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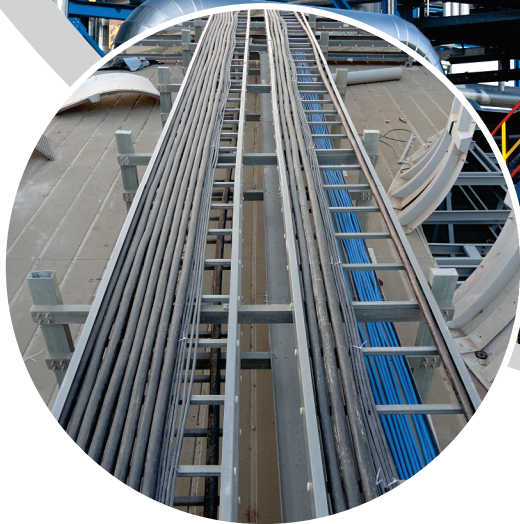
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'Policy Transition along with Digitalization to bring Transparency in Governance can boost the Energy ecosystem in India'

"As one of the largest producers and consumers of energy, India has to create a sector that will be distinct, secure, affordable, and more sustainable and innovative with a focus on renewable sectors such as wind and solar. At the same time, it needs to improve the complete value chain efficiency of the traditional power sector, from mining to processing and distribution," says **Suresh Nagarowth, AVP & Delivery Head IENR, Cyient.**

Industrial Energy & Natural Resources Sector Scenario in India

The rapid infrastructure development, transportation and industrial growth has led the India's energy demand vs supply disparity. India's energy use is highly intensive and among the highest per capita. Even though India imports nearly 80 per cent of its required oil, it is making equally large investments to discover new oil fields. Additionally, the government has set an ambitious target to curtail oil dependency and explore energy production through renewable means. Through its newly framed Independent Power Projects (IPP) policy and initiatives such as Make in India out of the Pradhan Mantri Ujjwala Yojana (PMUY), the market promises growth for different energy types including renewables and other cleaner fuels. Coal-based power plants will still exist, though a limited number of new plants will come online in the near future. With many existing plants completing their full lifecycle and decommissioning of that capacity may potentially lead to demand for new plants. All of this presents an exciting environment and the opportunity to improve capacity and flexibility of power generation situations in India, which will drive growth for industrial energy companies and products.

More Transitions Require in Policy Framework to Support the Growing Energy Demand

Though India is a land of ample minerals and natural resources, the challenge it faces is exploring the sources to cater the growing energy demand while managing the risk of climate change. The Government of India has instituted many initiatives such as '24x7 power for all' and 'Ujjwal

DISCOM Assurance Yojana (UDAY)' in this regard. An attempt to revive debt ridden state electricity boards, UDAY has seen reasonable progress with some states making stronger tariff hikes.

However, progress on other key fronts, including reduction in transmission and distribution losses, remains slow. This initiative (when supported with technology) yielded desirable results, which is beneficial, as the government wishes to electrify almost all rural villages in India.

As one of the largest producers and consumers of energy, India has to create a sector that will be distinct, secure, affordable, and more sustainable and innovative with a focus on renewable sectors such as wind and solar. At the same time, it needs to improve the complete value chain efficiency of the traditional power sector, from mining to processing and distribution. Initiatives such as the First Offshore Wind Project India (FOWPI) will definitely boost the power generation capacity while India develops its offshore capabilities. Electric vehicles will also transform highly oil-dependent public transportation infrastructure, which represents a major need.

Growth opportunities are inhibited by the current ecosystem, and more time and investments are needed for these initiatives to become a reality. Subsidies to Independent Power Producers (IPPs) will also be a game changer as most of the power generation and distribution is controlled by the government or its subsidiaries. Though oil will remain the primary energy source, India should explore possibilities where natural gas can

"With the newly framed Independent Power Projects (IPP) policy and initiatives such as Make in India out of the Pradhan Mantri Ujjwala Yojana (PMUY), the Indian energy market promises growth for different energy types including renewables and other cleaner fuels."



lead the demand with cost-effective ways to reduce CO₂ emissions. To achieve clean energy targets, the use of technology will be crucial. Recent advances in technology are promoting energy efficiency gains to slow demand growth, and open up new energy supply options, including unconventional oil, natural gas, nuclear, and renewables.

Role of Analytics, Data Infrastructure and Digitalization Transforming the Sector

Two important aspects should be considered while looking at the role of these emerging trends in the sector. The first is that the Government of India has allowed 100 percent Foreign Direct Investment (FDI) in the mining sector and exploration of metal and non-metal ores under the automatic route. The second is that in 2018-19 budget, the Government of India allocated close to USD 30 billion towards smart cities and renewable energy. These have the potential to influence a positive change in the industrial energy & natural resources sectors in India and require the kind of technology, efficiency improvement and return on investment that digital solutions can provide.

‘Digitalization’ will be in the forefront of such technological advancements changing the way we develop new projects, enhance operational efficiency, drive transparency in governance and finally deliver cost benefits and better services to the citizens. For example, there are states in India where estimated distribution losses are in excess of 20–30 per cent. With implementation of the right digital infrastructure and analytics, such losses can be reduced by effectively identifying high loss areas. The other big change due to digital transformation including IoT, analytics and mobile technology is that industry players of various sizes and capabilities will need to collaborate and deliver projects to survive in the long term.

An example of such change is technology companies like Cyient and many start-ups are now working closely with Indian power and mining corporations on technology intensive areas such as mine planning, asset management and fleet management.



Finally, many companies are identifying how these technologies will deliver return on investment and opting for incremental improvements vs. large-scale implementation. Our clients are at different phases in their IoT life cycle, from just beginning to consider what digital could mean for them to full IoT product platforms and offerings. The digital transformation is also opening communication lines between intercompany functional groups that traditionally operated in silos. Engineering, research and development, aftermarket products and services, warranty management, customer service, health and safety, and even sales are all finding common ground and value by leveraging data to deliver new insights.

Cyient Technical Expertise in Energy and Natural Resources Sector

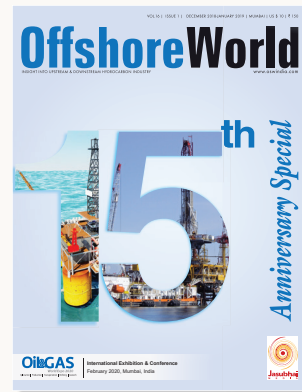
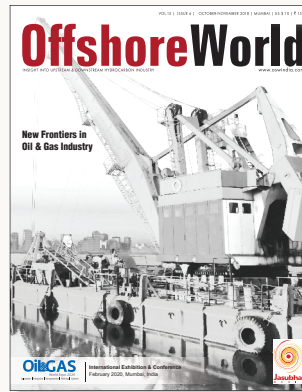
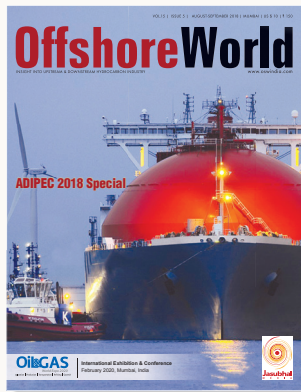
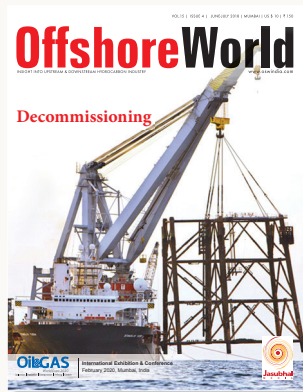
Cyient is involved across every major segment of the energy and natural resources sector in India, working with clients across the value chain covering exploration companies, operators, industrial equipment original equipment manufacturers (OEMs), power generation OEMs (including nuclear), and engineering, procurement and construction companies, just to name a few. Cyient is in the forefront in helping its clients to tackle new opportunities by leveraging technology like IoT, predictive analytics, asset management and data collection and/or solving operational inefficiencies with artificial intelligence, machine learning, and unmanned aerial vehicles and drones to make an impact. With its vast experience in advanced technologies, Cyient brings cross-pollination of ideas between different sectors and geographies, thereby helping customers deploy world-class design and achieve higher operating efficiencies. Cyient is also focused on bringing new technology solutions to market and solving the problems that matter - to the clients and to society. ●



Suresh Nagarowth
AVP & Delivery Head IENR
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Middle East 'Big Oil' to Boost Global Petrochemicals Footprint

While US Cracker wave due to the boom of Shale gas is getting traction nowadays, the article details about the mega projects that big oil & gas players in Middle East are lining up and how it could change the entire landscape of global petrochemicals by 2025 and beyond.

While the US cracker wave on the back of the shale gas boom is getting much of the attention, big oil and gas players in the Middle East are lining up mega projects that could shift the landscape of global petrochemicals from 2025 and beyond.

Driving this push from oil companies is the growing realisation that oil demand for transportation fuel will plateau with the electrification of vehicles and improving fuel efficiency.

Thus, the future for hydrocarbons is not in gasoline and diesel, but in chemicals, where demand should continue to climb alongside GDP growth.

And it's clear that "Big Oil" is no longer satisfied simply providing feedstock for the downstream chemical sector.

ADNOC'S USD 45 billion Investment Plan

Abu Dhabi National Oil Company (ADNOC) wants to "stretch the dollar" from the barrel of oil to the maximum through producing chemicals, said Sultan Ahmed Al Jaber, CEO, ADNOC.

ADNOC is embarking on a USD 45 billion investment plan with a goal to more than triple petrochemicals capacity at its Ruwais site from a 2016 base of 4.5 metric tonnes/year to 14.4 metric tonnes/year by 2025, and adding new downstream product chains in construction chemicals, oilfield chemicals, surfactants and detergents.

In February 2019, its 50/50 joint venture company Borouge awarded front-end engineering and design (FEED) contracts for the 4th phase of its expansion in Ruwais which will include a 1.8 metric tonne/year mixed feed cracker and add a total of 3.3 metric tonnes/year of olefins and aromatics capacity.

The cracker will be the first in the country to use mixed feeds. The feedstock slate will be ethane, butane and naphtha.

"The Middle East is running out of cheap natural gas. All new projects are mixed feed, with a typical mix of about 35 per cent ethane, and 65 per cent propane, butane and naphtha which is not as advantaged as ethane," said Hassan Ahmed, Analyst, Alembic Global Advisors, a US-based investment research firm.

While ADNOC and JV partner Borealis plan to finalise the downstream configuration within three months of the FEED contract awards, it should include polyethylene (PE) and polypropylene (PP).

ARAMCO'S COTC and USD 100 billion Plan

Saudi Aramco's planned crude oil to chemicals (COTC) complex with SABIC in Yanbu, Saudi Arabia is perhaps the most watched project on the planet as it could have stunning implications for the petrochemicals sector.

In late March, Aramco agreed to buy a 70 per cent stake in SABIC from the Public Investment Fund of Saudi Arabia in a USD 69.1 billion deal, taking control and effectively merging the kingdom's energy and chemical giants into an integrated, international powerhouse.

Featuring a budget of around USD 30 billion and a process to convert 400,000 bbl/day of crude oil to 9 metric tonnes of chemicals and base oils, the Aramco/SABIC COTC mega complex is expected to start operations in 2025.

The initial plan was to convert 45 per cent of each oil barrel to petrochemicals. However, Aramco aims to boost that figure significantly by advancing its proprietary process technology.

Aramco believes it can convert between 60-70 per cent of the oil barrel into petrochemicals using this technology.

Petrochemicals are averaging about 10-15 per cent of global refinery output, with wide differences between integrated complexes.

"In recent years, refiners have increasingly raised their share of petrochemical output at the expense of traditional fuels. Some of the new refineries in China can convert up to 40 per cent," according to Stefano Zehnder, Vice President of Consulting at ICIS.

"In Saudi Arabia the original base concept is rapidly evolving. It's clear Aramco is looking to scale up to commercial size its crude-to-chemicals technologies," said Zehnder.

"With the potential for further increase from the base 45 per cent yield, this points to even higher petrochemicals and base oils capacities than the 9 metric tonnes/year base. The final configuration will be function of the desired balance between petrochemicals, base oil and fuel products," he added.

Ahmed from Alembic Global Advisors notes that crude oil-to-chemicals is all about 'integration and trying to be more efficient both upstream and downstream'.

That's because 'every new facility in the Middle East puts them higher on the cost curve', a function of the mixed feedstock slate.

MIDDLE EAST MEGA PROJECTS						
000 tonnes/year						
Company	Type	Products	Capacity	Location	Cost	Start-up
Saudi Aramco/Total	Mixed feed cracker	Ethylene and derivatives	1,500 (ethylene)	Jubail, Saudi Arabia	\$5bn	2024
Saudi Aramco/SABIC	Crude oil-to-chemicals	Petrochemicals, base oils	9,000 total*	Yanbu, Saudi Arabia	\$30bn	2025
ADNOC	Mixed feed cracker, other	Olefins, aromatics, polyolefins, surfactants, specialty chemicals	9,900 total**	Ruwais, Abu Dhabi	\$45bn	2025
* May be much higher, depending on crude oil conversion rate						
** Planned capacity to achieve its goal of 14.4m tonnes/year of petrochemicals capacity by 2025. Includes a Borouge mixed feed cracker of 1.8m tonnes/year and a total of 3.3m tonnes/year of olefins and aromatics						

Aramco plans to invest an eye popping USD 100 billion in petrochemicals over the next 10 years, CEO Amin Nasser said at the Gulf Petrochemicals Association (GPCA) annual meeting in Dubai in November 2018.

In October 2018, Aramco and France-based Total signed a joint development agreement for the front-end engineering and design (FEED) of their planned joint venture petrochemicals complex in Jubail, Saudi Arabia.

The USD 5 billion project, slated for start-up in 2024, will comprise a mixed-feed (50 per cent ethane, 50 per cent refinery off-gases) cracker with 1.5 metric tonnes/year of ethylene capacity and downstream units.

The petrochemical complex will be downstream of Aramco and Total's joint venture SATORP refinery and the companies expect an additional USD 4 billion in investments in petrochemicals and specialty chemicals capacity from third-party investors.

Aramco is also in the process of merging with Saudi Arabia-based petrochemicals and polymers giant SABIC.

Mega Projects Worldwide

Aramco and Abu Dhabi's ADNOC are not only plowing investment dollars in their backyards but setting up mega complexes around the world.

The most ambitious among these is the memorandum of understanding (MoU) signed in June 2018 between Aramco, ADNOC and a consortium of Indian oil companies (Indian Oil, Hindustan Petroleum, Bharat Petroleum) to build a USD 44 billion refining and petrochemicals complex in India with 18 metric tonnes/year of petrochemicals capacity. Aramco and ADNOC would jointly own 50 per cent of the project, with the Indian consortium owning the other half.

The Indian government expects construction to start in 2020 in Raigad, India with completion of the project by 2025.

Alembic Global Advisors' Ahmed cautions on raising expectations from MoUs. "The Crown Prince of Saudi Arabia went on a tour across Asia and many

MoUs were signed. But MoUs sometimes don't materialise. Until we see steel in the ground, we typically don't take them too seriously," said Ahmed.

China is another target for Middle East oil companies. In February 2019, Aramco signed an agreement with China's NORINCO Group and Panjin Sincen to develop a USD 10 billion-plus fully integrated refining and petrochemical complex in Liaoning, China with start-up expected in 2024.

The partners will create a new company, Huajin Aramco Petrochemical (Aramco 35 per cent, NORINCO 36 per cent, Panjin Sincen 29 per cent), as part of a project that will include a 300,000 bbl/day refinery with a 1.5 metric tonne/year cracker and a 1.3 tonne/year paraxylene (PX) unit. Aramco will supply up to 70 per cent of the crude oil feedstock for the complex.

SABIC Merger to Bring Projects

And Aramco is inheriting two additional mega projects in its planned merger with SABIC.

SABIC and China's Fuhaihuang Petrochemical are planning to jointly build a petrochemical complex in Fujian, China, a source from Fuhaihuang said in late February. The project to be located at Gulei in Zhangzhou would include a 1.8 metric tonne/year cracker, a 600,000 tonne/year propane dehydrogenation (PDH) unit and derivatives units, according to the Fuhaihuang source. An official deal has yet to be finalised.

However, one SABIC mega project is already underway. On the US Gulf Coast, SABIC and ExxonMobil are building a 1.8 metric tonne/year ethane cracker in San Patricio County, Texas, with a monoethylene glycol (MEG) plant and two PE units downstream.

Project completion is expected by the fourth quarter of 2021 and start-up in the first half of 2022.

Beyond the potential merger between Aramco and SABIC, Middle East oil companies could seek to acquire Western petrochemical assets.

MIDDLE EAST COMPANY MEGA PROJECTS ABROAD						
000 tonnes/year						
Company	Type	Products	Capacity	Location	Cost	Start-up
SABIC/ExxonMobil	Petrochemicals	Ethylene, PE, MEG	1,800 (ethylene)	San Patricio County, Texas, US	NA	2022
Saudi Aramco/NORINCO/Panjin Sincen	Refinery, petrochemicals	Olefins, aromatics	1,500 (ethylene), 1,300 (paraxylene)	Liaoning, China	\$10bn+	2024
Saudi Aramco/ADNOC/India consortium	Refinery, petrochemicals	Petrochemicals	18,000 total	Raigad, India	\$44bn	2025
SABIC/Fuhaihuang Petrochemical	Petrochemicals	Olefins	1,800 (ethylene), 600 (propylene via PDH)	Zhangzhou, China	NA	NA

FEATURES

Aramco acquired Germany-based LANXESS' synthetic rubber business by buying out the latter's 50 per cent stake in their ARLANXEO joint venture in December 2018, while SABIC took a nearly 25 per cent stake in Switzerland-based specialty chemicals and catalysts company Clariant in September 2018.

