Metso acquires the valve automation division of RMEPL

Metso has signed an agreement to acquire the valve automation division of the India-based valve technology company Rotex Manufacturers and Engineers Pvt. Ltd (RMEPL). The company has a market-leading position in India in the actuator business and an advanced offering of switches, process valves, and valve automation products and solutions. The acquired division's sales in the last fiscal year were approx. INR 1,500 M. It has two manufacturing facilities in the Mumbai area and sales offices in Mumbai, Vadodara, Kolkata and Pune.

Essar recoverable shale gas prospects in West Bengal

Essar Oil & Gas Exploration and Production (EOGEPL) has said the company is expecting reserves of at least 1.5 trillion cubic feet (tcf) of recoverable shale gas in its Raniganj block in West Bengal, which could require investment of at least $1 billion. It currently produces around 1.5 million standard cubic metres of gas per day (mscmd) of coal-bed methane (CBM) and will go ahead with its shale plans after further policy clearance from the government. “Our expansion plans are on fast-track and we are looking to produce at least 2.5 mscmd by March 2021,” said Vilas Tawde, chief executive officer, EOEPL. According to an estimate of the United States Trade and Development Agency (USTDA), the block has around 7 tcf of reserves. “If that, around 1.5 tcf is recoverable,” Tawde added. Last month, state-run GAIL had won the contract to buy CBM produced from Essar oil’s Raniganj block. The price will be around $4.16 based on net calorific value (NCV). CBM is the natural gas stored in coal seams and shale can be found at a much deeper level in the same block. This is expected to increase CBM production in the Raniganj area to an average three mscmd for 20 years, leading to direct investment of around Rs 100 billion. CBM is presently sold at Rs 15.5 per unit in the country. Essar owns CBM rights for five blocks — Raniganj in West Bengal, Talcher and the 6 Valley in Odisha, Sohagpur in Madhya Pradesh, and Rajmahal in Jharkhand.

Essar Oil of Gas Exploration and Production (EOEPL) has said the company is expecting reserves of at least 1.5 trillion cubic feet (tcf) of recoverable shale gas in its Raniganj block in West Bengal, which could require investment of at least $1 billion. It currently produces around 1.5 million standard cubic metres of gas per day (mscmd) of coal-bed methane (CBM) and will go ahead with its shale plans after further policy clearance from the government. “Our expansion plans are on fast-track and we are looking to produce at least 2.5 mscmd by March 2021,” said Vilas Tawde, chief executive officer, EOEPL. According to an estimate of the United States Trade and Development Agency (USTDA), the block has around 7 tcf of reserves. “If that, around 1.5 tcf is recoverable,” Tawde added. Last month, state-run GAIL had won the contract to buy CBM produced from Essar oil’s Raniganj block. The price will be around $4.16 based on net calorific value (NCV). CBM is the natural gas stored in coal seams and shale can be found at a much deeper level in the same block. This is expected to increase CBM production in the Raniganj area to an average three mscmd for 20 years, leading to direct investment of around Rs 100 billion. CBM is presently sold at Rs 15.5 per unit in the country. Essar owns CBM rights for five blocks — Raniganj in West Bengal, Talcher and the 6 Valley in Odisha, Sohagpur in Madhya Pradesh, and Rajmahal in Jharkhand.
GAIL bags approval for Urja Ganga pipeline from PNGRB
Oil regulator PNGRB has approved extension of state gas utility GAIL India Ltd’s ‘Urja Ganga’ pipeline up to Gowahi in Assam. GAIL is currently laying a 2,655-km pipeline from Jagdispur in Uttar Pradesh to Halda in West Bengal and Bokaro in Jharkhand and Dhamra in Odisha at a cost of INR 12,940 crore. The pipeline from Barauni in Bihar to Gowahi in Assam would be 672 km long and would be 24-inch in diameter and would be executed in 36 months from the first notification of Right of User (RoU) acquisition. As per the MoU, Government of Assam would facilitate GAIL (India) Ltd to obtain necessary permissions/approvals/clearances etc from the concerned departments/agencies/authorities of the state as per the existing policies/rules and regulations of the state government. Jagdishpur-Haldia-Bokaro-Dhamra pipeline of 816-km long, which is targeted to be completed by 2019-20.

IMC to lay Kakinada-Nellore gas pipeline
Chennai-based IMC Ltd has won oil regulator PNGRB’s nod to lay a natural gas pipeline from Kakinada in Andhra Pradesh to Nellore in Tamil Nadu. The Petroleum and Natural Gas Regulatory Board (PNGRB) has issued the authorisation letter, the 522-km pipeline would have a capacity to carry 1.6 million standard cubic metres per day of natural gas. Starting from Kakinada, it will go to Rajahmundry and Vijayawada and onwards to Guntur and Ongole before terminating at Nellore, PNGRB said in the letter. IMC is a port terminal and infrastructure company that is engaged in bulk liquid tank storage, dry bulk terminals, international trading, and oil exploration businesses. According to the approval, IMC would also build 145 km of spur lines to feed customers enroute.

Indian Oil develops refining processes to save cost
India’s biggest oil refiner, Indian Oil Corp., has developed refining processes that may help it save between USD 1.5 and USD 2 billion in costs as well as challenge global giants in the technology leasing business. State-run Indian Oil Corp., which controls nearly half of the country’s refineries, has created its own processes using catalysts and hydro-cracking to convert crude oil into fuels such as gasoline, diesel and liquefied petroleum gas (LPG). The company has now developed new refining processes that it can now supply to 5% of the technology needed for its plants. The licensing fees it typically pays out to refining-technology providers is about 5% of the project cost. Indian Oil has a home-grown fluidized catalytic cracking unit, called IndMax, that can increase UOP output at its newest 300,000 barrels-a-day refinery on the country’s east coast. It also plans to spend INR 2 billion (USD 31 million) to build a catalyst manufacturing plant in Panipat in northern India.

IMC to lay Kakinada-Nellore gas pipeline

GAIL bags approval for Urja Ganga pipeline from PNGRB

Indian Oil develops refining processes to save cost

IMC to lay Kakinada-Nellore gas pipeline

India offers INR 1 lakh business in bio-fuel and -energy
Petroleum and Natural Gas Minister Dharmendra Pradhan has said that India is a happening place as it is offering INR 1 lakh crore business in bio-fuel and bio-energy to the investors across the globe. Addressing the gathering he said by 2040, India’s energy consumption will grow by CAGR of 4%. India’s energy access for all and the policy makers are working on the ground to accelerate the industry and energy leaders, along with the policy makers, discussed the current scenario, roadmap to achieve the target for renewable energy generation of 175 GW by 2022, opportunities and challenges.

Wacker expands its silicone production at Amtala site
Wacker Metroark Chemicals Pvt. Ltd. is expanding its existing silicone production at its Amtala site near Kolkata with a new hydrosilylation plant for manufacturing functional silicone fluids. The plant with an annual capacity of over 6,000 metric tons was officially opened at a ceremony in Amtala. The expansion is WACKER’s response to growing regional demand for specialty silicones for use in the textile, personal care, rigid and flexible polyurethane foam and agrochemical sectors. The investment for the plant amounts to around €6 million. Hydrosilylation is a chemical process in which organofunctional groups, such as glycols, olefins or ketones, are “docked” onto the periphery of silicones. This is done in order to modify the properties of the end product and render a silicone fluid, for example, hydrophobic (water-repellent) or hydrophilic (water-attracting).

BPLC-HPCL to build a liquid terminal at Kamarajar Port
An equal joint venture between state-run oil refiners Bharat Petroleum Corporation Ltd (BPCL) and Hindustan Petroleum Corporation Ltd (HPCL) has won the rights to develop and run a liquid terminal at Kamarajar Port Ltd near Chennai. The BPLC-HPCL consortium had quoted a revenue share of 25% for the new facility which seeks to tap into the growing demand for POL, LPG products and Lube Oil Base stock (LOBS) in bulk in Tamil Nadu and neighbouring States. Kamarajar Port Ltd, the entity that runs the port, is among the 12 ports owned by the Central government and the only one to be run as a company. The other ports are run as trusts. Cargo contracts at Central government-run ports were till now decided on the basis of revenue share. When commissioned, the HPCL-BPLC facility will be the second liquid terminal at Kamarajar Port.

BPLC-HPCL to build a liquid terminal at Kamarajar Port

Indian Oil develops refining processes to save cost

Wacker expands its silicone production at Amtala site

ABO expands its sales network to South Asia
ABO, a leading manufacturer of control and shut-off valves for industrial use, ventures into new territory in Asia, and expands its sales network by opening a new branch office and production centre: ABO Controls. The new branch will be established on the west coast of India in the sixth largest city of the world, in Mumbai. It includes a new branch office and production centre—ABO Controls. The new branch will be established on the west coast of India in the sixth largest city of the world, in Mumbai. India offers new opportunities for business growth in local fast growing market. In recent years, we have been able to increase our turnover and attract new customers in this market, so the next step was to move forward. The goal was to build our new branch office in this country to respond to market demands and to be as close as possible to our customers. India is one of the fastest growing economies in the world and is therefore a good destination for investment. With this, ABO takes its first steps to tapping into the potential markets of the Indian subcontinent and South Asian region.

ABO expands its sales network to South Asia

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ABO expands its sales network to South Asia

India News
Welcome to another new financial year. I trust that you all closed off last year well and are looking forward to new challenges and successes for the coming one. Whilst figures for the first quarter are still unknown, the growth outlook for FY2018-19 is quite optimistic. The pains and impact of demonetization and the GST implementation are beginning to fade and the projected growth rate will accelerate from 6.5% last year to 7.5% this year.

This issue’s ‘Spotlight On’ pages (28s) are on Chennai-based Larson and Toubro ... “L&T has a long and rich history in the manufacturing of valves for critical applications in the oil and gas and power sector as well as custom-engineered solutions for defense and aerospace applications.” Their journey began in 1961 producing plug valves. Today, the company prides itself on being a one-stop shop for valves for almost all types of process valves – gate, globe, check, ball, butterfly and plug valves, in all sizes, pressure classes, and different materials. L&T Valves can provide their clients with almost any kind of valve they may need. The Indian market accounts for 45-50% of L&T Valves’ revenue, with the Middle East being the company’s most prominent region for doing business outside of India. The valve industry is moving ever increasingly towards automation and digitalization, and L&T are at the forefront of R&D and product development with more than 60 designers continually developing smarter products, and valves for special applications, which will bring added value to their customers.

On page 10, Mr. Deepankar Bose from TechSci Research evaluates for us the potential of the African Industrial valve market. Africa is growing, although at a slow pace, and the emphasis there will be on industrialization as the key growth factor for the region’s industrial valves market. Recovering oil prices globally are one of the key factors currently driving growth in the market. As Africa has proven oil reserves, Nigeria and Angola are the leading demand-generating countries in the region. In addition to oil some of the key drivers for industrial valves are the growing demand for access to clean water and wastewater as well as power generation. With rising investments across a number of sectors in Africa, demand for industrial valves is further expected to grow in the coming years.

Since valves are the number one source of leakage of fugitive emissions, we plan to feature this topic in all issues of the Journal for the foreseeable future. On page 8 Mr. Tim-Fredrik Kohler evaluates for us ISO 15848 versus TA Luft.

More about fugitive emissions can also be found on page 19 where Mr. Tony Majka of ValvTechnologies looks at various stem sealing solutions and the reasons why one might choose them.

I wish you enjoyable reading. If there are topics you wish to have featured in the upcoming issues please do feel free to contact me at k.creedon@kci-world.com

The next issue of Valve World India will be the June/July issue.

