most cost-effective way of manufacturing a product without effecting its purpose. In this project, we have used VAVE methodology to improve manufacturing process of Tata Intra frame assembly. Now we have shifted our frame manufacturing from die stamping to hydroforming, resulting frame production from single metal sheet. This process ensure increase in overall chassis strength, reduction of process cost, reduction in number of child parts required and improvement in weight to strength ratio. The end customer will also reap benefits in terms of better mileage and increase loading capacity.

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Value Methodology Study On Electric Vehicle Inverter

Sheetal Kumbhar[1] , Nilesh Surase[2], Sunny Dharmajidnyasu[3]

Eaton is an intelligent power management company doing business in more than 175 countries dedicated to improving the quality of life and protecting the environment for people everywhere. We are guided by our commitment to do business right, to operate sustainably and to help our customers manage power — today and well into the future. By capitalizing on the global growth trends of electrification and digitalization, we're accelerating the planet's transition to renewable energy and helping to solve the world's most urgent power management challenges.

As electric vehicles become more popular worldwide, having the ability to make a cost-competitive product, understanding competitive offerings and key differences are critical elements of driving product development strategy and capturing market leadership. Value Engineering technique helps to achieve such goals in the new product development process. The Inverter of the electric vehicle is the most important section & used to convert power. This makes it important to consider it for Value Methodology study to developing new alternatives for avoiding risk of electronics component shortages, to optimise the design to reduce overall cost.

This paper narrates how application of Value Methodology helped to design best in class inverter, mitigating risk of electronics component shortages by finding alternatives and also achieve cost optimisation in the electric vehicle inverter within the boundary condition set by customer. The outcome helped to improve product performance along with identifying 16% cost savings per product, increase the profit and to increase the market penetration.

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Value Engineering case study on Optimisation of Hardware in High Speed Rail Project

Nachiket C Phatak [1]

The paper refers to Value Engineering techniques applied in Mumbai Ahmadabad High Speed Rail Project. L&T ECC constructed Launching Girder and Straddle Carrier Machines for High Speed Rail Project. Thsese machines were first time designed and constructed in India under Make In India Initiative of Central Govt.

Our major scope in this project was automation of these machines. Due to space constraint and Transportation flexibilities, There were many opportunities to have innovative design to optimise space and cost. Team discussed all alternatives during brainstorming station. After FCW analysis, best ideas were selected and implemented.

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[1]BE (Instrumentation, VMA, holds a Bachelor degree in Instrumentation has more than 15 years Automation industry experience in design DCS System.

Value Engineering achieved on Optimized Design of DCS System Architecture

Sebin Mathew [1] , Manas Kanti Kar [2]

SEIPL had won and is currently executing an Electrical and Automation package for two cement grinding unit projects awarded by Dalmia Cement Bharat Ltd at Bokaro and Sattur locations.

SEIPL is designing and supplying Ecosturxure Process Expert which is the Distributed Control System of Schneider designed for Cement Industry along with Networking System as part of the automation package. Based on the technical data available during Prebid stages, a detailed networking BOM was derived and considered consisting mainly of various Ethernet switches and Media converters.

However, after award of order i.e during the detailed engineering stage, we the Instrumentation and automation engineering team, relooked the final data inputs received and optimized the proposed network system architecture with different Industrial protocols and topologies. Subsequently we derived an efficient network BOM which led to savings of approx. 29,73,511 INR for both locations included.

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Improvement of Tundish Sequence Length through Value Engineering

P.N.Shivangi[1]*, Alok Kumar[2], V. R. Krishna[3], Pranay Ranjan[4]

The present paper is focused on exploring the methods of increasing tundish sequence length in the thin slab caster of TATA Steel, Jamshedpur using Value Engineering Methodology. In thin slab caster, the two main enablers of increasing production are throughput maximisation and caster availability. Again, the caster availability has different impacting parameters such as unplanned cast aborts, revival time in planned and unplanned breaks, and extension of planned sequence duration.

Because the tundish sequence length is a constraint in the planned sequence break, value methodology is used to make the most of it. The increased tundish sequence length will not only help in increased utilisation of tundish but will also ensure reduced caster stoppage. The tundish sequence length depends on the erosion of Dry Vibro-Mass lining, stopper and Submerged Entry Nozzle(SEN).

Using Value Methodology steps, in the function phase, we identified the basic function and function worth analysis. A FAST diagram is developed to know the root cause through How – Why of the entire process. In the creative phase, we identified multiple alternatives through brain storming sessions (in which we involved all the levels of the people in the process). We evaluated all the potential alternatives through a paired comparison matrix with the desired criteria elements relevant to the business. We developed an implementation plan and mapped all required resources. After implementing the ideas, the Tundish sequence length increased and 5% of Tundish consumption was reduced. The potential savings obtained from the project is ~2.52 Cr.

With the help of the Value Methodology technique, we successfully and timely completed the project and resolved the business issue.

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Performance Improvement of Limestone Screening

Abhishek Chaudhary[1]*,Sourav Banerjee [2], Avijit Bose[3], V R Krishna[4]

The present paper is focused on exploring the methods of increasing tundish sequence length in the thin slab caster of TATA Steel, Jamshedpur using Value Engineering Methodology. In thin slab caster, the two main enablers of increasing production are throughput maximisation and caster availability. Again, the caster availability has different impacting parameters such as unplanned cast aborts, revival time in planned and unplanned breaks, and extension of planned sequence duration.

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