Earlier major deals included SABIC's acquisition of US-based GE Plastics in 2007 and Abu Dhabi's IPIC (now Mubadala) buying Canada's NOVA Chemicals in 2009.

"They would be still be interested but we would not expect them to go too far from their comfort zone in olefins and polyolefins, and possibly in polyurethanes. We think they would look to the US rather than Europe," said Ahmed from Alembic Global Advisors.

It's clear Middle East oil companies have giant ambitions in petrochemicals with plans to bring on massive amounts of capacity in 2025. However, it remains to be seen what projects actually start up and in what timeframe.

"The devil's in the details in terms of what gets built, delayed and cancelled. We all know the game of companies throwing down big numbers to prevent competitors from overbuilding," said Ahmed. ●



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Global Editor

ICIS Chemicals Business

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FORM IV

Statement about ownership and other particulars about newspaper **OFFSHORE WORLD** to be published in the first issue every year after the last day of February

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I Hemant K Shetty, hereby declare that the particulars given above are true to the best of my knowledge and belief.

Date: 30th January 2019

Signature of Publisher

OffshoreWorld

Advertise in April-May 2019 issue of Offshore World

Next Issue Focus: April-May 2019 | Health, Safety & Environment in Oil & Gas Industry

Hydrocarbon Industry comprises of Up-, Mid-, and Downstream is highly inflammable, hazardous and risk-involving due to its nature of operations and maintenance. Thus, it is fundamental to have and implement an HSEMS (Health, Safety and Environmental Management System) which defines the principles by which operations are conducted and control the risks in the whole industry cycle. Also, the Oil & Gas industry has changed substantially over the last decade by the greater connectivity of the digital age. However it has opened the door of Data theft and Cyber attacks.

In this backdrop, the forthcoming issue – April-May 2019 based on “HSE in Oil & Gas Industry” – of Offshore World will seek views and insights from Industry Experts on forefront of technology innovations and adaption to safeguard the highly-invested industry, its manpower, equipment and the environment. It will also cover cyber security aspect in the advent of digital technologies in the sector.

These are few topics that will be covered in the issue:

- HSEMS Management in the Oil and Gas Industry
- Oil Spill management in exploration and production
- Technology enhancement to prevent hazards in Oil & Gas industry
- Occupational Health and Safety Aspects of Oil and Gas Extraction
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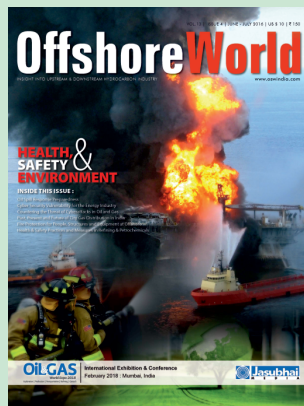
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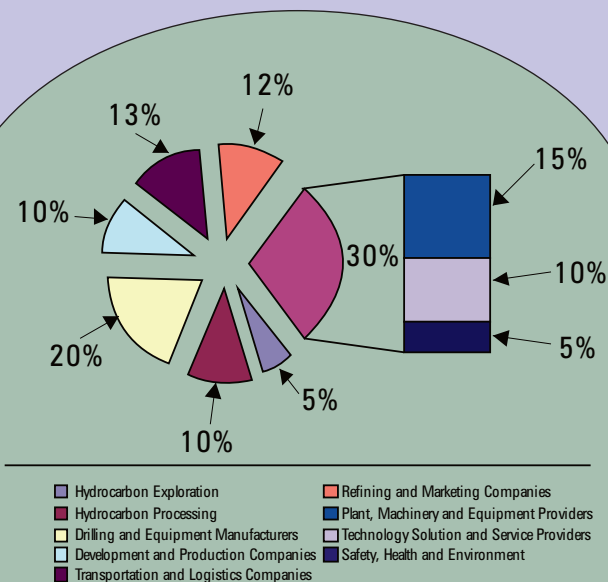


Offshore World is an all-encompassing magazine for the hydrocarbon and allied industries. A bi-monthly magazine, launched in December 2003, Offshore World disseminates authentic, critical and well-researched information on global hydrocarbon industry innovations. The magazine offers latest and strategic information on the upstream and downstream hydrocarbon industry. The endeavour of Offshore World is to become a vehicle in making “Hydrocarbon Vision 2025” a reality in terms of technologies, markets and new directions, and to stand as a medium of reflection of the achievements and aspirations of Indian hydrocarbon industry.

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Advanced Technologies in Oil & Gas Industry

Though Oil & Gas Industry is adapting Advanced Automation for improving business efficiencies to cater today's budding energy needs, there are numerous challenges ahead as well in embracing new technologies looking at the changing dynamics of the industry in future. The article highlights the challenges and benefits of technology adaption in the current scenario and at the future looking at the continuous changing dynamics of the industry.

With growing population and an increase in the per capita energy consumption, the demand for Oil and Gas (O&G) is rising. To keep up with these growing demands, O&G companies are increasingly adopting advanced automation to achieve significant business benefits in terms of operational efficiency, increased productivity, cost reduction and profitability.

Challenges for the Future

The most pressing challenges arise from the conflict between increasing demand and shrinking reserves. Mastering this balancing act calls for increased investment in more efficient extraction and handling technology, such as Gas to Power, so that decommissioned oil and gas fields can be reopened to utilise the remaining resources. The same goes for underutilised resources, including fields that were not previously economical to exploit such as oil sand, fractionation and deep water drilling. The supply-demand conflict also increases the importance of storage, liquefaction of natural gas (LNG) and long-distance transport routes (e.g. oil depots, LNG plants and extended pipelines).

Intensifying environmental regulations is also becoming an increasingly important factor. In addition, challenges such as skilled labor is forcing the industry to use more automation, predictive and secure remote maintenance, digitally connected infrastructure and many other technology solutions.

From an India perspective, India is a cost sensitive market and it is a perception that latest automation solutions are expensive and need immense investments. Lack of clarity regarding investments is the biggest challenge faced by Indian industry.

Technologies as a Driver

Technologies help industry to maximise their return on investment (ROI). Today, with advancement of technologies, it is possible to overcome various challenges, which was not the case a couple of years back. These are extremely versatile and ideally aid daily operations involved in this industry. While implementing these technologies in greenfield plant, it needs high investment, planning, technology intensive products, software and necessary expertise for deployment.

In contrast, a brownfield plant is not equipped with latest technologies and might even be decades old. Both greenfield and brownfield plants with automation and digitisation strategies can leverage these technology advancements.

To reduce costs plant owner can look at advancements such as digital twin and virtualisation. This would help drastically reduce cost of installation and commissioning. A digital model of the entire plant would be available even before the plant installation begins. This can be coupled with various automation solutions to check the feasibility of a plant. This can be done even before ordering the automation systems right down to I/O's and sensors. The digital model also helps in providing performance of the assets over time. IIoT solutions help brownfield plants to retrofit legacy and digitally isolated equipment and to create an IIoT 'green patch' in a brownfield plant without any changes to existing hardware and software. In this scenario, edge architectures is a perfect fit for transferring data from field to the cloud securely and building smarter plants. An end-to-end connectivity helps integrate the IT systems of the plant with the process, providing the management with a holistic view of operations. These are some of the many opportunities, which management can explore in such a process industry. However, understanding these new technologies, their benefits,



Centralised acquisition of operating and process data is much easier thanks to advanced automation solutions.

FEATURES

and the challenges they face, are essential in entirely adopting them in everyday operations in industry. With the Industrial IoT implementation and digitisation, the need of connectivity has resulted in increased efficiency through big data analytics, and the ability to automate highly-sensitive tasks and with this, cyber security is a major area of investment for the O&G industry.

Benefits of Advanced Technologies

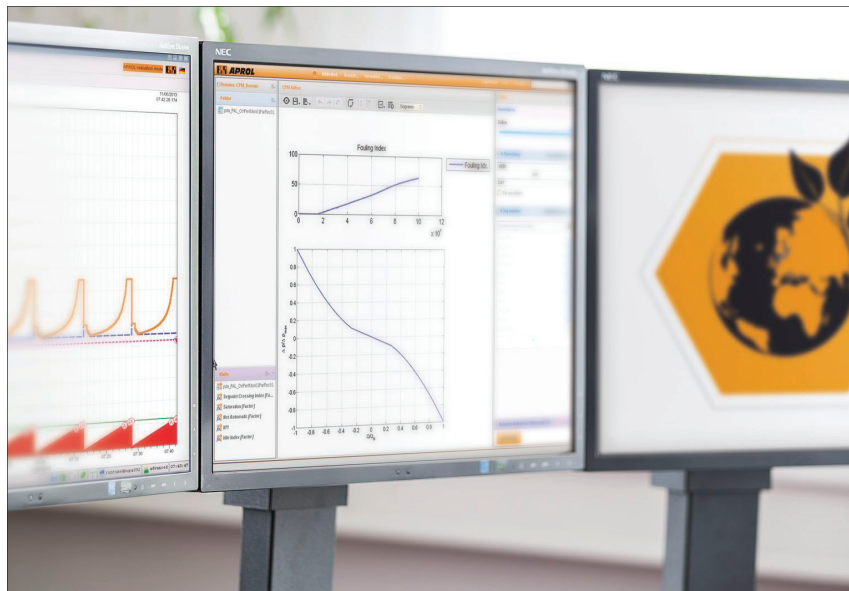
The O&G industry has started the move toward digitisation with more sensors collecting data from rigs around the world, but there are still areas O&G companies can improve within an increasingly diverse market. There is a clear incentive for O&G companies to equip their facilities with advanced automation technologies. The daily operations involved in this industry, as pipe handling and assembly for drilling are complex and high-risk operations for humans. Fully automatic operations require no human intervention, takes people away from the drill floor, and therefore reduces the probability of accidents. There is also efficiency and cost saving benefits to consider.

Unplanned downtime is another concern in the O&G industry. It not only costs time and money, but it also have a ripple effect in delaying production, time to market, and more. Predictive maintenance solution allows plants owners to constantly monitor plants health and use the collected data to calculate upcoming service intervals. This approach prevents unplanned downtime and substantially increases availability.

Remote maintenance solution makes it easy to service machines and system anywhere in the world from office or on the road. This remote solution makes it easy to quickly respond to unforeseen problems in addition to accelerating commissioning. The capacity utilisation of system is maximised as a result. A service technician or engineer can access plants from anywhere in the world to retrieve logbook entries, application data and much more. Downtime can be kept to a minimum, and costly travel can be completely avoided.

By acquiring data for all media – from electrical energy to natural gas and heating oil and even compressed air – it is possible to automatically and comprehensively record all energy consumption. The ability to calculate and view consumption and costs makes it considerably easier to implement energy management systems as defined in ISO 50001. Evaluation and visualisation of historical data allows energy consumption to be analysed at various levels of detail in order to accurately identify cause-and-effect relationships.

Remote maintenance solution makes diagnosing and maintaining plants easier than ever. The solution utilises the latest IT and security standards and allows for significant savings with low investment costs.



B&R's APROL process control system makes it possible to monitor assets constantly. This helps reduce maintenance costs and downtime and optimise the availability and utilisation.

B&R: Right Choice from Drill to Fill

B&R solutions are involved in every single step of the process – from extraction and production to transportation, storage and billing. That's why 'From drill to fill – B&R is the right choice'. B&R offers automation solutions ranging from the field and controller level (up to SIL3) to the DCS/SCADA/ Batch level including connection to Level 2 systems (Dispatching/MES/ MIS). B&R's complete hardware and software solutions, comprehensive service and hard-earned expertise in the automation and digitalisation of plants offer advantages for both new (greenfields) as well as existing legacy plants (brownfield).

To bridge the divide between IT and automation, plant operators are increasingly turning to the open OPC UA standard. When it comes to complex processes with real-time requirements, however, OPC UA has had its limitations. That is now changing thanks to Time Sensitive Networking (TSN). B&R has tightly integrated OPC UA into its automation products. It is therefore possible for any B&R controller to be implemented as an OPC UA server or client. This allows a seamless vertical and horizontal communication.

B&R works with O&G companies both directly and indirectly – via authorised B&R partner companies with extensive industry know-how. As key accounts, our customers receive optimal support from our sales and applications teams in order to work out the best possible solutions. ●



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Digitalisation: Key to Fast, Compliant, High Quality Design of Oil and Gas Equipment

Oil & Gas is a massive and growing industry, at the same time it is a complex and fluctuating business. Access to easy oil, fluctuating oil price, stricter safety and environmental regulation and norms, etc are few factors make the oil & gas more complex and fluctuating business today. The article enlightens how digitalisation in oil & gas process can enable manufactures to optimise performance, add value, and enhance cost control in operation and business.

The oil and gas business might seem like an overwhelmingly mechanical industry, but it's becoming increasingly digitalised - from advanced computer analysis to reveal new deposits from geophysical surveys done decades before, to sensors for real-time tracking and safety monitoring of deliveries. Manufacturing needs to join this digital world, and there are significant opportunities to stand out by doing that well.

Oil and gas is a massive and growing industry but it's also a complex and fluctuating business, in terms of both supply and demand, and geopolitics. Easily accessible deposits of oil and gas are largely exhausted, so the deposits being worked now are harder to extract reserves from; that requires manufacturing innovation to optimise the performance of the process. At the same time, the fluctuating price of crude costs makes it important to keep a tight control of costs, and for manufacturers to look for places where they can add value. And even more than in other industries, the need to meet stringent safety requirements in a complex and highly regulated environment, while delivering that mix of innovation, cost control and added value, demands that you have a digital process to help you cope.

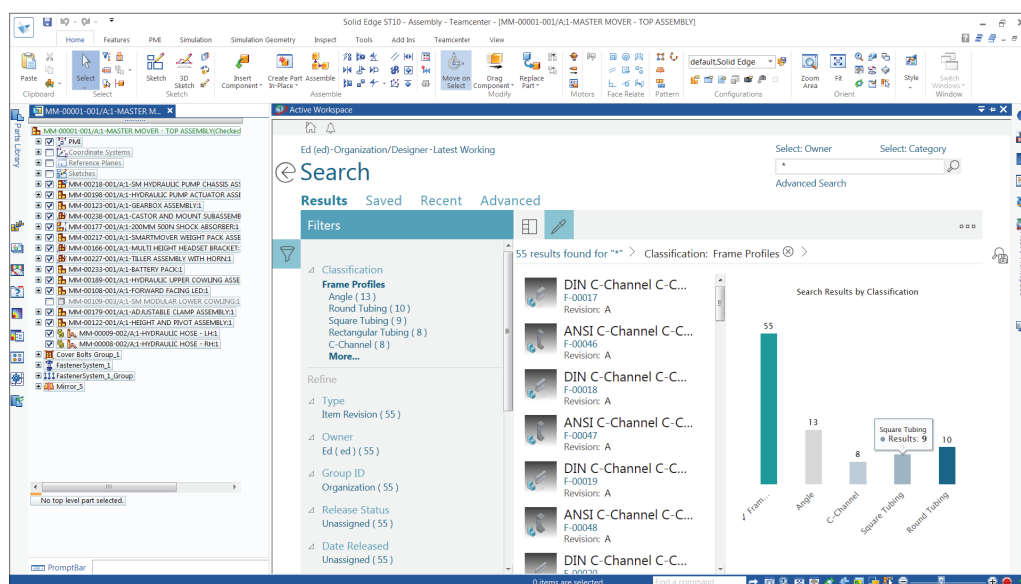
Going digital allows manufacturers to research ways of getting into reserves more efficiently and cost effectively, and to clearly communicate complex designs, allowing researchers, designers, suppliers and engineers in teams that often span the globe to share information.

Some of the advantages of a digital process are obvious. Digital workflows are easier to track and audit, so you can see what stage a

design is at, make sure that requirements and specifications are consistent and track everything from inventory to documentation, knowing what you're seeing is live and reliable data.

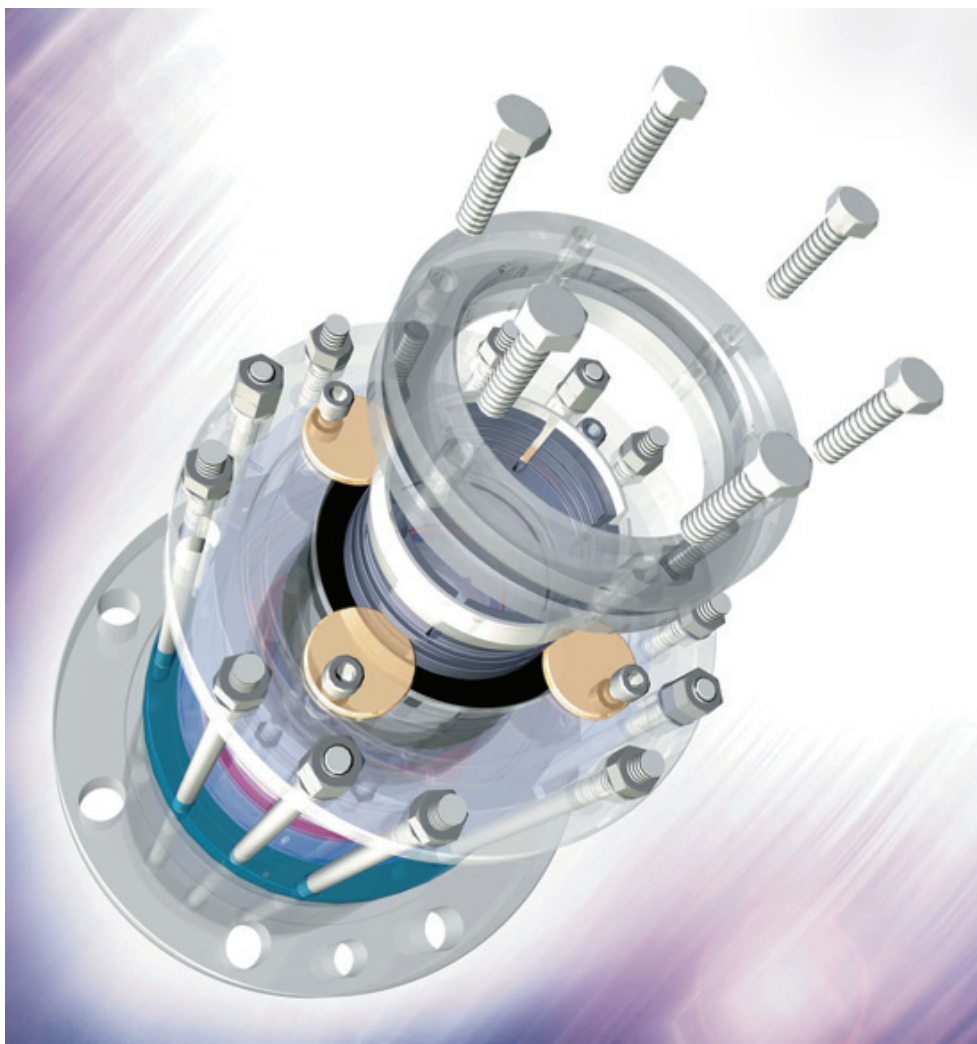
Changes can be made once, rather than separately in drawings, bills of materials and change notes. Weir Valves and Controls, UK found it was saving half an hour a day for every engineer by using Siemens' digital solutions, as well as removing errors. It was also able prove when the design drawings of valves it provided to customers had been changed after WVC sent them out; traceability is key when unauthorised changes to a design can have major safety and liability implications.