With warm greetings and thanks
K.C. Creedon
Director Valve World India
k.creedon@kci-world.com

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**Regional News**
L&T Valves, a subsidiary of the conglomerate Larsen & Toubro, is a manufacturer of high-end flow-control solutions for the oil & gas, power, and process industries, as well as mission-critical valves for the defence and aerospace sectors. The company has an expertise that spans five decades, an array of products approved by the global majors and an excellent reputation amongst end-users and EPCs alike. Extremely proud of what they do, the company’s vision is to be the most trusted valve manufacturer in the world. It is a task that they are working towards with great enthusiasm. Valve World India Journal spoke to Mr. N.V. Venkatasubramanian (Venkat), Chief Executive and Director, L&T Valves, to learn more about the company, their products, and their future plans for growth. Mr. Venkat has been with the company for over three decades. Under his leadership, it has grown rapidly in terms of its customer base and product range to become one of the leading organisations in the valve industry.

By John Butterfield and Gillian Gane

L&T Valves: ‘Valves that Add Value’

L&T Valves began its life as a joint venture between Larsen & Toubro and the British plug valve manufacturer Serck Audco, way back in 1961. The company started its Chennai operations in 1966, initially producing plug valves. From the beginning, our objective was to leverage Indian resources and talent, and we set up our own R&D facilities to design and develop our products. Over the decades, we added two more manufacturing facilities at Kancheepuram and Coimbatore. We moved on to manufacture gate, globe and check valves and later ball and butterfly valves. Today, we produce a whole array of critical valves for the oil and gas, power and process industries. Marketing was always handled by Larsen & Toubro through their superb network both in India and overseas. In 2013, Larsen & Toubro acquired the shares of the joint venture partner to create L&T Valves Limited as a wholly owned subsidiary of Larsen & Toubro.

Key products and markets

The Indian market accounts for nearly 50% of L&T Valves revenue, and the balance comes from international markets, with the Middle East being the most prominent territory. “We are a one-stop-shop for almost all types of process valves – gate, globe, check, ball, butterfly, and plug valves. We offer these valves in many combinations of size, pressure class, materials, and so on, and we are equipped to provide our clients with almost all their process valves requirements” says Mr. Venkat.

“Further, L&T Valves also offers a complete range of valves for the power industry. In fact, we are one of the few companies that can offer all valves and accessories required for an ultra-supercritical thermal power station.”

“Custom-engineered solutions for defence and aerospace applications form an important part of our portfolio. The experience that we gain from working in these sectors has helped us to improve our product quality, strengthen our processes and expand our knowledge base.”

Product development

Product development plays a key role in continued and consistent success in a spectrum of industries. Mr. Venkat says: “We have around sixty engineers working on R&D and we are continually developing new products, variants, and valves for special applications that can add value for customers. Incidentally, our company tagline is ‘Valves that add Value.’”

They are also developing smart valves with diagnostic and communication capabilities built in. Real time data collected from the valve can be analysed to monitor valve health, diagnose issues, and proactively plan spares and maintenance.

Customer relationships

When it comes to customers, Mr. Venkat says that they can be broadly classified into three types. “There are end users such as Saudi Aramco, who buy valves from us for their projects and MRO requirements. Then there is a second group consisting of EPC contractors and thirdly, we sell through distributors. In India, we have an extensive network of forty-five distributors at various locations close to industries served. No other valve company has that kind of reach in the Indian market. Internationally as well, the company has strategic alliances with key distributors in the US, Europe, the Middle East, and APAC to reach customers in all corners of the world.”

“Most customers remain with us a long time, some of them have been with us for three decades and more.

“Our gate, globe, ball, and butterfly valves are all SIL-3 certified. Additionally, we also offer SIL-3 capable HIPPS. We can integrate valves, actuators, logic solver and other accessories, offered on a skid, or in any form that the customer may want, and we have already supplied such packages to major customers in the industry.”

Emergency shut down (ESD) valves are critical in the pipeline and process industries and L&T Valves offers a range of ESD valves valve can be analysed to monitor valve health, diagnose issues, and proactively plan spares and maintenance.

A Machining Centre.

Outside L&T Valves with Mr. N.V. Venkat - Chief Executive and Director.

A smart valve with diagnostic and communication modules.
“Most customers remain with us for a long time, some of them have been with us for the last three decades and more,” Mr. Venkat says proudly, adding, “Take Reliance in India, for instance. We have been associated with them since the 1980s. They have recently expanded the Jamnagar refinery, the world’s largest. We supplied over 375,000 valves for the project – nearly 65% of the valves that were purchased.”

“L&T Valves shares an enduring relationship with EPCs like JGC of Japan. In the last fifteen years, L&T Valves has had a presence in every major project executed by JGC. Moreover, JGC plays an active role in helping to nurture a ‘Quality Culture’ at L&T Valves. At the recent JGC Quality Forum, L&T Valves was awarded MVP in recognition of L&T Valves’ initiatives to proactively identify and improve the quality.”

Digitalisation

An area of importance for L&T Valves is digitalisation. “Since we focus on engineered and customised valves for large global projects, end-to-end digitalisation makes it easier to manage the complexities of the business,” explains Mr. Venkat.

“The system ensures that customer specifications and requirements are accessible to everybody in the chain from design and quality to manufacturing. Manufacturing progress is tracked using barcodes attached to components, and 100% visibility ensures on-time and error-free manufacture.”

“We offer a revolutionary RFID-based solution that addresses customer’s traceability requirement. The system retrieves cross-referenced test certificates and other documents instantly and ensures smoother installation and operation. The system is currently in operation at installations with large valve populations, and it significantly reduces documentation hassles at site.”

L&T culture

All these developments and improvements in L&T Valves production systems are in sync with company’s attitudes towards quality. Mr. Venkat: “Our vision is to make L&T Valves the most trusted valve company in the world. We placed the achievement bar very high for ourselves and it is something that differentiates us. To realize this goal, we have to earn the trust of customers and I can do this only if I respect and trust my employees. Every person at L&T Valves is therefore encouraged to creatively contribute to the workplace through ideas, and they are left in no doubt that they are all an important part of the L&T family. Most of our employees stay with us for a very long and successful career. Many like myself, have been in the company for over three decades. I reached the top after starting the career as a sales engineer. Our attrition rate is probably one of the lowest among valve companies in India. I know that we instil pride and ownership in all our employees and as a result we are able to enhance the quality of our products and services and make them stand out.”

Looking to the future

It goes without saying that with these accomplishments under their belt a bright future can be predicted for L&T Valves. Certainly, the company has no intention of resting on its laurels. Mr. Venkat: “The valve industry is moving towards automation and we will continue our endeavour to develop valves and processes that add value to our customers. The digitalisation programme will help improve the quality and efficiency of our production processes without losing focus on safety. We plan to enhance our differentiation and competitiveness, so that we can add more value to our esteemed customers in the long run.”

To address customer service, L&T Valves have recently opened a modern service centre in Jamnagar to cater to key customers in the area. It is a flagship centre and, once it has proved successful, the company intends to replicate it in more locations in India and overseas.

In terms of market reach, L&T Valves see themselves moving increasingly into newer territories like Africa, Eastern Europe, and South America. They have already recruited marketing professionals with international experience, to create an impact in those markets.

Conclusion

In short, there are lot of exciting plans and developments in the pipeline at L&T Valves, which will see them continue to provide added value to their customers and drive them further along the road to become the most trustworthy of valve companies.
**Fugitive emissions: ISO 15848 versus TA-Luft***

By Tim-Frederik Kohler

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### ISO 15848

- **In the framework of ISO 15848 the entire industrial valve, including the body seals, will be subjected to type testing.**
- **The ISO type test classifies the complete industrial valve into a pressure, temperature, endurance and tightness class.**
- **The overall cost for all the Oil Marketing Companies (OMCs) to shift to BS VI fuel is estimated to be around Rs 30,000 crore.**
- **Rama Gopal said IOC will start selling the BS VI grade fuel at all of its 187 retail outlets in Delhi beginning April 1, 2018.**
- **It is a big challenge but it is only a beginning.**

### TA-Luft

- **TA-Luft only deals with the sealing system of the stem passage. A simple manufacturer declaration is sufficient for verification.**
- **The TA-Luft test qualifies only a “high-quality sealing system.” TA-Luft is considered to be compiled with metal bellows with a safety packing or similar sealing systems are used; whereby the equivalence in the verification system must be confirmed in accordance with VDI 2440.**
- **The requirements of the ISO type test are very specific and detailed and as a result, the test duration for a complete ISO 15848 type test takes 4 to 10 weeks.**
- **ISO 15848 Industrial valves - Measurement, test and qualification**
- **For example, many seal manufacturers like to advertise with “TA-Luft packings”. Simply using “TA-Luft packings” of this type does not guarantee long-term leak tightness. Many other factors play a significant role in a sealing system. These include, for example, the stem surface finish and the gap dimensions between the gland and the stem.**

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### About Tim-Frederik Kohler

Tim-Frederik Kohler is Global Chief Sales Officer of the AS-Schneider Group and Managing Director of AS-Schneider Subsidiaries’ in Singapore and Dubai. Tim has worked in the valve industry since 2004 and has a comprehensive global background in sales, marketing and development in the industrial valve sector. He believes in permanent re-organization to adapt to the ever-changing challenges of the world. Today this applies not just to organizational changes but more importantly to challenges in the valve engineering field. Reducing fugitive emissions are equally important but Tim believes the future will be all about smart valves to monitor and prevent leakages in the future.

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### Table 1 The difference between ISO 15848 and TA-Luft

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### The bottom line

ISO 15848 approved valves are excellent and reliable at reducing fugitive emissions. This improves plant safety, reliability and protects the environment and health.

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### Rotork Innovation

- **Protect your investment**
- **Increase plant availability**
- **Maximise productivity**
- **Reduce cost of ownership**
- **Protect the environment**

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*This short article was first published by Tim-Frederik Kohler in Emissions Control, 2017.*
Catching unfit control valves

How do you catch those unfit control valves during your project before it is too late? I mean too late before it really hurts! Before it eats your energy! Before it gives you sleepless nights! During my 42 years in the petrochemical industry, working 35 years for an American oil and gas major, I was often involved in large and mega projects as the automation engineer responsible for the engineering, commissioning and startup of instrumentation and control including those control valves.

By Henk Hinsen, iHandl Engineering

How many of you have mastered the control valve sizing and selection process such that all your valves selected, except maybe a few, proved fit for the application and the plant started up without a glitch? In other words, you were never on the radar screen of the startup leader. You never got on the critical path of a startup. Never were you in a situation where people were waiting for you putting the hydrocarbons in and finally making the product...

How many times have you had to correct control valve selections during commissioning and startup? And work your butt off to get those redesigns expedited to getting the plant started up and running?

For those in this first top category, I deeply respect their skills to master the control valve sizing and selection process. I have been really jealous of them for many years! For those in the last category, like me, I deeply feel your frustrations of, over and over again, going through endless weeks, days and nights of aggravation and stress to get you off the critical path to start up the plant! Well, then, this article talks about you and me, and I am sharing my experience in my journey to master that skill.

A roadmap to master the control valve sizing and selection process

My suggestions and personal journey to master the control valve sizing and selection process reads like solving a puzzle, a complex process that under your belt is a must. Process designers may provide those also, or it is up to you to get them clear and correctly derived. Often we get insufficient data; often we get too much data.

• Piece one of the riddle is to understand the operating condition it is most of the time functioning? With this application picture the instrument engineer is able to decide where it is important to address the valve fitness and where not!

• Piece two of the riddle is to understand what makes control valves work. It has all to do with thermodynamics. The basic process parameters are Medium, Pressure Up and Down, Temperature and Flow. The process designers will generate those parameters for you. It is up to you to derive from them essential thermodynamic properties like Fluid phase and state, Molecular Weight, Density, Vapor pressure, Viscosity, and Entropic Coefficient. Not all of them are essential for each application however, so getting that under your belt is a must. Process designers may provide those also, or the control valve vendor, but see it as your task to master the skill to get those essential parameters unambiguously and correctly derived. Often we get insufficient data; often we get too much data. It is up to you to get them clear and concise.

• Piece three of the riddle is to understand how phenomena like cavitation, flashing, choking, and outgassing behave over the full working range. Getting those under your belt takes time. Grabbing those does not come overnight. You will learn to quantify such behavior using mathematics behind it.

• Piece four of the riddle is creating awareness of abnormal conditions that potentially trigger reliability challenges from physical parameters like the pressure drop, the outlet velocity, the power dissipated or the noise generated by the valve down stream pipe.

• Piece five of the riddle is predicting reliability challenges! Easy to say, but a challenge to master. Most often unreliability occurs due to combinations of flow phenomena with extreme physical parameters. Reflecting back on my journey, mastering that part of the puzzle is the most challenging and probably the critical success factor to make you become part of the top category of end-users that manages the sizing and selection process as it should. If you completed the puzzle I am sure you will be able to size and select a valve for your application.

It is important in your work to create awareness of abnormal conditions that potentially trigger reliability challenges.
My personal journey to master the control valve sizing and selection process

Let me share my journey of how I finally cracked this challenging sizing and selection puzzle.

- Piece one was pretty obvious for me. I started as an instrument engineer with a project constructing a High Pressure Polyethylene Plant and mastered, I thought, the importance of getting minimum three working points. I noticed however so many valves were specified with only one working point. I learned later that with even two working points you can already drastically improve your reliability prediction versus having one working point.

- Very late however, I dove deep into the Heat and Material balances (HMB) of the process designer to better understand the challenge for them to create those max, norm, min and abnormal process conditions from those HMB’s. And very recently I came across a project with valve selections with more than 10 working points even…

For piece two I was lucky and gifted with a passion for thermodynamics. For me thermodynamics was one of the most difficult courses to get under my belt during my engineering study. Now I have realized why it was that difficult: the teaching, the handbooks and my notes were poor. Luckily for those engineers who are studying thermodynamics today, the tools around today are great to teach you thermodynamics! I bumped into a powerful tool approximately 15 years into my career, and it changed my ability to understand thermodynamics in general and for control valves specifically. Knowing which properties are essential for each application is something very important to master. You must focus on the essential ones only! Therefore you must ignore or weed out those of no use for each specific application. Mastering that I believe is also a critical success factor. It took me most of my career to feel comfortable. The better the tool to handle this, the more successful you will be, so make sure you get the right tool.

- Together with my colleagues we created an automatic tool approximately 15 years into my career, and it changed my ability even during the FEED stage thereby identifying the High Performance Control Valves and securing the appropriate budget for those valves.

- After this journey we finally mastered our sizing and selection tool process and rolled it out to the instrumentation and process design communities.

- To go the extra mile, I convinced the tool developer to create a automatic batch routine to identify those valves unit for use during the FEED or Detailed Engineering phases to automatically identify out of a batch of control valves those that are unfit for the application so they can be redesigned prior to purchase! Easy to ask, more challenging to get! It took another four years to materialize. It became a service offered to projects generating substantial capital efficiencies with an even higher than 100/1 benefit/cost ratio, not by lower the engineering man-hours but by reducing the capital expenditures needed to correct the design flaws during commissioning and startup. This method has now been proved successful on a major current project in Europe. The results are fascinating and convinced my prior company to consider this for each future major project. For those interested please contact me via email or see me at the tool developer’s Valve World Americas booth # 932 where they will demonstrate the service.

- For project two I was lucky and gifted with a project spinoff. End-Users are now approaching the tool developer to expand the service not only for projects but also for operational purposes. Time will tell if this approach will yield a service that can be applied for turnaround planning (which valves to take out for overhaul), for scanning (I am tempted to call it a DNA scan, to identify their High Performance Valves, to match the Bad Actor listing, etc.) or other potential operate and maintain phenomena with extreme physical parameters.

Most often unreliability occurs due to combinations of flow phenomena with extreme physical parameters.
Iraq opens the West Qurna/1 wet oil treatment

Ira...
Outlook for the industrial valve market in Africa

**MARKET REPORT**

**Looking at how the valve market in Africa will be affected by the changing economic situation between 2017–2022.**

By Deepankar Bose, Research Manager, TechSci Research, Noida, India

The global industrial valve market stood at USD 61.92 billion in 2016 and Africa's share was 4.59%, which is expected to increase in the coming five years. The economy of Africa is growing, although at a slow pace. The emphasis will be on industrialization as the key growth factor for the region's industrial valves market. Recovering oil prices, globally, is also one of the factors driving growth in the market, as Africa has proven oil reserves. Nigeria, Angola, and South Africa are the leading demand-generating countries in the region. Many African countries have also formulated policies for the energy & power sector with importance being given to more power generation to increase the share of people with access to electricity, which in turn is expected to be the tailwind for the valves market in the power sector. The oil & gas, power, chemicals, and water & wastewater sectors contain the lion's share in the region's industrial valves market and are expected to maintain their market dominance during the forecasted period of the next five years as well.

**Market size**

Africa’s industrial valve market stood at USD 2.96 billion in 2016 and grew at a CAGR of 2.55% during 2012–2016. The market is forecast to grow at a CAGR of more than 4% during 2017–2022, owing to an increase in public and private investments, a growing focus towards water sanitation, a rising demand and the relative recovery in prices of oil and gas. Additionally, an increasing number of projects such as the construction of two new nuclear power reactors in Egypt, investments by the Government of Angola in developing water management and sanitation across the country, and the planned development of the Assa-North/Dhiai-South fields by the end of 2018 in Nigeria, are expected to boost the demand for industrial valves in the region.

Ball, gate, butterfly, and globe valves are the major revenue-generating industrial valves in the African region, accounting for close to 80% of the market. Ball valves: They can sustain challenging working conditions in the oil & gas industry, where the flow of oil & gas exerts pressure on the piping infrastructure. Gate valves: As gate valves apply less pressure in comparison to other valves, they are used in long piping networks for the transportation of fluids between two or more countries. Globe valves: They are used to throttle the flow of the fluid and shut off is carried out by moving the disc against the flow rather than across it.

Others: The market share of other industrial valves including plug, check, and diaphragm valves is also expected to increase marginally across the region in the coming years. The oil & gas sector emerged as the largest contributor to industrial valves revenues in 2016, followed by other sectors such as power generation, water, and chemicals. Oil & Gas: Nigeria, Angola, Algeria are the largest oil producers in the region and the major demand for industrial valves is being generated from these countries. The market share of the Oil & Gas sector decreased during 2012–2016 due to the decrease in oil production globally, as well as in the African region.

**Table 1: Africa Oil Production, By Volume, 2016 (Thousand Barrels Per Day)**

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<thead>
<tr>
<th>Country</th>
<th>Oil Production</th>
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<td>Nigeria</td>
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<td>Libya</td>
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<tr>
<td>Rest of Africa</td>
<td>1396</td>
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Bunkers include international aviation and international marine bunkers. Source: International Energy Agency.

**Power:** Africa is home to the largest number of people having no access to electricity. However, increasing government's initiatives to cater to the demand of the power generation sector is expected to increase the revenues of industrial valves. In 2013, the United States Government launched a Power Africa campaign in Africa to increase the power generation capacity in the region, which increased the demand for industrial valves during the period 2013–2017 as a result.

**Conclusion**

Increasing industrialization and growth in other sectors apart from oil & gas is driving the market for industrial valves in Africa. In 2016, the African Development Bank approved USD 391 million for water and sanitation projects in Kenya, which is expected to drive the market for industrial valves. Others: Apart from these sectors, the mining, chemicals, and agriculture sectors are also expected to offer ample growth opportunities to companies operating in the Africa industrial valves market. The mining industry in Africa is one of the leading sectors contributing towards the GDP of some countries such as South Africa. Mining is also a major growth factor for the industrial valves market there.

**Fig. 1. Global total primary energy supply, by volume, 1990 & 2015 (Mtoe). Bunkers include international aviation and international marine bunkers.** Source: International Energy Agency.

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**REFINERIES/PETROCHEMICALS**

**Jamnagar refinery to undergo further expansion**

The Jamnagar refinery located in the special economic zone at Jamnagar in the north-west of India in Gujarat is renowned throughout the world. It was originally commissioned in July 1997 as a private sector, crude oil refinery, owned by Reliance Industries with an installed capacity of 660,000 barrels per day. Over the years it has grown considerably in size, the Special Economic Zone (SEZ) plant being added in 2008, making it into what is today considered to be the largest refinery in the world.

Most recently at the very end of February 2018, Reliance Industries announced a 35% increase in the installed capacity of this export-focused, which will again lead to a mammoth expansion of this world’s largest refinery complex. So what is the capacity that is actually being produced by the refinery at present. As recently as October 2017 India’s Petroleum Planning and Analysis Cell reported that the Jamnagar refinery’s installed capacity was 35.3 million tonnes a year. In comparison the same Petroleum Planning and Analysis Cell had indicated in a report published two months earlier in August 2017 that this figure was up from 27 million tonnes or approximately 545,000 barrels a day as of April 2017.

The new capacity is equal to producing approximately 705,000 barrels per day of crude processing oil. The first plant built by Reliance Industries sold most of its fuels to the regional Indian market, but particularly after 2008 exports have become a dominant factor. Reliance Industries have indicated that the expansion in SEZ capacity has been largely due to “debottlenecking a number of processes, whilst at the same time ensuring that other processes were streamlined”. Nevertheless, to date the company has not provided more details as to the capacity within the refinery has been increased. It has, however, been known for some time that the company has been constantly operating its export-oriented refinery at a rate that is higher than its nameplate capacity. Other comments on the situation have not been forthcoming from Reliance Industries for the time being.

Looking ahead, the refinery will continue to be one of the most complex in the world with facilities maximizing production of gasoline and diesel from higher density crude oil. In presentation that Reliance Industries have given to the press on a number of occasions they have estimated that production capacity from its Jamnagar complex will be raised to 100 million tonnes per year by 2030 at a estimated cost of $10 billion. It will therefore further expand as a hub for industry and high technical employment in the region.

**Table 1 The six largest refiners in the world**

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<thead>
<tr>
<th>No.</th>
<th>Name/Owner of refinery</th>
<th>Location</th>
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<tbody>
<tr>
<td>1</td>
<td>Jamnagar Refinery</td>
<td>Jamnagar, India</td>
</tr>
<tr>
<td>2</td>
<td>Paraguan Refinery</td>
<td>Punto Fijo, Falcin, Venezuela</td>
</tr>
<tr>
<td>3</td>
<td>SK Energy Ulsan Refinery</td>
<td>Ulsan, South Korea</td>
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<tr>
<td>4</td>
<td>Yeosu Refinery</td>
<td>Yeosu City, South Jeolla Prov-</td>
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<td>ince, South Korea</td>
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<tr>
<td>5</td>
<td>Onsan Refinery</td>
<td>Ulsan, South Korea</td>
</tr>
<tr>
<td>6</td>
<td>Port Arthur Refinery</td>
<td>Port Arthur in Texas, USA</td>
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**INDIA NEWS**

**Aramco, RRPCL sign MOU on petrochemical plant**

Saudi Aramco recently signed a Memorandum of Understanding (MOU) with “Ratnagiri Refinery and Petrochemicals Ltd.” (RRPCL), a consortium of Indian oil companies which includes The Indian Oil Corporation Ltd. (IOCL), Bharat Petroleum Corporation Ltd. (BPCL), and Hindustan Petroleum Corporation Ltd. (HPCL), to jointly develop and build an integrated mega refinery and petrochemicals complex at Ratnagiri, in the state of Maharash- tra. Saudi Aramco may also seek to include a strategic partner to co-invest in the mega refinery. The project cost is estimated at around $4 billion.