Engineers and customers need to be able to visualise designs clearly long before they're built. That covers everything from configuring an accurate 3D model, to testing the safety and structural integrity; or using that model to create a photorealistic rendering or animation to show off the product before it's ever built.



Siemens customer Weir Valves and Controls, UK WVC in the UK saves half an hour a day for every engineer by using digital applications, Teamcenter product lifecycle management with Solid Edge.

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Moving to 3D Solid Edge from 2D, designers at AESSEAL cut complex design of mechanical from 2 to 3 days down to half an hour. By digitising their designs, manual calculations for machine tool programming are reduced or eliminated.

Switching from 2D to 3D CAD meant designers at AESSEAL could finish the complicated details in the design of a mechanical seal in half an hour rather than the two to three days it used to take, and then waiting yet another day for manual calculations needed to reprogram machine tools to make the parts. AESSEAL can send 3D designs to its casting suppliers in a format they can work with directly. But it also meant that for the first time, the company could show customers cutaways and animated models of what they were actually buying; the hundreds of precision engineered parts inside the seal, not just the anonymous metal casing protecting those parts.

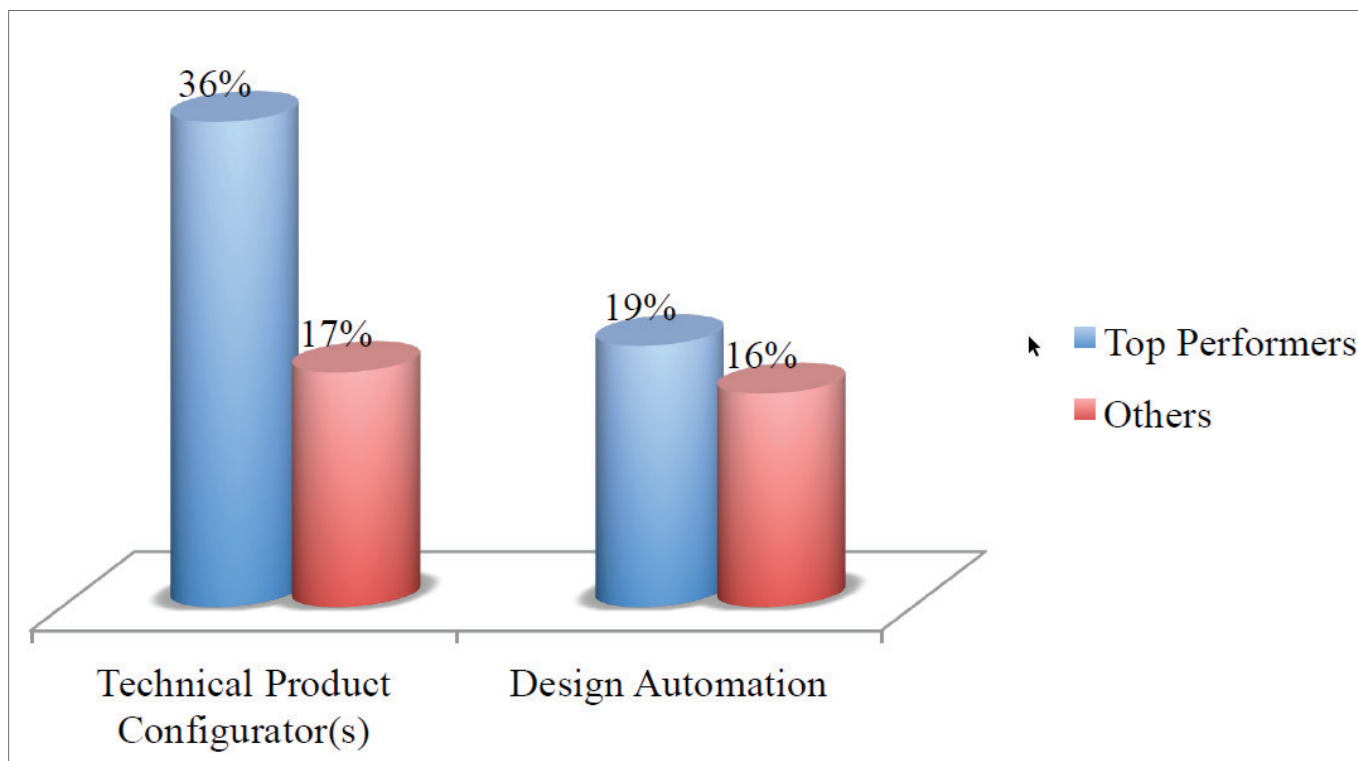
“Going digital allows manufacturers to research ways of getting into reserves more efficiently and cost effectively, and to clearly communicate complex designs, allowing researchers, designers, suppliers and engineers in teams that often span the globe to share information.”

A digital process lets designers and engineers cope with new complexity in manufacturing and design, and integrating sensors, actuators. GPS trackers and other electronic components in oil and gas equipment is becoming more common; that means generating wiring diagrams and schematics as part of the design. At the other extreme, designs need to include frames and fabricated structures around the equipment; testing those for safety in advance, down the placing of the weldments, through structural analysis in a digital environment, instead of over-engineering them saves both time and money.

Manufacturers don't just deliver designs and physical equipment; they also need to create installation, assembly and maintenance documentation. With a digital process, you can create those from the same digital assets, which is faster and more accurate. Just laying out components and routing pipes in a 2D drawing doesn't give enough information to fit equipment into the available space in a plant; engineers can

produce pipe runs in and generate 3D projections – or installers can look at 3D diagrams on site using mobile viewers.

Product customisation is becoming more common in the industry, and manual processes for complex custom products lead to bottlenecks in delivering both quotes and orders. Manufacturers who create custom hardware that's engineered-to-order, covering thousands of design elements, to fit into the customer's specific environment and processes, and designed to the customer's specifications, depend even more on a strong digital process.



According to Tech-Clarity, top Performers in the Oil and Gas equipment industry are more likely to capture knowledge and automate engineering tasks that improve engineering efficiency and shortening lead-times while reducing errors.

According to Tech-Clarity's recent research, what distinguishes the top performers in Engineer to Order from the less successful and less profitable companies isn't just the engineering they do, important as that is; it's the speed, accuracy and efficiency of the way they do it. They complete the designs they work on faster. They give more accurate quotes for those designs and deliver on those quotes faster. They can keep costs down but still deliver large, complex systems that fit into customer facilities. When they win a customer, they engineer their projects faster, more efficiently and more accurately. And what they deliver to that customer comes with more accurate manufacturing documents.

Those are all advantages you need a good digital process to get. Successful ETO manufacturers use design automation technology and product

configurators to capture knowledge, improve the efficiency of their engineers, reduce errors – and to create a process where they can improve on every project by learning from what they've done before. They know exactly what materials they need to order and when. They have automated tools for creating quotes, configuring manufacturing tools and producing documentation from engineering documents. They're not losing money overrunning on costs or having to remake orders that go wrong. They rely on digital tools that make their engineers productive and streamline the order process, gaining them more sales – and higher profits. ●

“Successful ETO manufacturers use design automation technology and product configurators to capture knowledge, improve the efficiency of their engineers, reduce errors – and to create a process where they can improve on every project by learning from what they've done before.”



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Optimizing Oil and Gas Production through Digital Technologies: Connecting Up-, Mid-, and Downstream

Today, smart devices – elements of the Internet of Things (IoT) embedded in wellheads, on compressors and pump stations, and within refineries – are yielding a new wealth of operational information. But making sense of that data is another matter. That's why leading oil and gas companies are taking advantage of advanced analytical software and the industrialization of Ethernet to create The Connected Enterprise. By smoothly integrating information technology with operations technology, oil and gas companies can better leverage the full value of their asset information, and accelerate high-performance petroleum production.

The oil and gas industry has entered a transformative era of global competition – what some analysts have labeled the 'new oil order.'¹

This era is rife with fluctuations, as the global oil and gas landscape continues to shift, leaving much uncertainty for economic projections. Case in point: The resurgence of onshore oil and gas production in North America contributed to a seismic shift in oil and gas supplies. The revolution in shale oil and gas technologies – combined with steady flows from conventional onshore and offshore fields – quickly transformed the United States into the world's No.1 energy producer.

Despite the downward price pressure triggered by the current supply, producers from Brazil to Bahrain have plenty of reason to keep pumping. The world's appetite for energy is expected to increase 37 percent by 2040, according to the IEA. European dependence on gas imports is expected to continue to fuel LNG markets. More significantly, improving living standards in growing economies like India and China will increase the need for more output. In China alone, demand is expected to increase by 75 percent by 2035.³



The implications of this new oil order extend far beyond the latest fluctuations in the global cost of a barrel. Oil and gas is arguably the world's most asset-intensive industry, and every additional wellhead, pump and compressor raises a company's operational risk. The potential cost of an equipment failure or operating error has never been higher. The industry average for a single hour of downtime is USD 1 million⁴, while a major event like the Deepwater Horizon oil spill could swipe USD 40 billion or more from a producer's balance sheet.

The nature of the new oil order has put new pressures on each major sector of the oil and gas industry. Upstream production is increasingly fragmented because new reserves often lie in far-flung locations. That widening geographic distance, coupled with the unprecedented surge in supply, has put new pressures on the midstream market, increasing the need for more and safer pipelines, and other types of petroleum transport and storage. Finally, refineries are facing unprecedented process changes as they adapt to distilling fuels and other products from more and different feed stocks.

These dynamics – combined with tightening environmental regulations globally and a shrinking pool of skilled, in-house expertise – are forcing oil and gas companies to find new ways to enhance recovery, optimize processes, increase efficiencies and contain costs.

As with manufacturing, telecommunications and other major industries, the search for solutions is leading to a boom in digital technologies. Today, operational technology (OT) led by integrated control and information solutions, including smart devices – elements of the Internet of Things (IoT) embedded in wellheads, on compressors and pump stations, and within refineries – are converging with information technology (IT) to enable enterprise connections that yield a new wealth of data. Leading oil and gas companies are taking advantage of innovations in industrial Ethernet-based connectivity and advanced analytical software to

better leverage the full value of their asset data, and accelerate high-performance petroleum production.

Realizing The Connected Enterprise has become a business imperative. As the benefits from the convergence of automation, communications and information technology multiply, oil and gas companies are creating digital oilfields, pipelines and refineries. Wireless technology, visualization software and other advances now allow oil and gas companies to access and monitor assets in real time, and help merge disparate oilfield data into streams of actionable information — anywhere, anytime.

A few examples:

- Instead of manually checking on remote wellheads, pump stations and storage sites, operators are using remote-monitoring technology designed for oil and gas applications. Combining sensors and cellular or wireless connections, this technology offers producers the ability to supervise their wells and other operations from a single, centralized — and safe — location.
- Operations management solutions help oil and gas producers optimize production in real time by gathering, analyzing, contextualizing and sharing information. By pairing production intelligence with intuitive dashboards and historian functionality, operations-management systems can automatically collect production data, calculate KPIs and present displays that facilitate fast reading of critical operational information.
- Uptime is everything in the refining business. So many petrochemical facilities are investing in industrial Ethernet-enabled control systems that transport diagnostic data from process units to the operations view, notifying staff about critical predictive maintenance needs.

Global-Size Challenges

Oil is the world's most commonly traded commodity, and with good reason. Despite the rise in alternative energy resources, fossil fuels will supply almost 80 percent of world energy use through 2040.⁵

Since the earliest days of drilling, oil and gas has remained among the most capital-intensive industries. The number of assets has quickly multiplied in the last decade with advances in deep-water drilling, and the advent of unconventional oil and gas extraction techniques used to squeeze out resources in areas previously considered impossible to access. Automation has helped increase recovery rates at many wells previously believed to be dry. Meanwhile, energy companies have implemented instrument asset-management systems with the promise of optimizing their production by improving uptime.

However, the energy industry has tended to lag other industries in the area of asset performance. When heavy industry firms are viewed on a global basis, world-class operations achieve an Overall Equipment Effectiveness (OEE) score of 91 per cent. Historically, oil and gas producers have been 10 or more percentage points behind this average.⁶



A major reason: The ability of many oil and gas companies to collect, share and decisively act on information has been hobbled by conglomerations of unconnected legacy equipment, siloed proprietary networks and various vendor databases. Cross-disciplinary data transparency often is hampered by application-centric information management.

These information challenges are complicated by other major trends affecting today's oil and gas sector, from exploration and drilling, to transportation and refining.

- **Growing Complexity of Operations.** During the last decade, thousands more wells have been drilled globally, both onshore and offshore. Ever-more sophisticated techniques and technologies are required to plumb the depths of the deepest subsea reserves, and to capture diffuse hydrocarbons from tight geological formations. The systems that operate these facilities are extremely complex, often requiring operators to interface with more than 200,000 tags of data and resulting alarms. Meanwhile, the rise of US oil and gas production has spurred a dramatic expansion of the nation's pipeline infrastructure, increasing the need for innovative diagnostic and monitoring technology. And while a major US refinery hasn't been built in more than 30 years⁷, refinery owners in America and across the globe are investing in advanced technologies to handle more diverse feed stocks, while seeking to reduce the high costs of energy and other operating expenses.
- **Increasing Regulatory Pressures.** Expanding global regulations regarding the environment and safety are making compliance increasingly complex for the oil and gas industry. Energy companies continue to face intense scrutiny from government and consumers demanding stricter oversight to prevent environmental damage and protect lives.
- **Growing Skills Gap.** The pool of highly skilled oil and gas professionals is shrinking as more and more edge toward retirement. Meanwhile, fewer young professionals are in the pipeline for these high-demand jobs. A sign of the times: 22 per cent of oil and gas respondents to a recent Ernst & Young survey said a lack of qualified personnel is already impacting their operations.

FEATURES

- **Heightened Security Risks:** The world's energy infrastructure is the target of an increasing number of physical and cybersecurity threats, according to a June 2013 study by the Council on Foreign Relations. Several of the world's major oil and gas producers have already been hit by cybercriminals. Most notably, malware unleashed on Saudi Aramco in August 2012 destroyed and deleted digital data from more than 30,000 computers. Aramco officials believe the attack came from an insider using external devices, such as USB drives, to sabotage the network.⁸

Realizing The Connected Enterprise

How can oil and gas companies effectively tackle these challenges? The answer lies in harnessing the collective power of people, technology and processes using a unified network architecture. Integrated control and information solutions enable oil and gas customers to build a connected infrastructure across the enterprise that meets the requirements of the automation layer and information layer, while providing complete connectivity and integration of data.

Validated reference architectures from Rockwell Automation help expedite the engineering and delivery of oilfield solutions so companies can achieve first time to oil faster. Rockwell Automation also helps oil and



gas companies deploy manufacturing execution system (MES) software, which can analyze the current status of production and make decisions on how to optimize operations in real time.

Using these best-practice, proven and repeatable solutions, downstream, midstream and upstream operations can take advantage of advances in technologies like open-standard IoT devices, big data and analytics, virtualization and mobility, and cloud computing that enhance The Connected Enterprise.

Digital remote-monitoring is one of the most significant advances enabled by the IoT. This technology seamlessly integrates sensors, hardware and software, and wireless connections to extract important operational information — such as daily oil production, pump pressure, etc. — from multiple assets across oilfields and along pipelines. Using this information, operators can continuously monitor current and historical operating conditions, troubleshoot

any potential issues, and make process adjustments at an earlier stage to help increase uptime — all without leaving their workstation, which can be hundreds or thousands of miles away from the physical site.

One example: Northern Natural Gas Company uses Allen-Bradley® ControlLogix® systems to control all its compressor stations, which move natural gas along the company's 14,700 miles of pipeline, from Minnesota to Texas. FactoryTalk® software from Rockwell Automation collects the control data from each station and converts the information into easy-to-comprehend visual graphics that operators can access inside company headquarters in Omaha, Nebraska.

Intelligent medium-voltage drives from Rockwell Automation are also an integral part of remote pipeline communications for many oil and gas companies. Embedded with Ethernet connectivity, they send and receive vital information about the condition of pump and compressor motors. If a compressor motor is running too high, for example, the drive will send a signal to central control, where operators can remotely throttle back the power. Preventing potentially dangerous pipeline blowouts carries huge operational and safety benefits.

Remote-monitoring technology is also helping bridge the oil and gas skills gap by allowing companies to fully utilize their best in-house — as well as third-party — expertise. Rather than travel to different sites, an expert can troubleshoot problems from headquarters, or even their home, by reviewing real-time data or viewing a live video stream. They then can direct people on the ground to make the fixes necessary to resume normal operations.

Securely Leveraging the Cloud

The use of cloud technology is growing in oil and gas as a remote-monitoring tool, as well as for storing data, and analyzing and contextualizing information. For example:, M.G. Bryan, a leading heavy-equipment and machinery supplier to the oil and gas industry, knew it needed a way to remotely monitor and maintain the performance of its USD 1 million fracking trucks. The Dallas-headquartered company invested in a cloud-based fleet management system designed and implemented by domain experts at Rockwell Automation.

Using mobile technology and the seamless transfer of business information over the Microsoft® Azure™ cloud platform, M.G. Bryan securely pulls data



from the cloud to Web browsers. Then, the software management system produces reports and dashboards showing the condition of individual vehicle's drivetrains and hydraulic fracturing performance. The system takes the guesswork out of maintenance scheduling, thus preventing unplanned downtime. By using the cloud, M.G. Bryan maintains no infrastructure, and it can scale the solution from one truck to 4,000 trucks.

Oil and gas companies that embrace greater connectivity within and outside the organization must adopt a security strategy that covers production operations and the broader enterprise. Rockwell Automation® solutions take a holistic view of industrial security, addressing people, process and technology risk to maintain operational integrity and protect oil and gas assets.

In most cases, this means following a 'defense-in-depth' strategy that addresses internal and external security threats. This is based on the premise that any single point of protection or individual firewall could be penetrated by the persistent attacker over time.

The most effective defensive solution is to erect multiple layers of defense, including physical, electronic and procedural. Under this approach, security is built into the infrastructure and becomes a set of layers within the overall network security. Any single point of penetration can be backstopped by different variables of capabilities provided by the other layers.

Improving Upstream Performance - Connecting Production

Advanced connected technology from Rockwell Automation is helping upstream oil and gas operations pull as much oil and gas from reservoirs as possible, while increasing efficiencies and safety. This industry-specific application of The Connected Enterprise is being called Connected Production by Rockwell Automation.

Gas lift is one of the methods used to improve recovery from older fields. These systems are designed to automatically sense and control the wellhead variables of a gas lift production site. The unit adjusts the gas lift injection flow to match an operator-determined flow rate and computes

the estimated gas, oil and/or water production in real time. A centrally located computer allows personnel to easily gather communication and results for analysis, such as trending of flow data which can be particularly useful in the early detection of well problems.

To help optimize production, gas lift systems feature ultralow power consumption and lightweight subassemblies. A built-in solar panel can drive an active production well for up to seven cloudy days, making the unit especially attractive in remote areas where electric power is not available and portability is important.

Rockwell Automation is working with one of the world's largest oil and gas companies in developing autonomous drilling-control systems. These are designed for low-cost land drilling in unconventional plays, where development involves thousands of the same kind of wells. A supervisory control and data acquisition (SCADA) system monitors drilling parameters, determines appropriate controls that need to be communicated back to the rig, and navigates the course of the wellbore.

Using Rockwell Automation controllers and software, the system requires only a small number of highly trained operators in a centralized location. Via a satellite link, operators can view the drilling sites on computer screens, and override the automatic controls to improve drilling efficiency or make other corrections. Besides decreasing the number of days required to complete a well, autonomous drilling reduces worker exposure to on-site hazards.

Managing Midstream Transfers

Solutions that advance The Connected Enterprise have helped streamline and better secure midstream operations, including an essential corner of the oil business – hydrocarbon transfers.

Hydrocarbon operations are spread far and wide, often in remote areas. Either on wellheads, storage tanks, pipeline inlets or terminals, buyers and sellers gain unattended access to oil supplies through a LACT unit. Until recently, accounting for these buyer/seller transfers has been a far less sophisticated process. Most LACT units have little automation and even less network connectivity. In fact, most rely on paper-based tickets that buyers drop into a mailbox that stands next to the unit.

Texas-based Trigg Technologies decided to bring its LACT units into the digital age. Working with Rockwell Automation, the company designed and developed a turnkey asset performance management (APM) solution, leveraging the Microsoft Azure cloud platform. Rockwell Automation software applications combine real-time and historical data into dashboards that provide contextualized information on transfers, overall oil quality, and well productivity over time. These measured variables and diagnostics can be seen from any location via a secure Internet connection. With information automatically pulled from the LACT control system to populate e-tickets, billing errors are virtually eliminated. Trending



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capabilities also allow site and operations managers to better understand the type of oil coming out of each well. This allows them to plan for long-term production across a number of wells or they can mix oil from a variety of wells to produce a more consistent product.

Refining Downstream Operations

Major refineries are sprawling industrial sites where the main units that process crude oil to generate gasoline, jet fuel and other petroleum products are surrounded by hundreds of auxiliary operations. For example, a major refinery may have seven or eight main processing units. Each of those may be supported by 10 to 20 subunits, including process skids. The configuration of processes depends on various factors, including the location of the facility, the types of raw petroleum it handles, and the products it refines.

Some ancillary units are critical to complying with environmental standards, such as onsite effluent treatment facilities and electrostatic precipitators. Others are essential to the demanding job of keeping the refinery running every hour of every day. Those include motor control centers and cogeneration plants.

The combination of aging legacy equipment, tightening regulations, advancing technology and, more recently, changing feed stocks has required many refinery owners to repeatedly invest in infrastructure upgrades. Today, many of those projects include smart devices and controls that help reduce unplanned downtime, improve preventive maintenance and give efficiencies without adding workers.



As oil refineries and gas processing plants begin to migrate legacy process control equipment, producers should consider a modern approach to migration. This approach delivers all the core capabilities of a traditional DCS to address the process control requirements, but is built on modern technology that easily integrates with other ancillary automation systems and critical business systems. Built using scalable, plantwide control technologies, a modern DCS, integrates process, discrete, power, safety and motor control to improve productivity, reduce unplanned downtime and lower total cost of ownership.

For example, a Southern California refinery that processes more than 200,000 barrels of oil per day tapped Rockwell Automation to design and develop an intelligent electrical SCADA system. The electrical-infrastructure upgrade, which replaced process equipment and systems that dated back to the 1950s, connects the motor control with a centralized maintenance and operations system where workers can view parameters and make sure the main process units are receiving optimum power. The system also alerts operators about preventive maintenance needs, reducing the possibility of costly unplanned downtime.

Conclusion

Realizing The Connected Enterprise and reaping the exponential benefits from the convergence of automation, communications and information technology across digital oilfields, pipelines and refineries requires a holistic approach. Accessing and monitoring assets from upstream, midstream and downstream operations and merging disparate oilfield data into streams of actionable information – anywhere, anytime – are essential to remaining competitive as the industry landscape continues to fluctuate and evolve. ●

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Source: Rockwell Automation

Embrace Digitalization to Drive 'Industry 4.0'

In a bid to match the current industry trends to minimize the labor cost and human risks, plants and manufacturing units are required 'Industry 4.0' by automating the processes as much as possible and adopting advanced technologies. However, they must digitize these technologies and automation to remain in the future or risk becoming obsolete.

In a vibrant world where digitalization is part of our daily life, where the control a machine for our morning coffee, regulate the water temperature for our shower or use a navigation system to optimize our journeys avoiding traffic jams it is already a common thing, therefore, the implementation of this digitalization in our field of work has become an obligation.

Such a virtual world began shortly after the first launch of an artificial satellite by the Soviet Union and the appearance of ARPA (Advance Research Project Agency) in February 1958. ARPA, an organization dependent on the State Department of the United States, emerged as strategic response to the technological and military challenges initiated by the USSR and strengthened the foundations of what would later be known as the Internet.

The Remote communication went from being terribly complicated to being literally child's play, the speeds of connection were accelerated exponentially, and the barriers that existed for centuries, succumbed to technology and disappeared.

Once the barriers of distance ceased to exist, communication or virtual interaction in our social life became the order of the day, this interaction became, quickly and deeply, part of the DNA of the emerging generations.

Then, why are still parts of our life in which virtualization or digitization has not developed, or at least, not at the same speed? The answer is simply 'Barriers'. Mental barriers, barriers imposed by regulations or international/local regulations, barriers created by the economic hegemony of certain industries denied perishing; in other words, imaginary Barriers.



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These barriers are about to give way, and before this imminent fact, the big companies, and others not so big, are developing products or adapting existing ones in such a way that this jump to the so-called 'Fourth Industrial Revolution' does not take them by surprise.

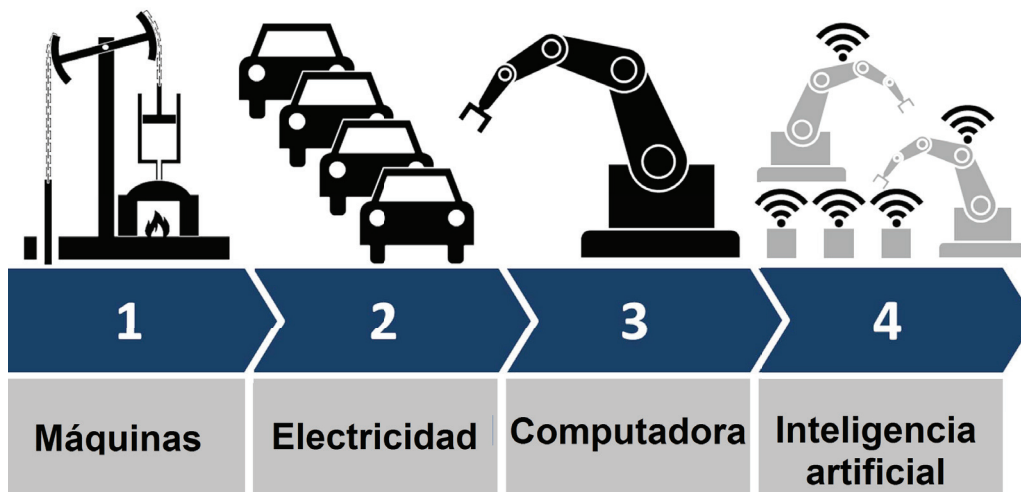
The concept of 'Fourth industrial revolution' or 'Smart factories', is based on the idea of limiting human interaction as much as possible to minimize labor risks and human errors, automating the processes as much as possible.

Such automation, although it is quite advanced in the industry, requires certain conditions that are not yet given.

- The third and most important condition to fulfill, is that the idea of a 100 per cent digitalized plant is designed for such purposes from its origins. Even if the previous statement seems obvious, the digitalization of already existing and operational plants would require a colossal effort and a disproportionate investment.

“Digitalization focused on the 'Industry 4.0' could be reduce personnel costs, minimize risk of hazardous and design costs, and focus on environmental care and improvements in the efficiency of processes, thus avoiding excessive waste and emissions.”

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Reference: https://commons.wikimedia.org/wiki/File:Industry_4.0.png

For the design focused towards Industry 4.0, different Softwares are available. These tools, also known as 'Engineering Databases', are developed to integrate all the design work (from conceptual engineering to commissioning) and the data that could be collected electronically from the plant already in operation.

The integration of the different stages (FEED, Conceptual, Detail and start-up) is given through the use of a cloud that stores the data implemented by the parties involved in each of the phases, verifies consistencies and allows automatic updating of the data which, later on, it is transferred to the Distributed Control Systems (DCS), Safety Instrumentation Systems (SIS) and Fire, Gas and Spillage Detection Systems (FGSDS) installed. Once the data is implemented and the plant comes into operation, the measured variables can be compared with the specified ones during the design phase and automatically corrected in the event of inconsistencies. These corrections would be validated in the same cloud used for the design and, when a replacement of a piece of equipment is required, the data for this equipment would be real, minimizing the chances of acquiring a poorly sized equipment. Ultimately, the acquired data would also be part of the Plant maintenance system, where deviations in normal performance would indicate the need for maintenance of certain equipment

“Digitalization focused on the ‘Industry 4.0’ could be reduce personnel costs, minimize risk of hazardous and design costs, and focus on environmental care and improvements in the efficiency of processes, thus avoiding excessive waste and emissions.”

and in turn, the maintenance data would be shared with the Engineering database to indicate automatically when an equipment must be intervened, which material should be purchased and which technicians should be present for such intervention.

As the access to the system (Cloud) can be achieved through a secure internet connection, remotely and with any smart device, like Tablet or

Smartphone, the operation and maintenance personnel would not need to be in the Plant at all times.

The advantages offered by the digitalization focused on the 'Industry 4.0' could be the following:

- Reduction of personnel costs
- Minimization of risk of a hazardous event
- Decrease in design costs
- Focus on environmental care and improvements in the efficiency of processes, thus avoiding excessive waste and emissions.

It only remains to hope that the efforts directed to the 'Fourth Industrial Revolution' will bear fruit sooner rather than later, meanwhile, it is up to the Engineering Companies, to prepare the ground so that digitization is possible, to give the necessary tools to the personnel to increase their knowledge in the area of digitalization and to increase the acceptance of such digitalization among end users and manufacturers. ●



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Riser Technology Protecting People, Structures and Equipment

The oil and gas industry is renowned for continuously pushing the limits. The exploration of offshore oil and gas continues to move into deeper waters and the demands for drilling operations to perform faster and more effectively to provide higher cost savings and safe well completions, have grown. Added to this challenge is the requirement to extract more oil and gas than ever before, and exploit ever harsher reservoir environments in new locations around the world. With these factors in mind, this article looks at why next-generation corrosion-free, polymer-based solutions can be the vital element to ensure the protection of people, structures and equipment from surface to seafloor.

Although technology has advanced to better address the ever-changing needs of the offshore environment, customers still require superior, cost-effective solutions with an increased focus on onboard safety and extended service life; increasing to up to 40 years from 20 years.

For both of these focus areas, choosing the most appropriate material is imperative and not surprisingly, polymer materials are becoming a more popular choice within the offshore industry. Polymer-based materials such as rubber and polyurethane are naturally flexible and very durable. Compared to alternative materials, such as steel, ceramic wool or

fiberglass, polymer-based materials can withstand greater temperature extremes, weather conditions, and vessel movements, while offering an exceptionally high durability. It is a diverse group of materials that can perform at every level to damp, seal and protect, and most of all has an extremely long lifespan.

Extending Service Life through Corrosion Protection

One of the most effective methods of extending the service life of a riser is to protect it from corrosion, particularly in the highly corrosive splash zone region. The splash zone is the area immediately above and below the water's surface and is a major corrosion concern for offshore



installations. As the water level rises and falls the metal surfaces of the riser are alternately wet and dry, which causes the metal to corrode when the saline water is exposed to oxygen.

External surfaces exposed in the splash zone region should be protected with special corrosion protection systems. Rubber-based coating on risers as a form of corrosion protection is an extremely popular solution and is widely recognized in the offshore industry as the most effective method of riser corrosion protection, particularly in the highly corrosive splash zone region.

When selecting a corrosion coating for a riser, manufacturers should ensure that the supplier they select can fully customize the coating material to meet specific project needs. Most rubber-based solutions can incorporate a range of protective qualities such as anti-fouling to inhibit marine growth. Additionally, rubber-based corrosion protection solutions are resistant to abrasion, chemicals, wear, blast, impact, jet fire, ozone, UV and salt water.

An important feature of any riser corrosion coating is the fact that the coating is chemically bonded to the metal surface or substrate permanently and won't crack or disbond. As a material specifically engineered to protect against sea and weather conditions, rubber corrosion coatings will guard against corrosion for the lifetime of the riser.

In addition to the splash zone, rubber-based riser corrosion protection can be applied as a robust rubber lining for any exposed steel components located on a riser.

Safety for Challenging Environments

It is no surprise that onboard safety is a key priority for the offshore riser platforms but this is becoming progressively difficult in increasingly challenging environments as installations move further offshore.

Advanced fire protection systems are critical to ensuring onboard safety, whether it is the platform's surface protection, an onboard deluge system or coating for the pipes and flanges for example. The performance of these systems is essential for the safety of personnel, asset protection and preventing fire escalation.

So, in the offshore oil and gas sector where the risk of uncontrolled, rapid fire spread is greater than most, firestop solutions need to provide full assurance to the onboard team that they will not fail to protect against fire. If damage is caused, costly shutdowns and repairs would be required and in the worst case scenario, the platform may fail altogether.

The harsh offshore weather environment causes metal products and components to be susceptible to rust and corrosion, which is detrimental to the performance and function of the platform. Additionally, ceramic wool and similar materials used for fire protection will become less

Rubber-based coating on a riser in the highly corrosive splash zone





Trelleborg's rubber-based fire deluge system - Elastopipe - under testin.

effective when wet. These less than optimal solutions simply are not an option when protecting people, structures, and equipment.

Protection from Surface to Seafloor

The drill riser provides a conduit for the drill string and drilling fluids from the ocean floor to the rig. A drilling riser typically has a large diameter, low-pressure main tube with external auxiliary lines that include high-pressure choke and kill lines for circulating fluid. All of these lines need to be protected during handling, storage, deployment/retrieval and drilling operations.

Some of the most trusted protection systems for bare riser joints include polymer-based protection covers. These protection covers are manufactured from polyurethane or polypropylene and are specifically designed to protect the drilling riser from impact damage when running

or retrieving through the drill floor and moon pool area or during handling operations in the riser storage bay.

Drilling risers, which can reach lengths of 10,000 feet or more and weigh millions of pounds, must be kept in tension to ensure safe operation of the equipment. In order to reduce the requirement on vessel tensioning systems to a more manageable level, discrete buoyancy units can be fitted along the length of the riser to reduce the weight of riser joints in water. These buoyancy units are made out of a polymer-based foam that not only reduces the weight of the riser string to a manageable amount but also protects the riser and auxiliary lines from impact and abrasion subsea.