The strategic partnership brings together crude supply, resources, technologies, experience, and expertise of these multiple oil companies with an established commercial presence around the world. The refinery will be capable of processing 1.3 million barrels of crude oil per day. It will produce a range of refined petroleum products, including gasoline and diesel, meeting BS-VI fuel efficiency norms. The refinery will also provide feedstock for the integrated petrochemical complex, which will be capable of producing approximately 18 million tons per annum of petrochemical production. In addition to the refinery, cracker and down- stream petrochemical facilities, the project will include associated facilities such as a logistics, crude oil and prod- uct storage terminals, raw water supply, as well as cen- tralized and shared utilities.

**Total and Saudi Aramco to build a petrochemical complex**

Saudi Aramco and Total signed a MoU to build a petrochemical complex in Jubail, Saudi Ara- bia with an estimated investment of $9bn. The complex will be integrated downstream of the SATORP refinery, a joint venture between Saudi Aramco (62.5%) and Total (37.5%) in Jubail. The project will produce more than 2.7 million metric tons of high value chemicals. Located next to the SATORP refinery in the same industrial area, the complex will comprise a world-size mixed-feed steam cracker (95% ethane and refinery off-gas) with a capacity of 1.5 million tons per year of ethylene and related high-added-value petrochemical units. The project will represent an investment of around $5 billion. The cracker will feed other petrochemical and specialty chemical plants representing an overall amount of $4 billion in- vestment by third party investors. The two partners are planning to start the front- end engineering and design (FEED) in the third quarter of 2018.

**Devlon® V-API Thermoplastic Valve Seats**

Devlon® V-API Thermoplastic Valve Seats

![Devlon® V-API Thermoplastic Valve Seats](Image)

Devlon® V-API offers better performance than standard polyethylene or PTFE and is more cost-effective than PEEK™.

**POSITIVE MATERIAL IDENTIFICATION**

Devlon® V-API has been developed by James Walker in close co-operation with the valve industry as the answer to the search for a superior valve seat material.

Devlon® V-API is a proprietary formula developed by James Walker. Specifically formulated to provide enhanced performance across a wide temperature and pressure range, Devlon® V-API is now widely specified by valve manufacturers and has rapidly earned a leading position for use by major oil and gas producers.

For further details, Contact:
James Walker Inmacco Industries Pvt. Ltd., 104, Gagan Complex, Behind Mital Industrial Estate, Andheri (E) Road, Andheri (E), Mumbai - 400 069, India.
Phone: 2220 2980, 119, E-mail: info@inmacco.com, sonal@inmacco.com

www.devlon.com
www.jameswalker.co.uk

James Walker Inmacco

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PEOPLE & PRODUCT NEWS

2L Engineers expand their business

2L Engineers, a fast growing valve manufacturer in India have so far successfully installed valves in about ten countries around the world and will be striving hard in the new financial year of 2018–2019 to increase upon this count. Mr. N.S. Honnalli, the Chief Executive Officer stated: “All of this has been achieved within three years of the brand’s inception. To meet growing manufacturing requirements the company has opened up a new manufacturing unit near Rayapur, Dharwad, Karnataka. The company already produces a whole array of valves including: ball, butterfly, check, gate, globe, forged, plug, and customized valves. See further www.2LEngineers

Rotork opens new fluid power actuator factory in Chennai

Earlier this year a new Rotork factory was opened in Chennai, dedicated to manufacturing Rotork’s Fluid Systems’ products in India. The 23,200 square foot factory was formally inaugurated by Ravi Shankar, Managing Director of Rotork India. The inauguration was attended by key customers and suppliers from across the country, who were given live demonstrations of the Rotork products. Rotork Fluid Systems’ products encompasses scotch-yoke and rack-and-pinion pneumatic and hydraulic actuators, gas-over-oil actuators, high-pressure direct gas actuators and electro-hydraulic actuators. In addition to quarter-turn designs, most ranges are also available for linear valve applications. Many actuators are built for critical high-speed fail-safe or emergency shutdown (SSD) duties in harsh locations, including subsea actuators for valves at depths measured in hundreds of feet. The Rotork service includes the design and production of control systems and instrumentation, facilitating the manufacture of complete fluid power actuator packaged solutions for projects of all sizes and complexities. Peter Matton, Rotork Fluid Systems Managing Director, commented: “The addition of this new facility will allow Rotork India to better serve its growing market for Rotork Fluid Systems products in India. The factory was commissioned in a record time of eight weeks from the date of taking possession of the premises to the assembly of the first pneumatic actuators.”

Bell O Seal Valves approved for chlorine applications

“After a twenty-year struggle for Bell O Seal Valves (P) ltd, we have achieved approval from Euro Chlor to supply our globe valves for chlorine and chlorine derivative applications,” Managing Director Rajesh K. Salins recently told the Valve World India Journal. The process involved in Euro Chlor approval is an important one in that a small leak of chlorine can be a human hazard leading to human deaths and hence is classified as a Cat M Fluid service. Being such a service, Euro Chlor brought in guidelines and an approval process related to Bellow Seal Valves involving: (1) A design review of Bellow Seal Valves. (2) A factory audit. (3) A sample testing of valves. (4) Fugitive emission’s compliance. (5) A field test report on valves that had been installed and had run successful for more than two years of operation. All these criteria were verified through TUV SUD, Germany. Why Euro Chlor Valves? Every end-user has an environment impact assessment report which assures the National Pollution Control Board that their fugitive emissions will be minimized so that LDAR exemptions are availed from the Government of India. By using Euro Chlor approved valves, the end-user has an assurance that reliable valves are purchased for critical/hazardous applications so that LDAR exemptions are taken and in this way they can avoid penalties and fines from the National Pollution Board. Bell O Seal’s valves can be used in such applications as: liquid chlorine, dry gas chlorine, HCL, pyrometric media, fluoride, hydrogen fluoride, phosgene, nitrogen trifluoride, CFCs and as per ASME B 31.5.

Inauguration ceremony at Shilpan Steelcast Pvt Ltd.

A second unit of Shilpan Steelcast Pvt. Ltd. was officially opened with a celebratory ceremony earlier this year. The location of the new unit is Lodhika, Khirish Gate, Kalawad Road, Metoda, in Rajkot, Gujarat. The ceremony commenced with ribbon cutting, followed by a symbolic lighting of the lamp to pay respect to Lord Ganesha as is Indian custom. The program was graced by some of the biggest and most respected names in the industry in the Gujarat region. This second unit, or SSPL-2 as it is fondly called, is a state-of-the-art investment casting foundry, spread over 10,000 square feet of land, and having a capacity of over 300 metric tonnes per annum. As it is fitting to this high-tech unit, it has multiple in-house machining shops and laboratories and is equipped with the latest in machining and testing facilities. A spokesman for the company told Valve World India Journal: “It is one of the largest single investment casting foundries of its kind in India.” SSPL-2 has been established with the sole purpose of providing extremely high-quality castings with the foundry focusing on such industries as pumps, valves, automobiles, turbochargers, surgical implants, and ordinance, etc. Certainly a factor playing to its advantage is its strategic location in Saurashtra - one of the fastest growing state economies in the country. The new unit is part of the Shilpan & Shyamal Group, an INR 60+ Cr. conglomerate, with business interests in infrastructure development, information technology, energy, education and engineering automation.

Saint-Gobain Seals providing critical sealing parts for the oil & gas industries

Oil & gas environments are some of the most hazardous industrial applications due to the presence of flammable vapors and gases. It is therefore essential that the parts used in these industries are reliable. In a recent conversation with the Valve World India Journal, Saint-Gobain stated that their Omnisert parts are valuable in solving reliability issues that occur when elastomer seals interact with corrosive oil and gas (or sour gas), or when temperatures vary, or when there are sudden high-pressure changes. The company produces a polymer spring-actuated, pressure-assisted sealing device constructed of a PTFE (or other polymer) jacket that is partially enclosed by a corrosion-resistant energizer that has a crucial place in the oil & gas industries. The sealing parts are made in-house using a special assembly line, which makes use of unique cutting tools that produce a variety of part geometries. Saint-Gobain also use CFD simulation tools such as finite element analysis to model, design and validate complex designs. The seal handles extreme applications with high pressure conditions - up to 300 psi and temperature ranges from cryogenic to proof and above. Saint-Gobain’s spring-energized seals have been used for fifty years by their main customers, OEMs, and engineers. Two of their key benefits being a precise fit and lifetime confidence. For further information, please visit: www.seals.saint-gobain.com

Think Valves. Think Microfinish.

• Over 40 years of traditional excellence and expertise in valves design and manufacturing
• Wide variety of sizes and materials
• 1,75,000 sq.ft. of world class manufacturing facility
• Full range of valve services

24 Microfinish Pumps Valves Automation

Saint-Gobain Seals

For further information, please visit:

www.seals.saint-gobain.com

Plants where they are used are: chloroalkali, TDI, MDI, isocyanates, chloro methanes, VCM, EDC, ECH, pesticides, insecticides, HFC, and halogenated plants, etc.

Exterior and interior of the new Rotork Fluid Systems Chennai factory on the day of the inauguration.
In addition to the company's Delta valve design, the WorleyParsons team will transition the construction and commissioning works until the final delivery of the Project in 2022.

CIRCOR open extension to manufacture refinery valves

The CIRCOR India Combiator facility recently celebrated the opening of an extension to their manufacturing facilities to produce refinery valves. Reliance India is their largest customer for refinery valves and will be served out of this facility. This is in line with CIRCOR's East for East strategy. In addition to the company's Delta Valve products, they will also manufacture TapiEnpro valves. Delta Valve designs, engineers, and produces top of the range, technologically advanced valves and related equipment for the operation of delayed coking units in refineries. TapiEnpro manufactures a diverse set of customized, highly engineered severe service valves and systems for fluid catalytic cracking units in refineries. It is the intention that the existing installations to process offshore crude at the Ruwais Refinery. WorleyParsons will oversee the performance of the EPC contractor through the detailed design and procurement phases over the next 14 months. Thereafter, the WorleyParsons team will transition to the Ruwais Refinery site to supervise the construction and commissioning works until the final delivery of the Project in 2022.

Egypt invite an alliance for Red Sea energy exploration

Egypt will invite international oil companies to explore for petroleum wealth in the Red Sea before the end of the year. An international alliance that includes British geophysical services company WesternGeco and the Norwegian geoscience data company TGS-NOPEC has been collecting data on Egypt’s Red Sea coast to determine oil and gas concentrations.

The alliance is investing USD 750 M in the studies, using equipment to create images of the seabed dozens of kilometres underwater. The alliance expected to finalise its data collection process is to publish a study outlining hydrocarbon concentrations in the area. The Petroleum Ministry would then issue a global tender to explore for hydrocarbons in the region.

ADNOC awards contracts to Samsung Engineering

Abu Dhabi National Oil Company (ADNOC) has confirmed the signing of two major contracts between ADNOC Refining, a wholly owned subsidiary of ADNOC, and Samsung Engineering Co., Ltd., worth a total value in excess of USD 5.5B. The two contracts comprise a USD 5.1B project to introduce crude oil processing flexibility and a USD 275M project to recover power and water, both at the ADNOC-owned Ruwais oil refinery. The first of the two new contracts awarded by ADNOC (ADNOC Refining) to Samsung Engineering was an EPC contract for a crude oil processing flexibility project. Scheduled to be completed by the end of 2022, this project will enable ADNOC’s Ruwais Refinery-West complex to process up to 40,000 bpd of Upper Zakum crude.