Taking the protection to the next level, a newly designed and tested helically grooved buoyancy option is available on the market that not

only optimizes uplift, it also effectively eliminates riser motions and higher levels of drag in onerous offshore current environments compared to traditional riser buoyancy. The new multi-functional solution integrates the technology to suppress vortex-induced vibrations (VIV) and reduce drag into riser buoyancy equipment during manufacturing, essentially eliminating the requirement of ancillary suppression equipment, alleviating complicated and time intensive riser running and retrieval procedures.

Similarly, buoyancy technology is used to offset tension loads on deep water umbilicals and risers for floating production systems. Distributed Buoyancy Modules are used reduce the top tension loads by providing uplift to sections of the riser to generate pre-defined configurations that allow the vessel a full range of surface movement without putting undue stress on subsea lines. These configurations include "Lazy Wave", "Steep Wave", "Lazy-S", "Steep-S", and "Pliant Wave".

Evolving Riser Technology for the Future

As more complicated exploration and production activities target more challenging reservoirs an evolution of current riser technology will be required to ensure continued safe and cost-effective operations. Advanced engineering analysis and simulation design tools provide the ability to effectively develop new riser equipment technologies considering the real world environmental and operational challenges they will be required to perform under.

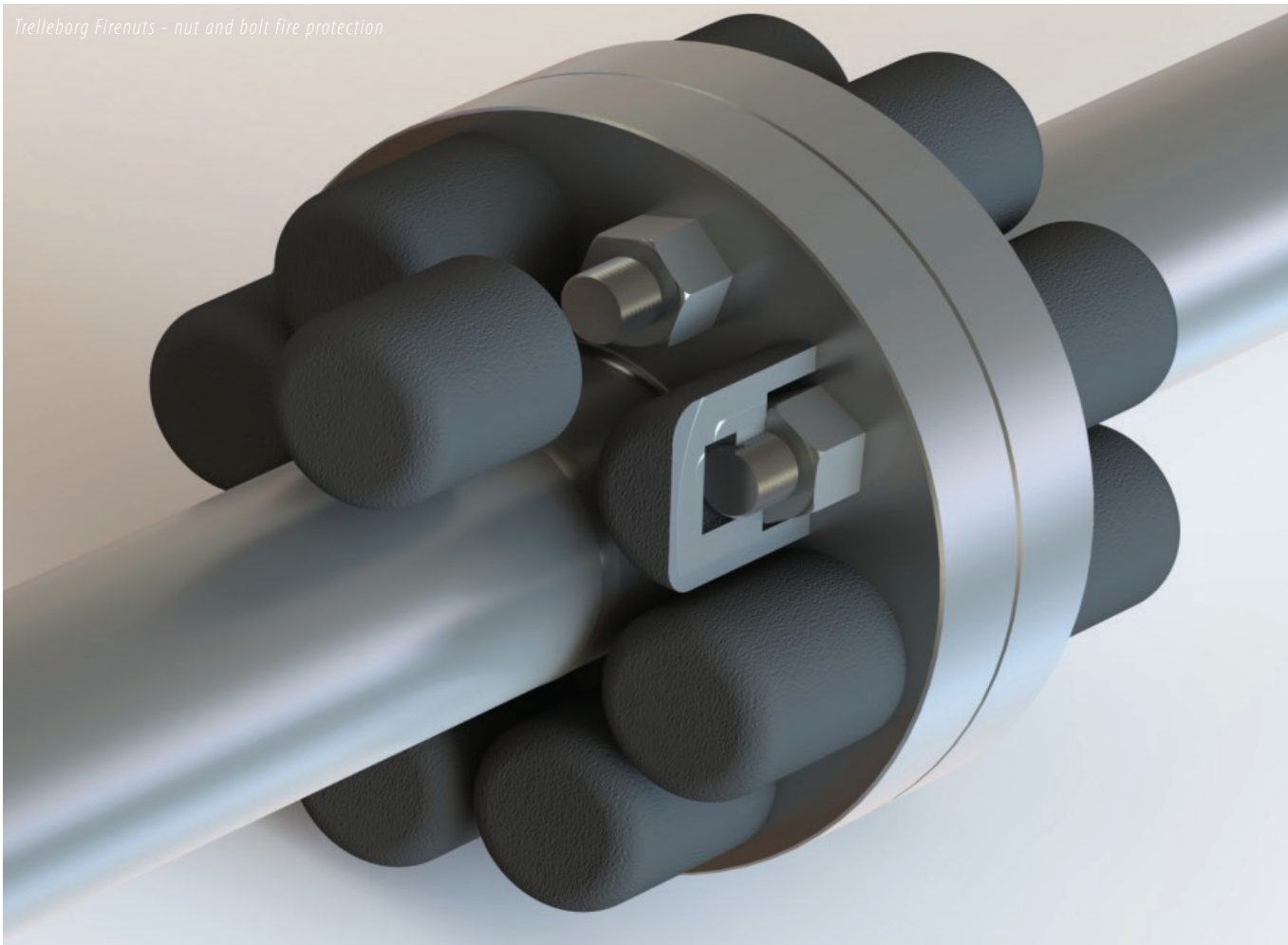
Computational Fluid Dynamics (CFD) analysis studies provide the means for exploring optimized equipment designs with consideration of minimizing hydrodynamic loading. Riser technology can be successfully designed to be multifunctional, suppressing VIV and reducing drag simultaneously while performing its primary protection and buoyancy roles. Local and global Finite Element Analysis (FEA) allows for equipment to be designed smarter, minimizing required size and material while optimizing loading paths, performance, and design lives. Employing these



Vikodeck from Trelleborg offers surface protection against blast, jet an.

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Trelleborg Firenuts - nut and bolt fire protection



advanced engineering tools will help advance riser technology moving into the future to expand and extend the capabilities of the industry.

Conclusion

While deep water drilling and production has been revolutionized by increasingly advanced technology in recent years, making high performance and dependable solutions has never been more important. This is because the requirement for equipment to operate safely and effectively while providing peace of mind is becoming more challenging in these demanding and dangerous environments.

By installing effective and reliable polymer corrosion and protection systems, the safety of hydrocarbons transportation installations will be increased. In the harsh offshore oil and gas industry, operators need the assurance of a material that delivers proven performance, without fail. It is the responsibility of the manufacturer to ensure that they can provide high performance

and reliable solutions, now more than ever. Similarly, operators should look to work with manufacturers who can provide the most advanced solutions which will guarantee performance and importantly, safety. ●



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Instrumentation on Production Platform

The article describes the instrumentation requirements of three critical and front end sections – Wellheads, Flowlines and Manifolds, and Separator - of a production oil & gas platform.

The hydrocarbons are believed to be formed by thermal conversion of organic matter trapped in sedimentary rocks from Jurassic era. The process is lengthy and not fully understood. The essential factors needed for oil and gas to evolve, to accumulate in a reservoir in known with a degree of uncertainty.

Drilling is very expensive especially offshore and it is essential that suitable exploration surveys should be undertaken before drilling begins. One well does not make an oilfield, far more must be found before oil operator can decide whether it is profitable to exploit the strike. A number of appraisal wells are drilled and samples taken for lab analysis. If appraisal wells indicate the field is big enough to be of commercial value then drilling of development wells begin. Due to enormous cost of offshore platforms the most economical way to develop an oil field usually involves drilling a large number of wells from a single structure using a technique called deviated drilling. Depending on type of reservoir several layers of strings of tubing will be inserted in to well bore and cemented in place to provide passage for oil and gas to flow to surface. The oil and gas flow to surface needs careful regulation at surface and cluster of valves and fittings is known as Xmas tree (see Figure 1).

A typical offshore production platform consists of the following sections:

- Wellhead Area
- Flow line & Manifold area
- Separation
- Metering
- Gas Compression/dehydration
- Gas Export
- Oil Stabilisation
- Produced water treatment
- Fuel gas

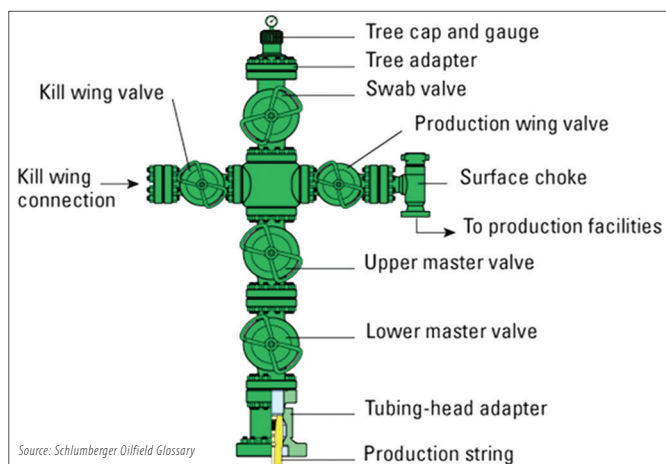


Figure 1: Well head & Xmas Tree

In this article, we will restrict to the critical and front end section of the production platform up to the separator section. The Instrumentation requirements of these 3 sections will be described in this article.

1. Wellheads

The term wellhead is used to describe the top section of the well located onboard the platform. Commonly referred to as the wellhead area this is where the well terminates and flow of oil or gas production can be controlled by series of valves.

Whether the well is single or dual completion the valve arrangement is similar for each string. The first valve within the tubing string of a well is located at a depth of approximately 600 meters below the platform. This valve is known as the sub surface safety valve (SSSV) or downhole safety valve (DHSV) and is controlled from the surface and hence the term surface controlled subsurface safety valve. These valves play a vital part in well isolation and because of their importance are only operated when needed. Subsurface valves are actioned close at the higher end of the platform shutdown hierarchy e.g. High Gas or confirmed fire situations.

When referring to a production well, topsides valves comprise the following in order of fluid flow.

(a) Lower Master Gate Valve (LMGV): This valve is manually operated and as with the subsurface valve is only operated when needed. The valve will be function tested periodically but this will involve partial closure and re-opening only.

Obliviously a partially open or stuck closed LMGV will have serious consequences on the production rates available.

(b) Upper Master Gate Valve (UMGV): This valve is remotely operated and is used when the occasion demands such as when production from a well is required to be stopped immediately. This situation can arise when a production cutback is required by closing in selected wells or when production stop is required and all wells are closed in.

All upper master valves or selected upper master valves can therefore be closed within matter of seconds.

Downstream of UMGV the well effectively divides in to three paths or routes normally referred to as:

- Production or active side is the route for reception of well fluids.
- Non-active or kill side of the tree whereby wellhead pressures can be monitored and kill fluids can be injected into well in order to stem or kill the flow.
- Swab connection is the connection provided at the top of Xmas tree vertically above the well stream through which access can be gained to the wellbore.

FEATURES

(c) Active Side – Production or Flow Wing Valve: This valve is used to isolate the well fluids from the associated well flowline (which in turn leads to production and test manifolds).

(d) Non Active Valve or Kill Wing Valve: This valve provides access/isolation to the wellhead and is used when injecting kill fluid or monitoring the well.

(e) Swab Valve: The swab valve allows well service operations through the well service lubricator.

Xmas trees and their associated valves are designed to withstand the maximum pressures that can be met. Typically 5000 and 10000 psi rated tress and valves are installed as required.

1.1 Interface with Other Systems

The wellhead valves indicated in section 1.0 are generally supplied by the drilling/Xmas tree vendor as part of the drilling package. Engineers at APG integrate the signals from the above valves with the platform Control/Safety system or Wellhead Control Panel (WHCP) based on the control philosophy of the platform.

1.2 Wellhead Control

Control of the downhole safety valve (DHSV) is by way of hydraulic line that is run and strapped to the production string. The platform valves can be either pneumatically or hydraulically actuated valves are controlled by a wellhead control panel (WHCP) that is in turn supplied by a hydraulic power unit (HPU).

1.3 Hydraulic Power Unit (HPU)

The HPU normally supplies hydraulic power to operate the wellheads valves through a control panel.

- Surface controlled sub surface safety valves
- Hydraulic upper master valves
- Hydraulic wing valves

The HPU can also supply hydraulic pressure for subsea riser valves and remote wellheads. The HPU is a closed loop system using either mineral based hydraulic fluid for surface operations or glycol based fluid for subsea operations. The cleanliness level of the hydraulic fluid is usually high. The HPU can supply hydraulic power at several levels using air and electric driven pumps as required by the volumes pumped.

1.4 Wellhead Control Panel (WHCP)

The WHCP receives the hydraulic power and manifolds it into various hydraulic actuated valves. The WHCP opens and closed the wellhead valves on signals from the main control room. The ESD logic is translated by a series of isolation and dump valves.

A series of hydraulic accumulators are usually fitted to provide security of supply.

The output from WHCP is divided into 2 discrete systems.

- Sub surface safety valve operating system
- Wellhead operating system

The differences between two systems is that SSSV is usually controlled at a higher

pressure due to distance and downhole pressures and any returns are routed back to a calibrated tank on the HPU. The wellheads valves return their fluid directly to the HPU main storage tank.

1.5 Production Choke

Purpose of Choke

The production of oil or gas from a well is controlled by a variable valve referred to as choke which is either mounted directly on the upper part of the Xmas tree or in close proximity to the wellhead. The choke is located on the production flowline downstream from all other shutdown valves.

The purpose of the wellhead choke is to provide precise control of flow and pressure, tight shut-off and high degree of reliability and resistance to wear and tear. Since the choke is the first stage of control over the well flow, it is essential that it is correctly sized for the required operating conditions from the outset.

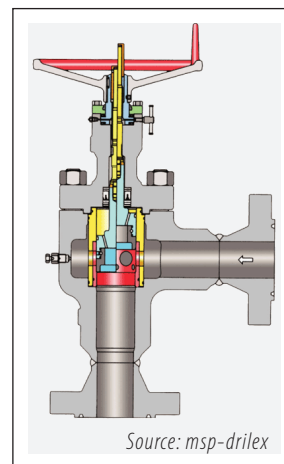


Figure 2: Choke Valve and Disc

The choke is generally referred to as Multiple Orifice Valve (MOV) by virtue of its capability to interchange the trim internals to achieve a multiple range of operating conditions (see Figure 2). The means of control is by two discs each having 2 holes of the same diameter.

One disc referred to as back disc is kept stationary by means of locating pins and other disc referred to as front disc is rotated through 90 degrees to expose a portion of the flow area.

Choke valves are fitted with calibration bands in 64ths of an inch or in oilfield language 'bean size'.

The choke is likely to encounter three types of conditions which are prevalent to all used equipment used in flow control. These are erosion, corrosion and cavitation and hence metallurgy of the valve is very important and should be taken care during section of the valve.

2 Flowlines and Manifolds

Flowlines are installed in order to transmit fluids to or from the wellheads. On the production side of the well the production flowlines is used to transmit the well fluids to the production or test manifold, the production flowline will normally include a choke for controlling the amount of fluids passing forward to the manifolds. The flowlines normally do have additional tappings in order to facilitate injection of chemicals as required. Typical examples are scale inhibitor to prevent calcium carbonate scales and methanol injection to prevent hydrate formation.

Also installed on the flowlines are the various instrument tapping's that are used to communicate pressure and temperature indications of the well fluids to the control room. Further there is provision for sampling monitoring of flowline contents.

Individual well flowlines are routed to either a production manifold or a test manifold. See Figure 3 for a typical Wellhead Oil production Flowline

2.1 Production Manifold

The production manifold is designed to accommodate the total production from all the wells and once the individual flows are combined in the manifold they pass on to main separation train.

Where each flowline terminates at the manifold there will be valve isolation available plus a non-return valve in order to prevent flow reversal back along the individual flowlines.

In event of problems arising within the system i.e. effective boxing in of

the manifold at both ends, then the manifold can be depressurized to the flare system through a blowdown valve and then drained for maintenance.

2.2 Test Manifold

The test manifold is designed to accommodate individual wells by routing them to a test separator. This is required so those individual wells can be tested in order to ascertain their flow and what the composition of the fluids is.

As with production manifold, the test manifold has facility to be depressurized and drained. See Figure 4 for production and test manifolds.

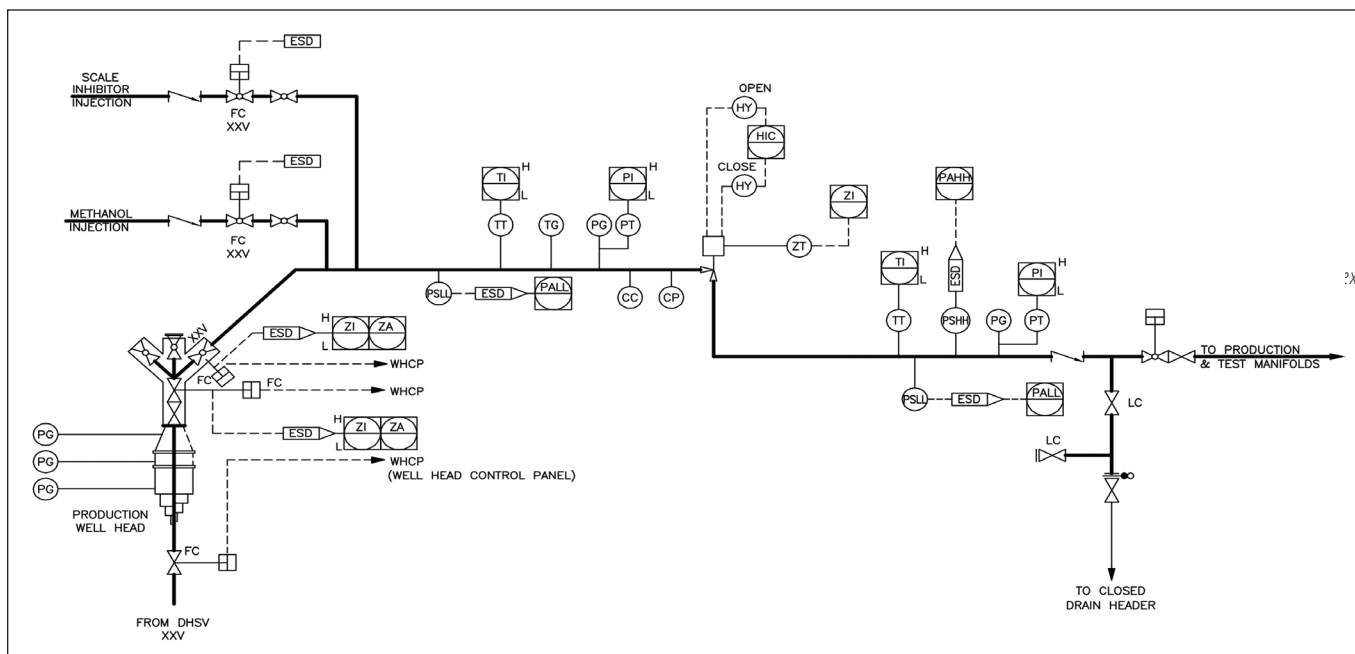
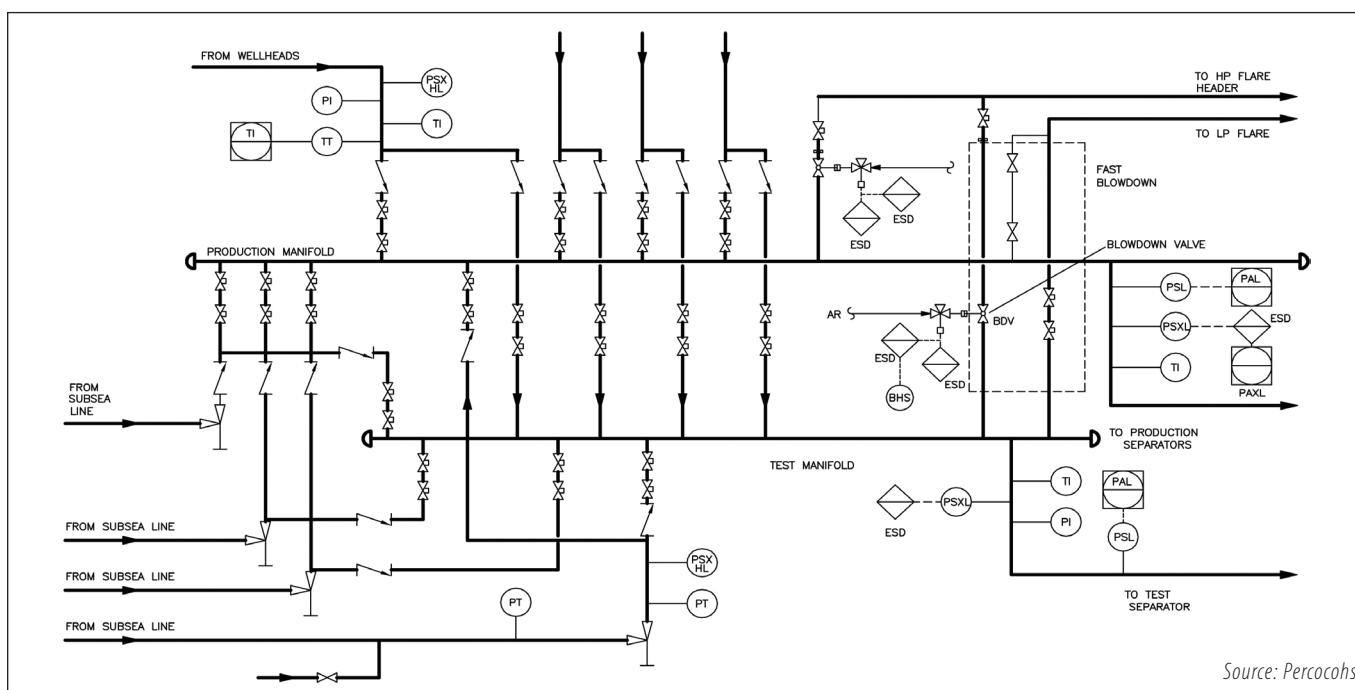


Figure 3: Wellhead Oil Production Flowline



Source: Percocohs

Figure 4: Production and Test Manifolds

FEATURES

3. Separator

A separator is a vessel in which a mixture of fluids, which are not soluble in each other, can be segregated.

On offshore installations, separators are used to segregate gas from liquids or one liquid from another such as water from oil.

For separator of gas and liquid, the separator is referred to as a two phase type. For separation of gas, oil and water, the separator is referred to as three phase type.

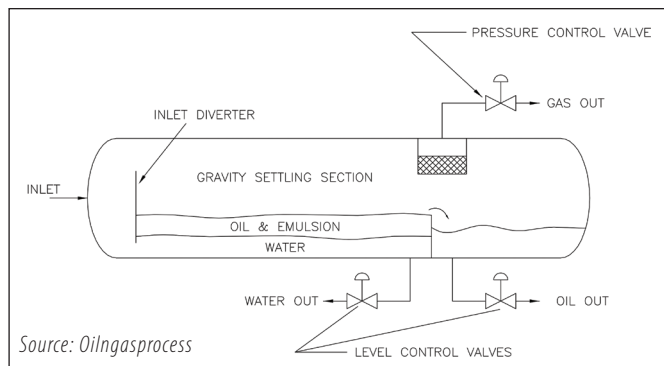


Figure 5: Production Separator and Instrumentation

3.1 Separator Instrumentation

Within the limits of design and construction all separators have the same basic Instruments & Controls and are as follows:

1. Pressure Transmitters - Monitors the pressure in the separator with remote indication in the central control room.
2. Temperature Transmitters - Monitors the temperature in the separator with remote indication in the central control room
3. Pressure Safety valve - Relief valves are installed on each separator, one in service and other isolated.
4. Manual blowdown line - This gives the facility to manually depressurize the separator, the gas being routed to the flare system.
5. Gas outlet line - This is split into two streams- the gas to the recompression and treating section and gas to flare system.
6. Pressure Indicating Controller and PCV - These two Instruments control the separator pressure. The PIC monitors and modulates the PCV as required
7. Gas off-take flowmeter - This measures the volume of the gas flowing from the separator in both the flare or recompression mode.
8. Level Indicating Controller and LCV - The LIC monitors the level and modulates the LCV to control the level at the set point
9. Oil outlet Line - This line which has the LCV in it, leads the oil to the next link in the process train which could be a lower stage of separation, storage or transfer pumps
10. Drains - This gives the facility to manually drain down the separator through the closed drain system

A typical production three phase crude oil separator together with its associated instrumentation and control system is shown in Figure 5.

3.2 Separator Controls

All Separators are fitted with the following protection facilities:

- Low level alarm

- Low level shutdown
- High level alarm
- High level shutdown
- High pressure shutdown
- High pressure relief valves
- In order to give added safety by preventing gas blow-by between separators, a shutoff valve is fitted to the pipework connecting the vessels. This valve is designed to close on a low level being detected in the upstream vessel or a high pressure being detected in the downstream vessel. Should either or both of these conditions be detected, then excessive pressure from an upstream vessel will not be communicated to a lower rated pressure vessel.

Regardless of what function is being monitored the sequence for alarm and shutdown is the same. The first notice is the alarm allowing the operator to take corrective action.

If no corrective action is taken or action is ineffective, further deterioration occurs and a shutdown results. All level, pressure or temperature separator shutdowns normally result in the closure of all producing wells upper master gate (surface safety valve) and flow wing valves. ●



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Paradigm Shift in Well Economics thru Robotic Well Interventions

In the back of low crude prices, new oil & gas projects have been delayed or indefinitely postponed so production targets are now being met from existing wells and fields. While fields maturing, it is imperative for all offshore assets to have an efficient and reliable solution to enable increased oil production while minimising investment cost and ensuring profitability. In last two decades, e-line based Robotic Intervention has evolved as future methodology or practices of Well Engineering to enable recovery rates higher than 50 per cent in offshore assets. The article discusses paradigm shift in 'Well Intervention' that allows future smart robotic intervention to minimise intervention cost along with increasing life of the well.

We are in the third quarter of 2016 and Oil & Gas E&P business has adapted itself to the new low price regime. Objectives and outlooks have evolved to enable increased oil production while minimising investment cost and ensuring profitability. New projects have been delayed or indefinitely postponed so production targets are now being met from existing wells and fields. With fields maturing, the need of the hour for all offshore assets is to have an efficient and reliable solution which will reduce the cost of production. For last two decades, e-line based Robotic Intervention has evolved to reach the moment when it defines future methodology or practices of Well Engineering to enable recovery rates higher than 50 per cent in offshore assets. There are three paradigm shift in Well Intervention – **firstly**, adopting intervention as methodology of increasing life of well; **secondly**, when wells are designed to enable future smart robotic intervention' and **thirdly**, adoption of robotic intervention to enable low

cost intervention – to recovery higher rate in minimum cost of production for the companies operating mature fields.

Adopting Intervention as Methodology of Increasing Life of Well

As wells are being designed, a universal design criterion is the capability to keep production flowing as long as possible without having to intervene in the well. This is why, typically, interventions are only done when something 'breaks' i.e. production becomes restricted, or stops or an unwanted production type begins. But this conventional strategy often forces operators into a position where they must cope with unnecessary levels of uncertainty, leading to inefficient responses. No other industry works on the principle of 'fix it when it breaks' approach and yet in the oil and gas industry billions of dollars are invested into putting wells in the ground only to squander the potential performance of the well and reservoir development through gross inefficiencies.

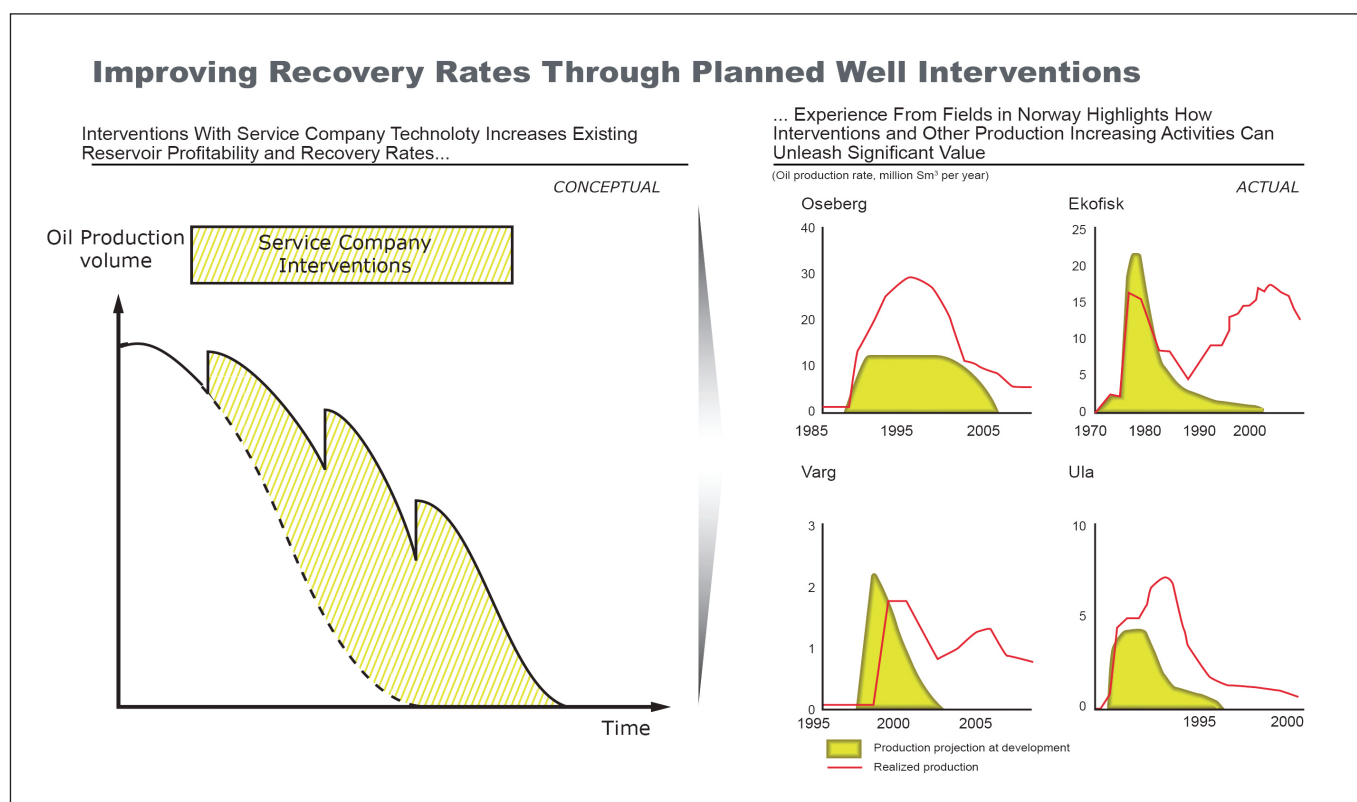


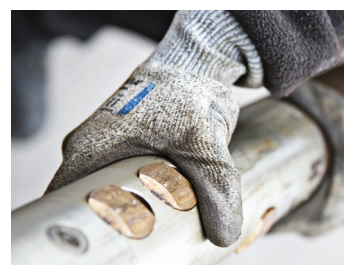
Figure 1

FEATURES

Similar to a vehicle or other expensive asset, regularly performed maintenance will increase the current performance and extend the overall life of the asset. Operators can prolong production and achieve the highest ROI possible while simultaneously increasing recovery factor and reservoir drainage. This is point number one, illustrated in Figure 1.

Figure 1 shows the theoretical understanding of higher recovery or increased life of well thru regular intervention and the data on the right courtesy Norwegian Petroleum Directorate shows the example of four fields in the North Sea which shows increased recovery thru management of wells thru Well.

What happens when Operator Designs Completion based on Intervention



Operators around the world design and complete wells based on production estimates and not based on future intervention plans. Planning wells with future intervention enables operators to extend live of well rather than only plan for side tracks or drilling new wells.

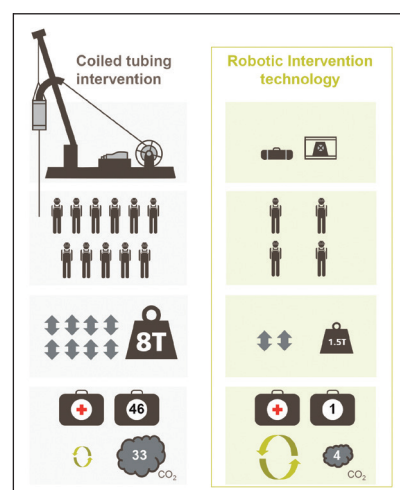
An operator in Offshore India had to design well based on new found production zone in well which meant zonal isolation was required to enable production from different production zone. Operator planned the well with 4.5" tubing in combination with 2.313" SSDs. Prior to running completion, operator contacted Welltec to plan future intervention; and it was determined, intervention on e-line was not feasible due to well completion restrictions. Well completion was redesigned with 3.5" production string which could be intervened in future with e-line robotic Intervention. Well intervention was carried out with Well Stroker, and 3 SSDs were opened to enable production of the well. New Well Completion design enabled saving of OPEX reduction of USD 750,000 per intervention as no barge and CT was required for intervention. This has enabled the operator to complete the well with multi zonal completion enabling extending the life of well and increased ROI for single well CAPEX cost.

Adoption of Robotic Intervention to Enable Low Cost Intervention

Intervention is generally defined by three generic parameters which amazingly have no clear definition across the industry: efficiency, Reliability and Innovation. Welltec believes in defining efficiency as the ability to quickly mobilise, rig-up, run in and out of the well, rig-down and demobilise off location, it's clear that a WO rig is the lowest while slickline and e-line score the highest. Reliability is defined as the ability to solve the problem once on location.

	Efficiency	Reliability	Innovation	
Slickline	8	6	4	18
Coiled Tubing	5	9	4	18
WO Rig	3	10	4	17
E-line	8	8	8	24

Here the WO rig scores the highest as it can generally overcome even the most severe of challenges. On the definition of innovation, this is the ability to understand what the problem is, adapt to the challenge and bring the appropriate technology to bear quickly, minimising downtime and restoring production as quickly as possible. With real time, surface controllable features enabled



by e-line versus the mechanical solutions offered by the others, it scores the highest in this category, offering a 40 per cent advantage over the WO rig.

While a workover rig has the highest chance of success to rectify the problem, what about the trade-off on efficiency and innovation? Slickline may be efficient as per our definition, but what is the confidence level on its reliability and innovation to overcome and fix the unknown challenge? Overall, e-line stands out as the overall winner for these key elements of success.

Another important factor which has not been addressed or scored, but should be considered as part of the innovation content is the ability to accomplish the work in the safest, most sustainable and cost effective way possible. A quick comparison of a CT unit to an e-line crew with regards to some simple metrics: total footprint, size, number of people, number and weight of lifts, sustainability, complexity of operations and carbon footprint, demonstrates that there is significant additional value to be gained from deploying e-line. If a WO rig were to be compared the contrasts become even greater.

When you consider these additional benefits it becomes even more clear that an e-line solution offers significant advantages, especially if you've got the right portfolio of tools. That's point number three.

A few examples to highlight that approach are provided below:

94% Time Savings, Increased Safety and Cash Flow

Offshore Mexico, subsurface safety valves (SSSV) require periodic function testing to ensure reliable operation when needed. Typically, they are tested and if they fail, a workover rig is scheduled to shut in the well and replace them.



A new technique has successfully been implemented which precludes the requirement to shut in the production or even to mobilize a workover rig. Using the Well Cleaner

Wishbone Honer (WBH), the operator has been able to repair the valve in-situ with the well flowing.