TAPI becomes powerful impetus for economic development

The transnational megaproject of the Turkmenistan-Afghanistan-Pakistan-India gas pipeline (TAPI), which is to be put into operation by 2019, will become a powerful impetus for the regional economic development. The construction, launched in Turkmenistan on December 13, 2015, will create not only new jobs, but also ensure stable energy supply of the region. TAPI project entered a new stage of implementation on February 23, which initiated construction work in Afghanistan.

Iraq seeks investors for Anbar refinery project

Iraq’s Ministry of Oil (MoO) has invited investors to submit proposals for the construction of a 70,000 bpd capacity refinery in Anbar Province near the city of Haditha. The deadline has been set for June 14 for the facility to be constructed on either a build-operate-transfer (BOT) basis or build-own-operate (BOD) concept by 2021. The MoO said recently that the region was seeking to raise its refining capacity to 1.5 M bpd by 2021. Of that, 500,000 bpd would be exported. There is also a push to attract around USD 4 B in funding for petrochemical projects.
Coming together of technologies

Industry experts further state that the potential of digitalisation is expected to increase because of the coming together of different types of technology: block chain, artificial intelligence IoT, robotics, simulation and predictive modeling. “We’ve been digital for decades,” a manager from Statoil says, “but it has had limited impact beyond becoming more energy efficient. All the above factors enable large changes at an increasing pace.” According to IEA, digitalisation would be able to decrease production costs by 10 and 20 per cent, with more advanced use of sensors, seismic data and reservoir modelling. It also could increase technically recoverable oil and gas resources by 5 per cent globally. Not a surprise that Bloomberg New Energy Finance predicts a surge in demand for these technologies, growing into a USD 64 billion market in 2025.

Lack of digital skills

The market, however, will not be all about the hardware and software. Human capital, or the skills package, will be instrumental whether companies will be able to reap the harvest of digitalisation, while also safeguarding their operations (cyber security). From the survey appears that a lack of required skills are seen as the biggest barrier. These digital ‘skill gaps’ need to be closed urgently, whether in house (hiring) or working together/forming alliances with digital companies. As a representative from Galp puts it: “We look for companies that have clearly had success within our key digitalisation areas, but not necessarily in oil and gas. We look outside, to other industries where we can learn new things.”

High-strength corrosion-resistant alloys in bar, plate and pipe.

With 80 years’ experience, we provide products that deliver functional performance in the harshest of conditions. Langley Alloys carry extensive stocks of high-performance stainless steels, nickel and copper alloys in bar plate and pipe form.

By Lucien Joppen

Digitalisation is one of the key trends for oil and gas, according to the report Confi- dence and Control: the outlook for the oil and gas industry in 2018 (DNV GL). The re- port, which hit my desk a couple of weeks ago, is based on a global survey among more than 800 industry professionals, along with 15 in-depth interviews with a range of business experts, business leaders and analysts. From the report emerges a sector sentiment which can be described as cautious opti- mism. It appears that price levels for oil (and gas) have become less volatile and in 2018 will move between 55 and 65 USD per barrel: relatively high but still not near previous peak levels between 90 and 100 USD.

As many experts say, these price levels can only lead to healthy margins if both running and investment costs are lower. And it seems that especially the major operators have succeeded in doing just that. It is interesting to see that over the last three years only seven companies have been responsible for 90 per cent of all megaprojects (see also the article on pages 29 and 30).

More profitable

The emphasis on keeping costs down will remain high on the agenda of the sector, given the expectations that price levels will remain at a modest level. As for operating costs, the sector identifies digitalisation as a key enabling technology. In the survey both digitalisation and cyber security are topping the agenda and Control: the outlook for the oil and gas industry in 2018 (DNV GL). The re- port, which hit my desk a couple of weeks ago, is based on a global survey among more than 800 industry professionals, along with 15 in-depth interviews with a range of business experts, business leaders and analysts. From the report emerges a sector sentiment which can be described as cautious opti- mism. It appears that price levels for oil (and gas) have become less volatile and in 2018 will move between 55 and 65 USD per barrel: relatively high but still not near previous peak levels between 90 and 100 USD.

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Corrosion protection of valves

Uses and types of valves

Valves and actuators are the essential part of any flow system to control and regulate the flow rate. However, the velocity of the fluid and impurities present in the fluid system result in disturbances in flow control and in some cases choke it. This thereby results in failure due to an excessive corrosive environment. The simplest method to protect the valves from corrosion is, therefore, to protect them with suitable coatings. Organic paint coating is one solution, alternative coatings using thermal spray and powder coatings can also give hard and long durable coatings.

Valves are the essential part of any flowing system, whether it is liquid or gas. The most common example of the use of valves is the distribution of water in cities, towns, and villages. They regulate the flow and also cut off the supply in case there is any puncture of pipeline ahead. The valves need to perform excellently and should be free from any corrosion or deterioration of their surface. In addition to water transportation, there are several other fluids which may be reactive to valve materials and may corrode with time and thus can cause contamination, as well as disturb the flow pattern. Hence, it is of the utmost importance to assure the stability of the valve material. Before we go into discussing the methods of protecting the valve material, it is important to highlight various other functions of valves.

There are various kinds of valves, each one having a special specific function as listed below:

1. Gate valves
2. Diaphragm valves
3. Butterfly valves
4. Ball valves
5. Needle valves
6. Globe valves
7. Check valves
8. Pinch valves
9. Solenoid valves
10. Taper plug valves.

Materials used for making valves

Valves are often used in flow systems that contain dangerous liquids or gases—perhaps toxic chemicals, inflammable petroleum, high-pressure steam, or compressed air—that must not be allowed to escape under any circumstances. Usually valves are made from steel as it is the cheapest material and is very easy to cast or machine into various intricate shapes. However, various other materials are also used to cast valves. Some of the common materials are:

- Carbon steel
- Ductile iron or cast iron
- Stainless steels
- Brass and bronzes
- Plastics – PVC

Carbon steel is the cheapest material, easily available and easy to fabricate in any shape or form. However, it has a strong tendency to get corroded in even most environments and can corrode heavily in aggressive environments such as onshore and offshore. Thus alternative materials such as stainless steels, and bronze, etc. are used. Plastic valves are also becoming very popular and they are free from any corrosion. Let us focus on the most common mechanism by which the valve materials deteriorate. One of the most common mechanisms of deterioration of valve material is erosion-corrosion.

Erosion and cavitation corrosion

Erosion is perhaps the most common and wide spread mechanism, responsible for the corrosion of valves. It takes place in aqueous fluids, organic fluids, and even in gaseous fluids. This basically is related to the flow pattern of the fluid flow. The velocity of the fluid affects the corrosion rate as shown in Fig. 3. Turbulent flow can cause major damage to valves and laminar flow appears to be the best. High pressure and a change in the direction of the flow causes cavitation damage in the form of deep pitting, which can finally turn into complete holes across the thickness of the valve material. The presence of suspended particles and impurities such as chlorides and sulphur bearing gases further aggravate the initial damage done by erosion alone.

Table 1 lists various kinds of flows of different fluids in relation to the velocity and the typical damage expected.

Protection against corrosion in valves

- Design & maintenance approach
  - Increasing pump suction, pipe diameter wherever feasible (to reduce bubble formation), as well as internal diameters of other pipes and tubes.
  - Reducing the suction pipe lengths to reduce pressure drops.
  - Redesign the system to reduce the flow-rate as well as turbulence; ensure net positive suction head.
  - Reduce the number of pipe joints on the suction side.
  - Maintenance effort to control fluid leakages from joints, suction-side, joint leaks in particular; use appropriate joint seals and parking.
  - Control the entry of particulate contaminants, moisture and air bubbles.

Protective coatings for valves

Organic paint coating is perhaps, the simplest method of protecting valve material from corrosion. The coating characteristics can be to provide good corrosion resistance and surface hardness. Several coating systems are available, based upon the chemistry of the resin such as alkyl, epoxy, polyurethane, acrylic, and polyester to mention but a few. From water to toxic fluids, the choice can be made based upon the chemistry of the resin. Alkyl being least resistant to corrosion, and epoxy the best. Surface hardness can be increased by:

- Allow fluid to settle down in a settling tank, so that water and air can be removed and sludge and emulsion, if any, can be separated.
- Select erosion corrosion-resistant materials compatible with environment.
- Use coatings and other surface treatments.

Table 1 Effect of various flow patterns and their relation to the velocity and types of valves

<table>
<thead>
<tr>
<th>Type of flow</th>
<th>Media type</th>
<th>Velocity range (m/s)</th>
<th>Recommended check valve type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Uniform</td>
<td>Water &amp; Oil</td>
<td>0.3–2</td>
<td>Inline guided disc</td>
</tr>
<tr>
<td>Uniform with insignificant reversal</td>
<td>Water or oil</td>
<td>0.3–2</td>
<td>Swing check w/lever and center w.</td>
</tr>
<tr>
<td>Pulsating</td>
<td>Steam, water, gas</td>
<td>2–30</td>
<td>Simple swing</td>
</tr>
<tr>
<td>Uniform with normal reversal</td>
<td>Water &amp; Oil</td>
<td>2–9</td>
<td>Inline guided disc with cushion chamber</td>
</tr>
</tbody>
</table>

Fig. 1. Pitting corrosion on a valve due to erosion-corrosion.

Fig. 2. Corrosion of the thread of a glamour bse Y-valve because of corrosive fluid.

CORROSION PROTECTION

This article looks at some of the reasons behind valves failures in excessively corrosive environments and how they can be protected by the use of organic, thermal spray, and powder coatings.

A.S. Khanna, Materials Department, IIT Bombay
by enhancing the cross-linking of the coating or by the addition of certain additives. The addition of nano-silica, nano-alumina helps in high surface hardness. Ceramic filled epoxies are also used to control the erosion/corrosion of the valves.

Two-component acrylic paint is used for valves, exposed to atmospheric influences and UV. The coating meets all requirements in connection to excellent resistance to UV radiation, mechanical stress, and corrosion. Two component acrylic paint is used for valves exposed to atmospheric pollutants and UV. This coating can be used for all valves used in industrial applications involving high air humidity and aggressive atmospheres.

Hard-rubber lining is a special coating used of valves in the chemical industry. It consists of a high-tech, premium-quality synthetic or natural rubber. The strong adhesion of the material to cast iron is ensured by vulcanising compositions can be achieved. Thermal spray coatings, using tungsten carbide or ceramic to the valve design process. Extremely hard careful selection of coating materials is integral gives a wide selection of hard Thermal spray is the standard technique for actuator casings, and also have high flexibility. Powder coating of finely ground resin, pigments, and binders.ing to achieve a finish consisting of a mixture oppositely biased valve body, followed by bak- is an electrostatically applied coating on an is a special coating used... to atmospheric pollutants and UV. This coating is about 240°C. It is resistant to almost all chemicals, highly concentrated acids and alkaline solutions, oils, organic acids, as well as other aggressive media, and also highly resistant against mechanical impact. It can be used in the chemical and pharmaceutical industries, power plants, refineries, food industry, gas industry, power supply, and abrasive media. In the water industry, valves are exposed to considerable stress such as high water pressures, extreme temperatures, desert or tropical climates. The valves have to be made of suitable material, with perfect technology and quality needs to ensure that the valves function reliably even after decades of service. VAG belongs to the most experienced providers of solutions for water distribution. Wherever water is treated, extracted, stored and distributed, VAG solutions play an important role. There are hardly any waterpumps, pumping stations, or waste-water treatment plants that do not use VAG valves [4].