Analysis determined that often the SSSV failed to close completely due to debris which limited its ability to hold pressure during the testing. After careful planning, a Well Tractor® and Well Cleaner® WBH were mobilized and run on e-line to the desired depth. There the WBH was activated and cleaning of the SSSV and surrounding tubing was performed. Following the cleaning the SSSV was successfully tested.

The entire operation was completed in only 18 hours compared to ~1 week for the rig operation to pull the SSSV. And the well remained on production throughout, demonstrating the benefits that e-line interventions can provide.

Production Restored, USD 2 million Saved

Onshore Nigeria, a retrievable safety valve assembly failed to seat properly in the tubing and flowed up hole with the production to get stuck somewhere near the tubing hanger; precise position unknown.

More than 1,000 slickline jar attempts were made to free the fish. Indicators showed that the lock mandrel fishing neck was partially open, suggesting that its keys were jammed in a slightly inclined position, below the lower ID of the tubing hanger profile.

Based on this problem description, Welltec engineered a solution. Using the Well Tractor and Well Miller plus a custom nipple milling bit in combination with the Well Stroker the team succeeded in milling out the safety valve which fell to the bottom of the well as desired, restoring access and production.

This successful milling operation enabled the operator to avoid having to pull the entire completion string and saved more than USD 2 million compared to the alternatives. The operator was very pleased to be able to regain the well in a shorter time frame and estimated that the milling solution was twice as efficient as the other options.



90% Cost Reduction while Restoring Injection on a Limited Space Platform

Offshore India, limited crane height, space and daylight operations posed challenges on a small platform to an operator trying to restore injection on a converted producer.

A thorough risk assessment was conducted and equipment mobilized offshore to rectify the problem. The first run revealed that the GS profile couldn't latch onto the lock mandrel completely. A Well Cleaner Power Suction Tool (PST) was then run to remove debris which had settled on top of the lock mandrel. The Well Cleaner PST uses a venturi system to create a powerful vacuum which agitates and mobilizes the debris, trapping it inside bailers and removing it from the wellbore.

Once the Well Cleaner PST was recovered, the Well Stroker with GS pulling tool was run. It latched the lock mandrel and with one stroke pulled the reluctant lock mandrel (and attached T TSS) free. The entire assembly was removed from the well and injection established at 22,000 bwpd.

The operation was carried out in only three days and provided significant savings, approximately 90%, versus a barge-based, coiled tubing operation. ■



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India

Reddy Appointed Director in Oil India Ltd

New Delhi: B N Reddy, OSD (International Corporation), Ministry of Petroleum & Natural Gas, Government of India, has been appointed as an Independent Director at Oil India Ltd, the National EPC enterprises of Crude and Natural Gas. Reddy, a Indian Foreign Service (IFS) in 1993, had served in Indian Missions in Indonesia (1995-98), Lao PDR (1998-2001), New York (Permanent Mission of India) (2005-2008), Malaysia (2008-2011) and Geneva (as the DPR in Permanent Mission of India) (2013-16).). He has served in the Ministry of External Affairs in the Administration Division and subsequently as the Director/Joint Secretary to the External Affairs Minister of India.

Reddy has a Master's Degree in Thermal Engineering from IIT, Bombay, and Bachelor's Degree in Mechanical Engineering from Birla Institute of Technology and Science (BITS), Pilani. Prior to joining the Ministry of External Affairs, Mr Reddy also served with TELCO (now Tata Motors) and also in the Indian Engineering Service (IES).

Sushmita Dasgupta appointed as Government Director of IOCL

New Delhi: Sushmita Dasgupta has been appointed as Government Director on the Board of Indian Oil Corporation Limited.

Sushmita Dasgupta is presently working as Senior Adviser in the Ministry of Petroleum & Natural Gas, Government of India. Dasgupta belongs to the 1985 batch of Indian Economic Service. She has Master's Degree in Economics from Delhi School of Economics with specialization in Public Finance, Econometrics and Classical Political Economy. She Graduated in Economics {Hons} from Lady Sri Ram College, New Delhi. Prior to joining the Government of India, she has worked as a lecturer of Economics in Miranda House and Daulat Ram College, Delhi University. She also holds M.Phil Degree in Economic Planning from University of Glasgow, U.K.

Sushmita Dasgupta has worked in different Departments of Government of India on diverse subjects ranging from International Trade, Public Finance, Financial Resources of the State Governments, Rural Development, Perspective Planning, Administrative Reforms, etc.

IOCL to Set up 150 CNG Stations in Bihar

Mumbai: The Indian Oil Corporation (IOC) will soon set up at least 150 stations for supply of compressed natural gas (CNG) across the state of Bihar.

The decision was made after the IOC was chosen for distribution of CNG at the 10th City Gas Distribution (CGD) Bidding Round conducted by the Petroleum and Natural Gas Regulatory Board (PNGRB). The PNGRB is the nodal body which authorizes the development and maintenance of CGD networks in different geographical areas.

Vibhash Kumar, Executive Director, IOC (Bihar-Jharkhand), said that the corporation had been trying its best to switch to natural gases for several years to control greenhouse gas emissions in the environment.

"Since more and more people are switching to natural gases, we will set up CNG stations in 21 districts, including Araria, Begusarai, Aurangabad and Rohtas, during the first phase," he said.

Vedanta reports oil discovery in Krishna-Godavari basin

Mumbai: Vedanta Ltd, Anil Agarwal-led integrated energy company, has announced discovery of oil in Krishna Godavari basin block (KG-OSN-2009/3) in the Bay of Bengal. The block previously had a gas discovery in the very first well drilled. Vedanta holds 100 per cent participating interest in the block.

KG-OSN-2009/3 offshore block in the Bay of Bengal was originally spread over in an area of about 1,988 sq km which was later reduced to 1,298 sq km due to exclusion of area within firing range. It is located in the shallow waters of the Indian Ocean along the East coast of India, approximately 1.5 km from the Indian coastline.

Regulator Drops Plan to Force LNG terminals to reserve share for common use

New Delhi: The downstream regulator has scrapped its plan to force LNG terminals to reserve a share of their capacity for common use after industry opposed the move arguing the proposal was premature and would hurt local gas demand.

In March 2018, the Petroleum and Natural Gas Regulatory Board (PNGRB) had published a draft regulation for LNG terminals in the country, requiring them to register with the board, follow certain safety standards and, most contentiously, offer some common carrier capacity.

The draft mandated an LNG terminal to "offer at all times, after registration, 20% of its short term (less than five years contract) uncommitted regasification capacity or 0.5 million metric tonnes per annum (MMTPA), whichever is higher, as common carrier capacity."

IOC-BPRL Wins Oil Block in Abu Dhabi

Mumbai: State-owned Indian Oil Corporation along with its partner Bharat PetroResources Ltd (BPRL), the Exploration arm of Bharat Petroleum Corporation (BPCL), has won an oil block in Abu Dhabi, where the two will invest USD 170 million. IOC and BPRL acting jointly as a consortium through Urja Bharat Pte Ltd have been awarded 100 per cent stake in the Abu Dhabi Onshore Block 1 Concession. IOC and BPRL hold 50 per cent each in Urja Bharat Pte Ltd.

The Concession has been awarded by the Supreme Petroleum Council (SPC), on behalf of the Abu Dhabi government, where participation of the Indian consortium is through a special purpose vehicle (SPV), Urja Bharat Pte Ltd.

L&T Bags Gas Export Pipeline Contract from Kuwait Oil Company

Mumbai: Larsen & Toubro Ltd (L&T), the Infrastructure major has won a gas export pipeline contract from Kuwait Oil Company (KOC). The new strategic gas export pipeline contract has been awarded through international competitive bidding on a Lump Sum Turn Key (LSTK) basis.

The company said the order falls under 'large' category that range between ₹ 2,500 crore and ₹ 5,000 crore as per its classification of contracts. The company said the new export gas strategic pipeline and its associated facilities will run a span of around 145 km.

Nayara Energy Starts its Rail-fed Oil Depot in Maharashtra

New Delhi: Nayara Energy, integrated downstream oil company, has operationalised its rail-fed Petroleum Oil Lubricant (POL) depot at Wardha in Maharashtra. According to the company press release, the depot, spread over 50 acres, has a capacity of handling over 16,000 kilolitres of oil products, which will be supplied from the company's refinery at Vadinar in Gujarat.

B Anand, CEO, Nayara Energy said that the addition of our new depot in Wardha is in line with our commitment to create world-class assets in a sustainable manner to fuel India's growing energy demands. This, being our first rail-fed depot, will be an important step towards enhancing our supply infrastructure in the region.

Green nod to HPCL Shapoorji's LNG terminal

Ahmedabad: Setting the stage for building the fourth liquified natural gas (LNG) terminal in Gujarat, the ministry of environment, forest and climate change (MoEF) has accorded environmental and CRZ (coastal regulatory zone) clearance to HPCL Shapoorji Energy Private Ltd (HSEPL) for developing new LNG storage and re-gasification terminal at Chhara in Kodinar of Gir Somnath district.

HSEPL, a joint venture between Hindustan Petroleum Corporation Ltd (HPCL) and Shapoorji Pallonji group's SP Ports Pvt Ltd (SPPPL), plans to set up 5 million tonnes per annum LNG terminal within the proposed area of Chhara port. The project cost is estimated to be ₹ 5,408.82 crore.

HSEPL's LNG terminal will have LNG ship unloading jetty, LNG storage, LNG transfer and vaporization as well as other utilities and infrastructure facilities.

EIL, Mongolia Pact for Oil Refinery

New Delhi: Memorandum of Understanding (MoU) between Engineers India Ltd, a PSU under the Ministry of Petroleum and Natural Gas, and the Government of Mongolia through Mongol Refinery State Owned LLC has signed for Project Management Consultancy services for construction of an oil refinery plant in Mongolia by EIL.

Government of Mongolia is in process to set-up 1.5 MMTA greenfield crude oil refinery in Sainshand province, under Line of Credit (LoC) extended by Government of India. EIL has carried out Detailed Feasibility Study for the project. It has been pre-qualified and subsequently shortlisted for providing project management consultancy services to Mongol Refinery for the project.

The MoU was signed by Dr Altantsetseg Dashdavaa, Executive Director, Mongol Refinery State Owned LLC and R K Sabharwal, Director (Commercial), EIL in the presence of Dharmendra Pradhan, Minister of Petroleum and Natural Gas & Skill Development and Entrepreneurship, and the Mongolian Minister.

Govt Approves Reforms in Exploration and Licensing Policy

New Delhi: The Union Cabinet chaired by Prime Minister Shri Narendra Modi has approved the Policy framework on reforms in exploration and licensing sector for enhancing domestic exploration and production of oil and gas. The objective of the Policy is to attract new investment in Exploration and Production (E&P) Sector, intensification of exploration activities in hitherto unexplored areas and liberalizing the policy in producing basins. Considering stagnant/declining domestic production of oil and gas, rise in import dependence and decline in investment in E&P activities, the need to bring further policy reforms was felt.

The policy reforms focus on four major areas. Firstly, increasing exploration activities in unexpected areas. In basins where no commercial production is there, exploration blocks would be bid out exclusively on the basis of exploration work programme without any revenue or production share to Government. Royalty and statutory levies, however, will be paid by Contractor. For unallocated/unexplored areas of producing basins, the bidding will continue to be based on revenue sharing basis but more weightage to work programme. An upper ceiling on biddable revenue share has also been prescribed to prevent unviable bids. The policy also provides for shorter exploration period and fiscal incentive for commencement of early production. Contractor will have full marketing and pricing freedom for crude oil and natural gas to be sold at arm's length basis through transparent and competitive bidding process.

Secondly, to incentivize enhanced gas production, marketing and pricing freedom has been granted for those new gas discoveries whose Field Development Plan (FDP) is yet to be approved. Fiscal incentive is also provided on additional gas production from domestic fields over and above normal production. Thirdly, to enhance production from existing nomination fields of ONGC and OIL, enhanced production profile will be prepared by both PSUs. For production enhancement, bringing new technology, and capital, NOCs will be allowed to induct private sector partners. Fourthly measures will be initiated for promoting ease of doing business through setting up coordination mechanism and simplification of approval of DGH, alternate dispute resolution mechanism etc.

Through this policy, a transparent, investor friendly and competitive policy framework is envisaged to accelerate exploration activities and provide impetus to expeditious production of oil and gas. The production enhancement scheme for nomination field of NOCs is likely to augment production by leveraging new technology, capital and management practices through private sector participation. With enhanced E&P activities, there would be macro-economic spin off benefits in terms of development of support services, employment generation, transfer of advanced technology etc. The enhanced production would help in reducing import dependence, improve energy security of country and save the precious foreign exchange on import bill.

International

Tokyo Gas signs deal to buy LNG from Shell Eastern Trading

Tokyo: Tokyo Gas, Japan's largest city gas provider, has signed a heads of agreement (HOA) with Shell Eastern Trading for 500,000 tonnes per annum of liquefied natural gas (LNG) for 10 years from April 2020.

The two companies have come up with an innovative pricing formula based on coal indexation, which is included in the agreement, it said.

Under the deal, Royal Dutch Shell will supply LNG to Tokyo Gas from the Shell Group's global LNG portfolio, rather than from specific LNG projects, it added.

Australia's Woodside signs LNG supply deal with China's ENN Group

Sydney: Australia's Woodside Petroleum WPL.AX has signed a Heads of Agreement (HOA) to supply liquefied natural gas (LNG) to China's ENN Group for 10 years from 2025.

Woodside, Australia's biggest listed oil and gas explorer, said in a statement the volume covered by the HOA is 1 million tonnes per annum (mtpa), to be sourced from Woodside's portfolio of gas supply. Signed at the LNG 2019 conference in Shanghai, the HOA follows a cooperation agreement sealed last October.

ENN is aiming to increase its market share in China's gas distribution and retailing sector, as well as internationally, Woodside said in its statement.

China's LNG Imports to reach 110bn cubic metres by 2025: CNPC

Beijing: China's imports of liquefied natural gas (LNG) could reach 110 billion cubic metres, or about 80 million tonnes a year, by 2025, according to China National Petroleum Corp (CNPC).

The growth will be driven by a stringent environmental policy and an accelerated restructuring of the country's energy mix, among other factors, according to CNPC.

China's LNG imports last year were about 54 million tonnes. CNPC accounts for about 60 percent of China's overall gas imports and 70 percent of domestic production, it said.

Russia's Gazprom to Start Baltic Gas Processing & Liquefaction Project

Moscow: Russian gas producers Gazprom and RusGazDobycha will start a major gas processing and liquefaction project near the Baltic Sea port of Ust-Luga, said Gazprom.

The project will have a capacity of 13 million tonnes of liquefied natural gas (LNG), while investment in the project will total 700 billion roubles (USD 10.67 billion), it said.

The first block of the complex is to become operational in the second half of 2023 and the second block by the end of 2024, Gazprom said.

Indonesia Gas Utility Builds LNG Terminal

Jakarta: Indonesia's state-controlled gas utility company PT Perusahaan Gas Negara (PGN), in cooperation with state port companies, is building a small terminal for liquefied natural gas (LNG) distribution in East Java, the company said in a statement. The terminal is targeted to start operation in the fourth quarter this year.

For the early phase, the East Java LNG terminal will have a regasification capacity of just 30 billion British thermal units (btu) per day, or about 30,000 cubic feet a day, although the company plans to expand that based on energy demand growth in East Java and surrounding areas.

The terminal is expected to improve PGN's distribution network in East Java for both its industrial-based and household customers, as well as for power generators.

Siemens signs deal with China's SPIC in effort to revive gas turbine

Beijing: Siemens and China's State Power Investment Corp (SPIC) have signed a co-operation deal on to improve the fortunes of its ailing gas to power turbines business.

The strategic partnership framework agreement comes on top of speculation that Siemens is looking to find a joint venture partner for the business, where sales and profit have collapsed.

China is one of the few remaining markets for gas turbines, which have lost ground elsewhere due to the increasing popularity and cheapness of renewable power generation.

The deal, signed in Beijing on Tuesday, expands an existing cooperation spanning power generation, product demonstration and novel management systems for decentralised energy systems.

2,000 engineers to be hired by Aarvi for BS-VI roll-out by oil companies

Mumbai: Aarvi Encon, Mumbai-based manpower outsourcing firm, has signed contracts to provide 2,000 engineers to oil companies, including a large PSU and multiple private firms, for implementation of refinery projects related to rollout of BS-VI fuel.

"Based on the contracts signed by us a couple of months back, these 2,000 trained engineers will be provided by us to oil companies to work on BS-VI projects and refinery expansion projects," said Jaydev Sanghavi, Executive Director, Aarvi Encon.

The company said the transition to higher efficiency BS-VI fuel would lead to upgrading of operations, machine and infrastructure frameworks across the 16 refineries in the country, resulting in the demand of 2,000 engineering jobs which Aarvi will help the companies to fill.

"For the projects, the unit operations for the existing 16 refineries across the country need large-scale upgrades amounting to between ₹ 4,000 to 5,000 crore," the company said. Compared to the earlier levels of sulphur and benzene in BS-IV fuels, BS-VI has much lower sulphur and benzene content.

Mercury in Steel Thermometer



Mercury in steel thermometer, ZM Series from Adarsh Industries are the most accurate/fast response instruments with accuracy of $\pm 1\%$ FSD, available in dial sizes 4", 6", 8" and 10" dial. They are available as both Rigid Stem Type and Capillary Type and ranges from -38 to max 600°C .

For details contact:

Adarsh Industries

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Tel: 022-29275496, Fax: 91-022-29275558
E-mail: sales@adarshpressuregauge.com

Flushing Ring



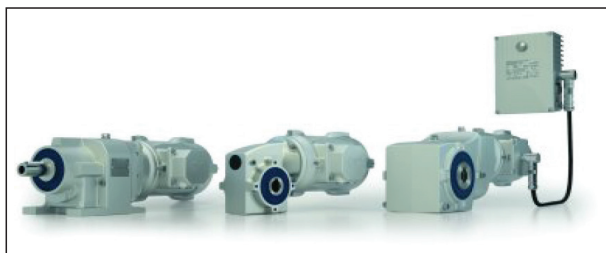
The flushing flange or ring is used for flushing solution combined with diaphragm seals. This type of flushing flange or ring is clamped between process nozzle and diaphragm seal. The reducer flange is used to mount a larger diaphragm seal to a smaller process connection.