About Professor Khanna

Prof. A.S. Khanna is a Senior Professor at the Metallurgical Engineering and Materials Science Department of IIT Bombay where he teaches Corrosion related topics and Surface Engineering. His specialties are: High-Temperature Corrosion, High-Temperature Materials, and Surface Engineering. His research topics are: High Temperature Corrosion, Surface Modifications by Laser and Thermal Spray Methods, Organic Paint Coatings, Smart Coatings such as Self Cleaning and Self-Healing Coatings, and Graphene Research. He has published more than 180 papers in peer reviewed international journals. He is a Fellow of ASM International and NACE International, a life Member of the Indian Institute of Metals and Society for Electrochemical Science. He is also a founder Chairman of SSPC India, a Fellow of Humboldt Foundation Bonn, the Royal Norwegian Science and Technology and a Fellow of the Japan Key Centre.

References


Fig. 4. A thermally sprayed coated valve.

To avoid erosion–corrosion choose a material with high hardness and wear resistance, or create coatings that show wear and corrosion resistance.

the rubber to the cast-iron substrate. The fin-
ished rubber lining is non-porous and exhibits great hardness as well as excellent chemical resistance. This coating is available e.g. as a lining for butterfly valves, the plunger valves, and slanted-seated tilting-disc check valves. Other superior quality valve coatings can be achieved by powder coating. Powder coating is an electrostatically applied coating on an oppositely biased valve body, followed by bak-
ing to achieve a finish consisting of a mixture of finely ground resin, pigments, and binders. Powder coatings have much longer durability and also have high flexibility. Powder coating is the standard technique for actuator casings, yokes, and cylinders, as well as for cast iron and carbon steel valve body assemblies. Thermal spray gives a wide selection of hard coating solutions for the valve industry. The careful selection of coating materials is integral to the valve design process. Extremely hard coatings, using tungsten carbide or ceramic compositions can be achieved. Thermal spray component surfaces. A plasma coating is used for hard tungsten carbide and ceramic-type coatings. Tungsten carbide powder or ceramic powder is injected into the hot gas flame. Chromium carbide coatings are used for ero-
sion protection at very high temperatures. Some of the well known commercial coatings in use:

- Hardide®: CVD make valves take parts scratch-proof and capable of resist-

- Nitin (VK 2000 / VK 2001) are par-
ticularly durable and wear-resistant two-

component coatings which meet the highest demands in terms of strength and chemical resistance. The smooth and non-porous surface reduces the frictional resistance of the media flowing through the material can be used to prevent wear in new valves and also for maintenance purposes. The coating is applied by an airless spray or alternatively by hand with a roller or a brush; it cures at room temperature. It is suitable for use with wastewater, river water, sea water, brackish water and cooling water. The application areas are: the chemical industry, paper industry, power plants, waterworks, cooling systems, cement plants, and mining.

- Ethylen chloride (fluoropolymer) [3] is a thermoset fluoropolymer synthetic material which exhibits high thermal resistance (up to 150°C) and offers excel-
lent and reliable corrosion protection. It has a smooth, non-porous surface. The coating prevents incrustation of dirt parti-
cles. The melting temperature of HALAR® is about 240°C. It is resistant to almost all chemicals, highly concentrated acids and alkaline solutions, oils, organic acids, as well as other aggressive media, and also highly resistant against mechanical impact. It can be used in the chemical and pharmaceutical industries, power plants, refineries, food industry, gas industry, power supply, and abrasive media.

- In the water industry, valves are exposed to considerable stress such as high water pressures, extreme temperatures, desert or tropical climates. The valves have to be made of suitable material, with perfect technology and quality needs to ensure that the valves function reliably even after decades of service. VAG belongs to the most experienced providers of solutions for water distribution. Wherever water is treated, extracted, stored and distributed, VAG solutions play an important role. There are hardly any waterpumps, pumping stations, or waste-water treatment plants that do not use VAG valves [4].

- Belzona 1 321 [5] is a two-part ceramic filled epoxy coating designed to provide erosion and corrosion resistance of metal surfaces. This solvent-free epoxy coating has outstanding chemical resistance and will bond to almost any rigid surface. Due to its high compression strength it can be also used to create a perfect shim. This material is easy to mix and apply without the need for specialist tools and it cures at room temperature, eliminating the need for hot work. It has long-term erosion and corrosion protection, excellent bond-
ing to almost any rigid surface included steel, aluminium, copper, brass and glass reinforced plastics with high compressive strength and excellent resistance against a wide range of chemicals. It can be used for internal coating for centrifugal and positive displacement pumps, heat exchangers, water boxes, and tube sheets, butterfly and gate valves, fans and rotary nozzles.

Summary

Valves are essential part of a flowing system, which deteriorate with time due to erosion and corrosion due to change in flow pattern, impurities present in the fluid. In order to avoid erosion and corrosion, one can either choose a material with high hardness and wear resistant or can create coatings which show wear and corrosion resistance. There are variety of coat-

ings and techniques available, ranging from simple paint coatings to CVD, thermal spray and powder coatings which help to control deterioration of valve materials.
BPCL plans to build a petrochemical plant near Mumbai

India’s Bharat Petroleum Corporation Ltd (BPCL) plans to build a USD 5.8 billion petrochemical unit to serve the Mumbai region to profit from the country’s expected surge in demand for petrochemicals as its economy expands. BPCL’s expansion is part of a national plan to spend USD 35 billion on petrochemical production in order to meet the expected increase in consumption of the chemicals for products including plastics, paints and adhesives.

BPCL earlier this month bought 502 acres (202 hectares) of land from a fertilizer unit of Hindustan Organic Chemicals Ltd. The land will allow BPCL to build a petrochemical complex that will use feedstocks from its Mumbai refinery, which processes 240,000 barrels per day (bpd) of crude. The site is about 60 km (37 miles) from the refinery. BPCL plans to pump feedstocks from the Mumbai refinery by pipeline to a nearby port to load onto tankers that will then carry the crude to a petrochemical complex. BPCL also plans to build a petrochemical plant at its 120,000 bpd Bina refinery in central India.

India to build a pipeline from east coast to Myanmar

India has proposed to build a pipeline from the country’s east coast to deliver oil products, mainly to Myanmar. A working group has been formed by Myanmar and India to look at issues such as security, land and oil storage, and how to price the fuel and the oil’s specification.

India currently imports about 100,000 barrels per day (bpd) of diesel and gasoline mainly from Singapore, and produces only 12,000 bpd of oil locally.

The country has invited investors to build refineries but high land cost is one of the main issues to overcome.

Aramco keen on majority stake in Ratnagiri refinery

Saudi Aramco, the world’s largest oil producer, is seeking majority ownership of the proposed USD 10 billion greenfield petrochemical complex on the Indian west coast, marketing rights over entire fuel and petrochemicals produced at the complex and an assurance that the refinery would mostly use crude oil from the Indian west coast, market-cum-petrochemical complex on the Mumbai west coast.

The complex is estimated to cost INR 3-lakh-crore refinery-capacity to be doubled by 2025.

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Iraqipip Saudi to become India’s top oil supplier

Iraq has overtaken Saudi Arabia with a wide margin to become India’s top crude oil supplier, meeting more than a fifth of the country’s oil needs in the current financial year. Saudi Arabia traditionally has been India’s top oil source but in the April-June period of 2017-18, Iraq dethroned it, supplying 38.9 million tonnes (MMT) of oil.

India imported 184.8 MMT of crude oil during the period as compared to 215.9 MMT in the entire 2016-17 fiscal, and 202.8 MMT in 2015-16. Despite India cutting imports over delays in refining the period as compared to 213.9 MMT in 2015-16.

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Weir Valves builds tungsten carbide control valves

Weir Valves & Controls UK is delighted to confirm the build and supply of the largest ever tungsten carbide control valves - designed to tackle the issues associated with black powder. Black powder is an undesirable by-product in pipeline systems within the oil and gas industry. In simple terms it is a hard powder which can cause erosion of equipment, including valves, if not adequately controlled.

The higher velocity flowrates associated with gas systems means that black powder is a particular issue, as it causes any powder in the pipeline to impinge on material surfaces and therefore cause erosion. One of the most common methods of addressing this issue is to manufacture the globe control valve trim from tungsten carbide. Tungsten carbide is very hard wearing material and therefore more resistant to erosion than conventional control valve materials made from hardened steels. In short, tungsten carbide is a perfect trim material for black powder applications. The most recent project, aimed at tackling the issues related to black powder is in Saudi Arabia within the Master Gas System Expansion, Phase II Pipeline - which is located on the west coast of Saudi Arabia.

Velan ABV shipped Key-C ball valve with cable actuator

Velan is proud to announce that Velan ABV has successfully shipped four complete control units combining the Key-C rotary control ball valve with the unique cable drive actuator. These huge 97” Class 300 control valves will be part of the gas treatment process for a modernization project of a large-scale refinery in northern Kuwait. Manufactured in Italy since 2010 and developed from a traditional trim ball design, the Key-C represents the new generation of rotary control ball valves as it matches high performance with wide flow capacity. The ball is equipped with a special caged trim-thesis multi-stage technology that limits the chance of cavitation or flashing phenomena in liquid applications and reduces the aerodynamic noise in presence of gas flow. The success of this project can be attributed to the innovative cable drive actuator, able to overcome the traditional drawbacks of a Scotch Yoke design in fast and demanding control conditions. Patented in 2014, its high efficiency transmission system develops linear torque and ensures low friction and zero backlash along the entire stroke. These key features enable accurate and precise control in high dynamics process.

KBL valves conform to IS 14846 standards for dimensions

Kitsoskar FM/UL valves generally conform to IS 14846 standards for dimensions, materials of construction and constructional features, as per the need of the application. These sluice valves are metal-seated type with an option for non-rising spindle/ rising spindle operation, different type of operators and accessaries, and have a proven performance. The products included in a fire protection system, such as valves and hydrants need to be highly reliable, as they are installed in systems that help protect human life against fire accidents. Kitsoskar Brothers Limited (KBL) always believes in IBA (Innovative + Reliable + Affordable) products, with the highest standards. KBL’s fire protection products are UL & FM certified. The company’s products are approved by well-recognised institutes & are used in fire protection systems globally. KBL offers a large range of valve products for both indoor and outdoor fire protection applications, such as NRI gate valves, OS&Y gate valves and post indicators. KBL offers a wide range and types of flanged gate valves, all of which are perfectly suited for various fire protection installations.

Reliance ARC appoints Ravindra Rao as its new CEO

Reliance Asset Reconstruction Co (ARC), part of Reliance Capital, said it has appointed Ravindra Rao as its new Chief Executive Officer. The company said Rao has taken over as CEO from Asokan Arumugam, who was heading Reliance ARC for the last four years. The statement said Rao has joined Reliance ARC from Fullerton India where he worked in different roles for over six years, with his last assignment being the CEO of the home finance subsidiary. Reliance ARC is a premier asset reconstruction company with Reliance Capital being the principal sponsor. Other sponsors include Corporation Bank, Indian Bank, GIC of India, Dacecroft and Blue Ridge, the statement added.

Mack Valves announces senior level appointments

Mack Valves, a joint venture between Herose GmbH and the Ador Group, has announced new senior level appointments within its Indian operations at Mack Valves India. Chitaranjan Jain will join the company as its new Managing Director, while Björn Stoll has been appointed as Chief Operating Officer of Mack Valves India. Jain brings a strong heritage of operations and financial management experience, having previously worked in various senior roles within the Ador Group, including company secretary, chief financial officer, head of procurement and his latest role, as head of commercial management & risk. Meanwhile, Stoll brings significant experience in production and operations management, quality management and implementation and also vendor development, having previously been based at Herose in Bad Oldesloe (Germany) where he worked as the head of production planning, controlling, and logistics. Stoll successfully implemented a number of production efficiency and lean related projects in his time at the company.

AMPO POYAM delivers engineered valves for Al-Khafji

The end user Al Khafji, a joint venture between Kuwait Gulf Oil Company (KGOC) and Aramco Gulf Operations Company (AGOC) of Saudi Arabia, and the EPC (GC) Gulf, have trusted in AMPO POYAM VALVES for the design and manufacture of 50 manual and electrically and pneumatically actuated Split body ball valves. The valves’ sizes will vary from 2” to 36” and the pressure range will vary from 150 lbs to 600 lbs. AMPO POYAM VALVES is a world leader in ball valves, but also in highly engineered valves for high temperature services. For this project the company will deliver many high temperature ball valves with special seats and gaskets, which will be designed while considering the following issues: valve robustness, materials, operability, temperature transmission, etc. The objective of Al Khafji joint Operations is to conduct the onshore and offshore activities related to Exploration, Drilling and Production of Oil & Gas in the Divided Zone, and it is currently developing the “Global Gas & NGL Recovery & Handling Project” in this area, where the mentioned AMPO POYAM VALVES will be installed.

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Severe service fugitive emissions

Packing for quarter turn applications

This article looks at various stem sealing solutions and the reasons one might choose them. The intricacies of typical severe service applications, high-cycle severe service applications, and what happens when a valve must become fast-acting, will be addressed.

The limitations of the common fugitive emissions specification (ISO 15848) and how ValvTechnologies has addressed these in the development of the EcoPack® fugitive emissions system for severe service applications will be further examined.

By Tony Majka, ValvTechnologies

Quarter turn and rising stem valves

When selecting the most suitable method of stem sealing technique, it is necessary to understand the valve actuation method. Among the most common valve actuation techniques are rising stem (linear) and quarter (1/4) turn. The linear actuation method is found commonly in gate and globe valves, whereas a quarter turn method is typically employed in the ball, plug, and butterfly valve types. The actuation technique refers to the method by which the stem or shaft of the product is moved to actuate through the line sealing mechanism. Refer to Figure 1 for a pictorial demonstration of the quarter turn method of actuation and Figure 2 for the rising stem method of actuation.

The quarter turn method of actuation is often considered to be the more robust design for stem/shaft sealing because the stem is merely rotated about its axis in the stem sealing area whereas the rising stem design is rotated about its axis and moved linearly through the sealing area. The linear movement of the rising stem allows for debris and shaft imperfections to generate leak paths as the stem pushes linearly through the seal from inside the pressure boundary to outside the pressure boundary. For this reason, ValvTechnologies utilizes quarter turn valve actuation in most severe service, high-cycling applications. This will be the basis of discussion moving forward.

Severe service stem sealing solutions

The definition of severe service has been the center of much debate in recent years. Often, severe service can mean that the media flowing through the valve can be lethal if leaked to the atmosphere. Sometimes severe service is used to define a process media that is highly abrasive or undergoing a phase change while flowing through the valve. All of these can provide a special challenge to valves and their ability to seal both through the line and to the atmosphere.

When chosen correctly, there are many stem sealing solutions in existence that can provide adequate external sealing based on a particular application. A combination of proper selection of seal material and geometry can last many years in service if the valve is appropriately designed. Some of the most common stem seals are made of elastomers (such as Buna, Viton® or Kalrez®), polymers such as PTFE, PEEK, or special PTFE based blends) or flexible graphite derivatives (such as Grafoid® C5, GFK or braided rope). Each of the sealing material have great properties in certain applications.

- Elastomer blends have great sealing characteristics and are particularly suited for high pressure, but have lower temperature limitations than graphite blended polymers and are typically more susceptible to failure in abrasive applications such as catalyst and slurry feed.
- Polymer blends can withstand more abrasive applications and often have great chemical compatibility. At very high temperature and pressure these often fail short of performance goals as PTFE really starts to lose its strength around 450°F (232°C) and cannot withstand a fire.
- Graphite derivatives are generally chemically inert and have very high temperature ranges. Unfortunately, graphite is porous allowing permeation in most emissions tests. Additionally, graphite tends to breakdown in high-cycle applications and extrude from the packing area if the valve is not properly designed. Although its nature does not promote longevity, it is common to find this material utilized in severe service applications due to the high temperature capability and its ability to withstand a fire.
- For high cycle applications, where stem sealing is crucial, it is common to utilize a mixture of several or all of these in a stem seal.

The geometry of the stem seal plays a key factor in determining the useful life of the seal. In past decades, it was common to utilize a stem seal that was only an extruded ring of material such as PTFE or Grafoid®. These rings looked like a washer that was compressed into the packing bore to effect a seal on the stem. These seals were prone to extrusion and failure over time. Throughout the years, many geometries of stem seal have been developed to increase the sealing capability and longevity of the stem seal. The details of each geometry present their own pros and cons list, but the key to each of them is to turn the axial compression from packing fasteners into a radial load which seals on the stem without over compressing and wearing too quickly. A common problem with all compression seals is that an end user will observe a leak and attempt to tighten the packing fasteners to stop the leak and often over-compress the packing thus reducing its effective life.

High-cycle service applications

High-cycle and fast-acting are commonly used synonymously but they are quite different and have their own design considerations.

What is a high-cycle application? End users have pondered this question with varying degrees of definition. Some users may consider 1,000 cycles to be a high-cycle application where some have thought more along the line of 1,000,000 cycles was a high-cycle application. Among other criteria, it really depends on the type of service, media flowing through the valve and size of pipeline to truly determine what really constitutes “high-cycle”.

ValvTechnologies’ rule of thumb is about 30,000 cycles as this is the point when most stem seals fail. This varies a lot based on size, etc. but is a good starting point. Common

Figure 1: Quarter turn valve

Figure 2: Rising stem valve

Packaging for quarter turn application
considerations when working with a high-cycle application are:

- Mounting kit design: the stem must remain on-center when cycling.
- Clearance in the packing box: this must be kept to a minimum to prevent extrusion of the packing.
- Fire safe: does the valve need to pass a fire test such as API 608 or API 680? This would require a high-temperature material.
- Fluid type: if the fluid is dry and/or abrasive, this can cause issues.
- Pressure/temperature: this will dictate material selection as well as valve type.
- Fluid type: if the fluid is dry and/or abrasive, this can cause issues.
- Thermal cycling: will the valve be subject to frequent thermal transients causing it to grow and shrink often?
- Speed of rotation: if the valve is fast-acting, see subsequent paragraph on fast-acting.

What makes the concept of fast-acting different from high-cycle is the material properties. When dealing with a fast-acting valve, it will be pushing the boundaries of what the materials are capable of handling due to a little discussed property known as the PV limit. The PV limit of a material is essentially the point at which material will begin to substantially deteriorate. The PV limit relates to the pressure and speed at which the surfaces pass across each other and correlates back to when the frictional heat will create microscopic melting/galling.

When valves are used for emergency shut down, they may exceed PV limits but only for a short time and only cycle every few months or even less in most cases. When you connect fast-acting with high-cycle you need to really worry about the soundness of an engineer- ing design. Many materials if not designed, machined and coated properly will fail at this point.

EcoPack® engineered solution by ValvTechnologies

When ValvTechnologies introduced the original PulseJet valve years ago, we employed a blended combination of braided graphite rope and PTFE. The design was intended to last roughly 100,000 cycles with routine adjustment to the packing. A stack of spring discs was utilized to maintain constant compression on the stem seals through wear and thermal cycling. Special considerations were given to the overall valve design and material configuration to achieve such high-performance. What made this product unique was the pulsejet application itself:

- The application was to “pulse” hot syngas (a flammable and lethal gas if inhaled).
- Atmospheric leaks are hazardous in multiple ways.
- The product operated at 1640 psig (113 bar) with temperatures of 475°F (246°C) while cycling from closed to open in 0.45 seconds.
- The valve would dwell in the closed position for roughly 90 seconds then operate again.
- This continued for four months before any maintenance could be performed without the system running.
- There was no question that this was severe service.

Although the first-generation pulsejet design had proved to be successful, ValvTechnologies found an area where the product could greatly improve by working with their customers. The routine adjustments to the packing arrangement were observed to be difficult, dangerous and improperly executed. This could cause the packing to unliven and prematurely wear. Partnered with our customer, ValvTechnologies commenced a program to develop a solution which could make the entire four months (125,000 cycles target) without a need to adjust the packing. This would reduce the number of times employees were in harm’s way and reduce volatile emissions into the environment.

When ValvTechnologies began this endeavor, they needed a measurement criteria for stem leakage. We decided to utilize one of the most common and widely accepted fugitive emissions tests, ISO 15848 for measurement. When developing our test, we had to make some test modifications because even ISO 15848 did not effectively simulate the test they were performing. After partnering with several vendors and running through many iterations of product design, the Special Projects team at ValvTechnologies came up a configuration which greatly exceeded the results we were seeking. Through painstaking efforts, the team was able to employ special materials, coating technology and a unique seal combination of filled PTFE, PEEK and graphite (known now as EcoPack®) to allow our customer to make it to an eight-month turnaround point. In late 2015, ValvTechnologies announced the offering of the EcoPack® technology which has been specifically designed for high-cycle applications of over 250,000 cycles without adjustment. The EcoPack® technology is a stem-sealing solution designed to seal at line temperatures of up to 450°F (237°C). The assembly is tested to be fire safe and shows excellent compatibility with syngas. The EcoPack® design does not require traditional live-loading utilizing spring discs, therefore, the gland is held stationary and flushed with the bonnet. This solution means the packing does not require adjustment during operation, reducing site safety concerns and flush with the bonnet. This solution means the packing does not require adjustment during operation, reducing site safety concerns and flush with the bonnet. This solution means the packing does not require adjustment during operation, reducing site safety concerns and flush with the bonnet. This solution means the packing does not require adjustment during operation, reducing site safety concerns and flush with the bonnet. This solution means the packing does not require adjustment during operation, reducing site safety concerns and flush with the bonnet.

Design Criteria

<table>
<thead>
<tr>
<th>ISO 15848 Requirement</th>
<th>PulseJet Requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cycle Life</td>
<td>100,000 cycles</td>
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<td>Cycle Speed</td>
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<tr>
<td>Valve Orientation</td>
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<tr>
<td>Pressure</td>
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<tr>
<td>Temperature</td>
<td>400° per second</td>
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About the author

Tony Majka is Director of Engineering at ValvTechnologies, responsible for research and development, product development and design, manufacturing, production and application engineering, as well as leading the engineering process continuous improvement and product standardization programs. Majka joined the company in March 2015. Prior to joining ValvTechnologies, he served as manager of valve product engineering and research and development for Flowserve Corporation in Cookeville, Tennessee where his responsibilities included oversight of the India engineering design center.
Emrise to supply valves for refinery in Iraq

Emrise has been awarded a pilot contract to supply valves for a refinery in Edil, Iraq. The deal was signed in Istanbul, Turkey, with the EPC contractor being St Petersburg based. Emrise received the order because of its entrenched quality after passing through several audits set up by the EPC contractor and the client. The valves will be used in a current expansion project running at the refinery expansion, which will involve a part of planned PC two units. (-1) a hydro-treatment unit, and (2) a reforming unit. Both these projects are expected to be realized by the end of 2018. "Emrise has agreed to provide the valves in accordance with Russian standards involving TReU Certification," Mr. Vipul Parekh (Managing Director) added.

Magwen Valves GmbH starts a subsidiary in India

Magwen has announced plans to open a valve manufacturing plant in India. The company registered in December 2017 will manufacture the complete valve program of the German parent, including butterfly valves up to 3000 mm. The Indian subsidiary is scouting for a suitable manufacturing location most likely in Pune, Maharashtra. The India facility will help us get closer to and better serve our current and future customers in the very important Indian market. It will also become a manufacturing hub for the Asia Pacific region", stated spokesman for the company.

Phase 13 refinery starts gas injection

The onshore processing facilities of South Pars Phase 13 started gas injection to the national gas trunkline on the occasion of the anniversary of nationalization of oil industry in Iran. According to Pars Oil and Gas Company (POGC), the first train of the refinery came online on March 20, 2018 by injection of 7 million cubic meters/day of sweetened gas to the national gas trunkline. There is a significant progress in construction and commissioning of the second sweetening train of the refinery. Phase 13 has so far made 85% progress while its onshore refining facilities have progressed 92%. South Pars Phase 13 will produce 56 mcm per day of sour gas, 50 million cubic meters/day of sweet gas, 2,900 tons/day of liquefied petroleum gas (LPG), 4,750 tons/day of ethane, 75,000 barrels/day of gas condensate and 400 tons/day of sulfur.

AISUS wins an oil contract in the Middle East with NOC

Leading offshore inspection company, AISUS has announced its first major contract win in the Middle East with North Oil Company (NOC). The six figure agreement marks a significant milestone for the firm and provides the foundation on which the company plans to build its growing business in the Middle East. The project, which is currently underway will see AISUS carry out two caisson inspection programmes across two assets located in the Al Shaheen oilfield, off the north-east coast of Qatar. Further projects are planned for later in 2018. AISUS will utilise its gravity deployed ultra-sonic scanning tool, SIRIUS-S. A tethered system which, when deployed from the top-side, allows for inspection data to be captured above, within and below a variety of obstacles and diameter variations commonly encountered within caissons, without removing the tool. Developed to maximise data accuracy and minimise the duration of inspections to meet the increasing demands of the offshore industry, it features a high torque rotary drive and a scanning speed of up to five metres per hour. AISUS is an innovative, technology driven company delivering remotely deployed visual and ultrasonic inspection solutions to the global oil and gas industry.

Fluor awarded FEED contract in Egypt

Fluor Corporation (FLR) was awarded the front-end engineering design (FEED) contract by Egypt’s state energy firm Enppi for the oilfields and utilities portion of the main plant and support services for the Waphco phosphoric acid production plant at Abu Tartour. Working with Enppi as an integrated team, Fluor will fast-track the FEED for the plant, which will use resources from the front-end joint venture to produce merchant-grade phosphoric acid. The project scope includes all process (1/16" tubes including a sulfuric acid plant, utilities with a cogeneration system, storage and other required units. Once completed, the facility will produce 500,000 metric tons per year of wet process phosphoric acid.

Petrofac secures a contract for MPP3 project in Oman

Petrofac has been awarded a contract worth USD 265 M for the development of the Marmul Polymer Phase 3 (MPP3) Project in southern Oman. This is the first award to be secured under a 10-year Framework Agreement with Petroleum Development Oman (PDO) signed in 2017, which enables Petrofac to provide Engineering, Procurement and Construction Management (EP-Cm) Support Services for PDO’s major oil and gas projects. The award of the MPP3 project builds on Petrofac’s existing track record of EP-Cm support contract delivery for the Rabab Harwell Integrated Project and Yibal Khuff Project on behalf of PDO. The scope of MPP3 involves Engineering, Procurement and Construction support for the extension of off-plot and on-plot production facilities associated with around 500 producing and 75 injector wells. In line with its commitment to further increasing in-country value, Petrofac will undertake the engineering, procurement and project management activities from its Muscat office, which will be expanded to support the needs of the MPP3 project.

HK Valves secures an annual rate contract for ball valves

The Managing Director of HK Valves told Valve World India that the company, which is located in Ahmedabad, India has successfully secured an annual rate contract for the supply of approximately 16,000 ball valves for its on-going/upcoming projects around India. HK Valves was very proud to have secured the rate contract despite stiff competition from around fifteen competitors under international competitive bidding. The agreement was for a total order of 16,000 ball valve orders received for an IB Power Project in international competitive bidding.
FLUID CATALYTIC CRACKING

LOOKING AT WAYS TO REDUCE THE ENVIRONMENTAL IMPACT OF DERIVATIVES DURING FLUID CATALYTIC CRACKING, WHILST AT THE SAME TIME RAISING THEIR PERFORMANCE LEVELS THROUGH THE DEVELOPMENT OF NEW TECHNOLOGIES.

Dr. Marcio Wagner da Silva, São José dos Campos, Brazil

One of the biggest challenges to the crude oil refining industry in recent years has been the development of technologies capable of reducing the environmental impact of the derivatives, while at the same time raising the performance of these compounds. This challenge is especially hard in the naphtha from Fluid Catalytic Cracking (FCC) Units dedicated to producing gasoline, which is one of the most consumed crude derivatives on the world market.

The use of increasingly heavier crude oil, which consequently has higher contaminants – mainly sulfur, has further increased the pressure of regulatory agents on refineries to reduce contaminants levels in the derivatives, especially diesel and gasoline. The main technology applied to reduce contaminants in crude oil derivatives is through hydro-treatment. Fig. 1 shows a simplified process scheme for a typical, low severity hydro-treatment unit.

The process scheme presented in Fig. 1 is common and widely applied in the refining industry. However, when producing high-quality gasoline, its use is limited once hydro-treatment reactions fatally lead to olefin saturations caused by the high octane number in the final gasoline. Straight run naphtha is normally directed to conventional hydro-treatment units for removing light compounds, whilst the product at the bottom is mixed with the lighter fraction and the final product is directed to the refinery gasoline pool.

To process this stream in a conventional hydro-treatment unit would have a poor effect. The main chemical reactions associated with the hydro-treatment of cracked naphtha can be presented as follow:

\[
\text{R-CH} = \text{CH}_2 + \text{H}_2 \rightarrow \text{R-CH}_2\text{CH}_3 \quad \text{(Olefins Saturation)} \quad (1)
\]

\[
\text{R-SH} + \text{H}_2 \rightarrow \text{R-H} + \text{H}_2\text{S} \quad \text{(Hydrodesulfurization)} \quad (2)
\]

As has been mentioned earlier, in the case of the hydro-treatment of naphtha to gasoline, the objective is to minimize the reaction (1) and maximize the yield of the reaction (2). The aim is further to keep a high octane number while the sulfur content is reduced, making the naphtha more environmentally friendly.

Over the last decades, technology process licensors had devoted their efforts to develop technologies capable of achieving these objectives. The UOP Company has commercialized SelectSulfing™ technology that applies fixed bed reactors to promote the selective hydro-treatment of naphtha, leading to unstable compounds (diolefins) saturation in the first reactor and the heavier olefins (higher sulfur content) saturation in the second reactor through the use of an adequate catalyst.

Nowadays, one of the most applied technologies to reduce the sulfur content in the cracked naphtha is the PRIME G+™ process, developed by the Axens Company. The process applies the concept of whereby the tendency of the sulfur is to concentrate in the heavier fractions of the cracked naphtha. As such it is carried out in a feed stream fractionation before the hydro-treatment step, as presented in Fig. 2.

The feed stream is served to a hydro-treatment reactor with the aim to promote diolefins saturation. Then the stream is separated into light and heavy fractions in a distillation tower. While the light naphtha is recovered at the top of the tower, the heavy fraction is removed from the bottom and sent to a selective hydro-treatment section. This leads to minimum octane loss. In the sequence, the hydro-treated naphtha is separated in a stabilizer column to remove light compounds, whilst the product at the bottom is mixed with the lighter fraction and the final product is directed to the refinery gasoline pool.

Another technology that applies selective hydro-treatment to reduce the sulfur content in the cracked naphtha is the Scafining™ process developed by the ExxonMobil Company. In this particular case, fixed bed reactors are applied without feed stream fractionation. We can highlight the product HyOctane™ developed by the ExxonMobil Company. In this particular case, fixed bed reactors are applied without feed stream fractionation.

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the selective hydrogenation of FCC naphtha. The GT-DeSulph™ process developed by the GT Company employs this principle. In this case, using an adequate catalyst, the olefin saturation and, later, the molecular rearrangement is carried out to recover the asphaltic fuels. A fundamental stream for the refineries is the asphaltic fraction, which is the result of the heavy crude fraction and the aromatic fraction.

Catalytic cracking units reach more than 50% of the overall production, and has a continuous regeneration system of the adsorbent through controlled burning of the adsorbed sulfur compounds. Another interesting route adopted by the licensors is non-selective hydrotreatment, followed by acid pre-treatment of the crude oil. This process results in a higher production of high-quality gasoline.

GTC Engineering Company applies an extractive distillation principle associated with environmental regulations. The S-Zorb™ process developed by ConocoPhillips is a process for the desulfurization of liquefied petroleum gases (LPG). This process is based on the use of an amine solvent to remove sulfur compounds from LPG.

Wouter supply butterfly valves for ISF Camp, Qatar

Wouter Witzel has supplied >1,000 butterfly lined valves for the Chiller rooms and cooling network to the Internal Security Force (ISF) of Qatar. The ISF is building the camp at the outskirts of Doha. This camp is planned to have an ultimate resident population of more than 17,000 and it is expected overall completion date is in 2025. Besides residential buildings, the area will include post office, unit force offices, unit guardhouses, check points, a five-star hotel and a 10,000 spectator stadium. All valves are double flanged type CL150 and sizes from DN50 to DN100. This delivery proofs again the good cooperation of Wouter Witzel with their distributors in the ME region.

Baker & GE sign a deal with Iraq to process natural gas

Baker Hughes and General Electric signed a contract with Iraq’s government to process natural gas extracted alongside crude oil at two fields in southern Iraq.

The plan was first announced by GE and is part of Iraq’s efforts to stop flaring gas associated with oil by 2021. Iraq continues to flare some of this gas because it lacks the facilities to process it into fuel for local consumption or exports. The contract with Baker Hughes and GE provides for processing the gas at the Nassiriya, Al Charraf oilfields. It is the second contract signed by Iraq to process gas associated with oil, after one with U.S. energy firm Orion in January. Iraq’s production of associated gas is expected to grow as the country increases its oil output capacity.

The country is currently producing about 4.4 mbpd, below its capacity, in line with an agreement between the member organizations of Petroleum Exporting Countries and other exporters including Russia to cut supply to boost oil prices. The Iraqi government depends on oil and gas sales for about 95 percent of its income.

Iraq plans for elevated refining capacity

Mr. Jabbar Al Al-Luiebi the minister of oil of Iraq has stated that it is the plan of the Ministry of Oil to elevate the refining capacity of the south refineries to 280 thousand barrels before the end of 2018. Mr. Al-Luiebi opened the second phase of the 4th unit project in the south refineries in Basrah governorate with production capacity of 30 thousand barrels/day. The addition of the 4th unit will elevate the production from 210 to 280 thousand barrels, which is a big achievement to raise the Iraqi production of the oil products in general and the south refineries in special. Mr. Al-Luiebi said that the project which is being executed by Techno Export Czech Company includes the construction of two units for liquid gas production and water treatment. He said also that the estimated time to finish the project is 120 days.

The company has completed, in 2017, many projects, including the expansion of the central wastewater treatment plant and the linking of many properties to the sewage network. They are currently working on several projects in various locations, including network expansion and development projects in Al Jurf Industrial Areas 1 and 3, Al Jurf Commercial Area 2, Al Jurf Residential Area 3, as well as a project to expand the sewage network in Al Safiya and the new housing projects in Al Raqayeb.
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