For details contact:

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Surface Treatment



The nsd tupH surface treatment offered by NORD DRIVESYSTEMS is an outstanding anti-corrosion treatment for gear units, smooth motors, frequency inverters and motor starters in washdown-optimised cast aluminium housings. Applying a special method, the surface is made corrosion-resistant and harder; in this way, aluminium behaves like stainless steel with regard to corrosion protection. This is not a coating, but the surface treatment creates a protective layer which is permanently bonded to the substrate material. In contrast to painting or coating, nothing can detach or flake off.

Damages remain locally restricted and do not propagate. The surface is easy to clean and largely resistant to acids and alkalis. It is even possible to use high pressure cleaners or a great variety of aggressive media.

For nsd tupH aluminium drive units, all DIN and standard components, including drive shafts, are made from stainless steel. The fanless smooth motors do not spread germs and run very quietly. They are available as synchronous and asynchronous motors and comply with efficiency classes IE2 and IE3 (asynchronous motors) and IE4 (synchronous motors).

NORD drives with nsd tupH comply with FDA Title 21 CFR 175.300 and for this reason are suitable for food application. They have been successfully tested according to ASTM D714 (blistering), ASTM D610-08 (corrosion), ASTM D1654-08 according to DIN EN ISO 2409 (scratching), ASTM B117-09 according to DIN EN ISO 9227 (salt spray test) and ASTM D3170 (Gravelometer). In addition, their resistance to common cleaning agents which are used in the food industry has been confirmed in tests.

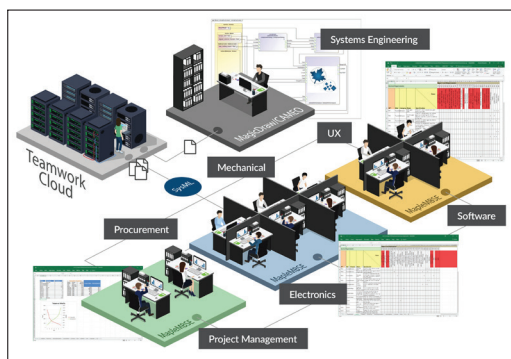
The nsd tupH surface treatment is advantageous for all drives used under extreme environmental conditions and for hygienically critical applications. This also includes the beverage and food industry, water treatment and sewage plants as well as offshore and onshore applications.

For details contact:

Getriebebau NORD GmbH & Co KG

Getriebebau-Nord-Straße 1
22941 Bargteheide/Hamburg
Germany
Tel: +49 45 32 / 2 89 -0
Fax: +49 45 32 / 2 89 -22 53
E-mail: pl.muthusekhar@nord.com / Joerg.Niermann@nord.com

Model-Based Systems Engineering



Maplesoft offers MapleMBSE, the software that enables companies to employ a Model-based Systems Engineering (MBSE) approach to their design projects without requiring every engineer on the project to be an expert in complex MBSE tools. The latest release, MapleMBSE 2019.0, further improves the workflow by making it even easier to create and modify many of the structures used to define and analyze the design.

Using an Excel-based interface, MapleMBSE provides a streamlined interface for each task in your MBSE project, such as defining requirements, impact analysis, trade-off studies, and failure mode effects analysis. These streamlined interfaces make these tasks significantly easier to perform, and reduce the time and errors that typically come with using a standard MBSE tool. The new release includes enhanced support for the Systems Modeling Language

(SysML) used by many MBSE tools, including MapleMBSE. Increased support is available for a variety of constructs that are used to define requirements, architecture, behaviour, and relationships, including activity diagrams, state machines, and parametric diagrams. By making it easier to create and modify these underlying SysML constructs, the new release further reduces the time and effort required to define the requirements and the relationships between them, analyze the impact of changes, and improve the design.

Other improvements in this release enhance the integration of MapleMBSE with model management systems, including faster model access through Teamwork Cloud. By connecting MapleMBSE to Teamwork Cloud, customers can seamlessly access models created in a number of different tools, including MagicDraw, and Cameo Systems Modeler. MapleMBSE can also be integrated directly with other SysML-based tools, such as IBM Rational Rhapsody.

For details contact:

Maplesoft

615 Kumpf Drive
Waterloo, ON N2V 1K8
Canada

Real-time Moisture Measurement



AMETEK Process Instruments has broadened its AME Vision communication and display system capabilities to include the 3050 Series of moisture analyzers. Originally designed for WDG-V analyzers, the AME Vision system provides real-time moisture measurements and trend data while also detailing a variety of maintenance and troubleshooting information.

Users can now continually monitor the measurement and diagnostic information for up to eight 3050 Series moisture analyzers. AME Vision enables the convenience of on-site calibration and communication with analyzers via Modbus RS485 and Ethernet LAN. The system augments or replaces the 3050 configurator software, providing all the same features and capabilities, including span verification and zero calibration. Additionally, AME Vision stores the last 10 successful calibrations and all alarms.

The 3050 Series analyzer can be pre-configured at the factory to directly communicate with AME Vision, eliminating the need to set it up, which will ultimately save time in the field. Users can extract data and upload new configuration files directly to the unit via a USB port.

AMETEK Process Instruments is the leader in online analytical instrumentation with the industry's most extensive product line. The company offers analyzers based upon 11 differentiated technology platforms for use in a variety of markets including oil and gas, power, pharma manufacturing and semiconductor chip manufacturing. AMETEK Process Instruments is a unit of AMETEK, Inc., a leading global manufacturer of electronic instruments and electric motors.

For details contact:

AMETEK

1100 Cassatt Rd, Berywn
Pennsylvania 19312
U.S.A.
E-mail: greg.galiffa@ametek.com

Online Water Quality Analysers



The new ORLAB WaterLine 2000 digital transmitter connects two digital sensors to monitor optical dissolved oxygen, turbidity, suspended solids, pH, redox, temperature, conductivity, salinity and sludge blanket (%), etc.

Transmitter uses digital communication technology; two digital sensor inputs, two 4-20 mA outputs, 2 relay outputs and Modbus RTU output.

Optical dissolved oxygen sensor uses luminescent optical measuring technique; Modbus RS485 communication; wide range of application and no drift and less maintenance. Turbidity/TSS sensor uses IR optical measuring technique with fibre optics; measures turbidity (NTU) or TSS (mg/L); measuring range up to 4,000 NTU or 4,500 mg/L; robust and water-proof for insitu mounting.

Suspended solids digital sensor measures suspended solids, turbidity and sludge blanket; digital technology for reliable measurements; optical sensor-based on absorptiometry; measuring range SS up to 50 g/l; turbidity 0 to 4,000 FAU and sludge blanket up to 100 per cent.

For details contact:

Orbit Technologies Pvt Ltd

B-50 Indl Estate, Sanath Nagar

Hyderabad, Telangana 500 018

Tel: 040-67216354

Fax: 91-040-23801579

E-mail: orbit@orbitindia.com

Mechanical Vacuum Booster



The vacuum boosters are of state-of-the-art design with many unique features ensuring complete vacuum tightness and leak-proof construction. The boosters are provided with highly reliable sealing system consisting of piston ring type labyrinth seals along with rotary axial between the conveying and bearing chambers along with a neutral chamber. The drive and

shaft is provided with double acting rotary seal and are properly sealed with O-ring.

The lubrication on both ends is by splash oil and the drive arrangement is either direct-coupled or V-belt depending on the model and the operating condition.

Standard and special models are available suiting specific application. The standard construction is out of high quality cast iron inoculated for vacuum duty. Optionally, it can be out of SS, ductile iron with or with special coating of Nickel/Teflon, etc.

For details contact:

Swam Pneumatics Pvt Ltd

C-2, Sector 3, Gautam Budh Nagar

Noida, Uttar Pradesh 201 301

Tel: 0120-4696222

Fax: 91-0120-4696200

E-mail: sales@swamatics.com

Triple Offset Butterfly Valve



DelVal Flow Controls offers top-of-the-line products in pipeline flow control. The DelVal Series 4 triple offset butterfly valve has been developed with extensive application, design and manufacturing expertise. These products are produced by employing modern manufacturing practices under a robust quality assurance system. These practices ensure consistent product quality and dependable performance. The DelVal Series 4 has been designed to include state-of-the-art features.

The DelVal triple offset butterfly valves provide bi-directional bubble-tight shut-off. This geometry ensures that the disc seal contacts the body seal only at the final shut-off position without rubbing or galling, providing a torque generated resilient seal with sufficient wedging to ensure a uniform seal contact.

For details contact:

DelVal Flow Controls India

Gat No: 25/1A, Kavathe

Post: Javale, Tal: Khandala

Satara District, Maharashtra 412 801

Tel: 02169-342285

Fax: 91-02169-241288

E-mail: salesindia@delvalflow.com

PRODUCTS

Candle Filter



SAP Microbac candle filter consists of elements made in multi-tubes of equal diameter either in metals and or plastics such as SS-304, SS-316, SS-316 L, SS-904 L Hastelloy or PP, PVDF and PTFE depending upon specific application.

The entire element is dressed with seamless filter bag tested at high pressure, depending upon the area worked out for enquired application. The length of the element is fixed considering installation qualification for the space provided, the diameter of the element remain the same.

The possible discharge may be dry or slurry form. The mode is back blowing the element with adequate pressure of permissible gas or liquid in process.

Slurry to be filtered is pressured with pump and enters the vessel where several elements are mounted on registers. The vessel is air-vented and then the outlet valves are opened and it is circulated for some time. During circulation max surface straining and surface filtration occurs and a precoat layer of high porosity is obtained on each bag which itself acts as a filter media. Other two mechanisms such as depth straining and depth filtration during circulation is minimum. Once the clarity is obtained circulation is switched over to filtration. As the slurry quantity exhausts the filter is scavenged either with air/nitrogen or steam and remaining is drained out and cake dried further. Lastly, cake is discharged by back blowing with gas and collected in bags for disposal. If the cake is pyrophoric in nature it is slurry discharged with mother liquer.

For details contact:

SAP Filter Pvt Ltd

Plot No: A-5, Sector 1

The Vasai Taluka Indl Co-op Estate Ltd

Goraipada, Vasai (E)

Dist: Thane, Maharashtra 401 208

Tel: 0250-3208273

Telefax: 91-0250-2458982

E-mail: info@sapfilter.com / sales@sapfilter.com

Oil Removal Filters



The efficient filtration of compressed air is a complex problem. And the new 2100 Series from ultrafilter offers the right solution by providing not only higher efficiency but also higher capacity at a lower price and a choice of quality pressure die-cast housings with the new generation of ultrafilter filter elements.

Filters manufactured by Ultrafilter reduce wear and tear in pneumatic equipment, tools and instruments, cut down production stoppages, lower repair costs to improve the quality of production and reduce energy costs.

The unique element has a three stage filtration effect. Oil and dirt laden compressed air flows through the filter element from inside to outside. The coarse particles of dirt and pipe scale are retained inside the pre-filter. Oil, water and the remaining fine particulate matter then pass to the main medium, a three dimensionally layered microfiber medium which provides the next two stages of filtration. Here, up to 99.99999 per cent of all oil and water aerosols and dirt particles down to a size of 0.01 micron are trapped. Liquid attach to the fibre and by coalescing the oil and water aerosol, bulk liquid is formed. This in turn is carried by the air flow to the outer foam sock which has a very high surface area. Within the cellular structure of the sock, the air and water separate, the air flows from the element in the upper section, whilst the water and oil gravitate to the bottom of the element and fall into the quiet zone at the bottom of the filter housing. The oil and water are discharged by a drain without the need of any maintenance.

For details contact:

Ultrafilter (India) Pvt Ltd

Plot No: 70, Bomasandra Indl Area

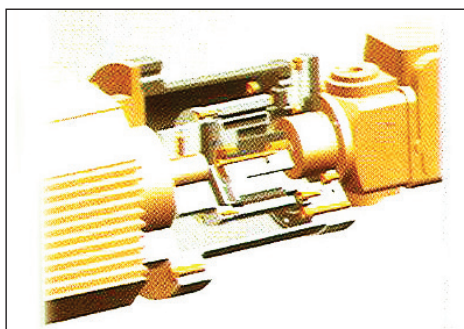
Bengaluru, Karnataka 560 099

Tel: 080-41429900

Fax: 91-080-41419903

E-mail: info@ultrafilterindia.com

Magnetic Couplings



DST permanent magnetic couplings provide leakage-free transmission for the process industries and are environmentally friendly. Hermetically-sealed drives for pumps and

agitators prevent any leakage of highly toxic or aggressive media. High torque can be transmitted wear-free through the vessel walls and are prevented from damage. A significant advantage of the DST magnetic coupling is the freedom from wear in contrast to dynamic seals. The standard construction range of permanent magnetic couplings is available with torque ratings from 1 to 450 Nm.

It finds application in chemical, pharma and food industries, isocyanate and polyol pumps in polyurethane moulding, industrial ovens, metering and batching machines, hydraulics, etc.

For details contact:

Beda Flow Systems Pvt Ltd

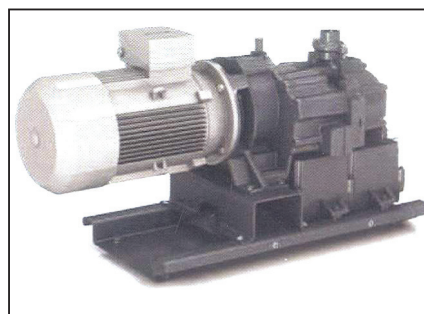
W-7, Sector XI

Noida, Uttar Pradesh 201 301

Tel: 0120-4329990

Fax: 91-0120-4080022

EDC Dry Claw Vacuum Pumps



With pumps up to 360 m³/hr and the ability to be driven by a proven variable speed drive (VSD) technology the EDC claw pumps afford you complete flexibility, efficiency and control over your process. These

machines designed with robustness, durability and superior materials of construction and technological advanced to give you a trouble-free solution to your specific application.

It is based on proven compressor and screw vacuum pump design for long trouble-free life even in the harshest applications. It is ideally suited for replacement market, compressor house installations and OEM machinery.

Allows you to optimise the energy you use to maintain your process duty point. The lowest possible flow will be delivered to match your required duty point or speed – nothing is wasted.

For details contact:

Edwards India Pvt Ltd

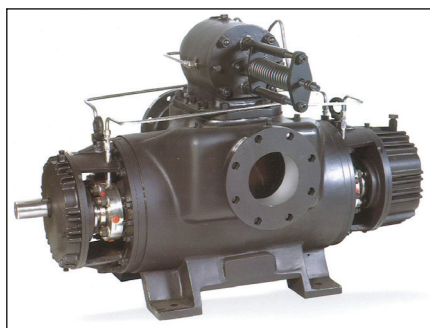
T 97/2, Bhosari MIDC

Opp: Saint Gobain

Pune, Maharashtra 411 -26

Tel: 020-40752222

Twin Screw Range of Pumps



The working principle of Roto gear timed dual flow twin screw pumps is dependent on the rotation of two screw spindles in closed compartment. Wherein a pre-defined clearance is maintained between the screw spindles as well as between the outside diameter of the screw spindles and the bore of the casing/liner in which the screw spindles are located.

Each half of the screw spindles is left-handed and right-handed. Thus, when the spindles start rotating, driven by a pair of timing gears located at the end of the screw spindles, the liquid is drawn towards the end of the screw spindles and entrapped between the bore of the pumping compartment as well as the flanks of the screws and is then propelled axially from both the ends towards the centre.

Such a dual flow nullifies the axial thrust completely thereby enabling the screw spindles to remain in a state of hydraulic balance. Rotor's unique double profile of the screw spindles contributes to a higher volumetric efficiency, thus an improved overall efficiency.

For details contact:

Roto Pumps Ltd

RotoHouse, 13 Noida SEZ, Noida

Uttar Pradesh 201 305

Tel: 0120-2567902

Fax: 91-0120-2567911

E-mail: contact@rotopumps.com

PRODUCTS

Console Gear Pump Drive



The new Cole-Parmer Console Gear Pump Drive is compact and cost-effective, offering simple variable speed control for many fluid handling applications.

When coupled with an appropriate gear pump head, this new drive handles system pressures up to 21 bar, differential pressures greater than 5 bar and flow rates as high as 5,850 mL/min - ideal for applications like pressure filtration, but also excellent for many other laboratory- and industrial-scale, continuous-duty flow applications.

These modern, reliable pumps feature 100:1 speed-control to deliver fluid over a wide flow range. A separate power switch enables the pump operator to maintain the speed setting when turning the drive

On or Off. Convenient remote control of start or stop is available via a DB9 connector on the back of the drive. Gear pump heads - purchased separately - are available in cavity or suction-shoe configuration and offer smooth, pulseless, accurate and repeatable fluid delivery.

For details contact:

Cole-Parmer India

403, A-Wing, Delphi
Hiranandani Business Park, Powai
Mumbai 400 076
Tel: 022-61394410, 61394444
Fax: 91-022-61394422
E-mail: vinita.singh@coleparmer.in

Mobile Dust Extractors



Whatever material, dust, chips or fumes you would like to remove or transport from or within the workplace, we have the solutions, even in dangerous environments, such as ATEX zones. With such a wide range available we have developed a diverse customer base, including clients from construction, heavy industry, aerospace and transport as well as the food industry, to name a few.

Dustcontrol supplies industrial mobile dust extractors and air cleaners, on-tool suction casings, stand-alone separators and cleaning accessories. This helps companies worldwide achieve cleaner and more efficient production, in addition to improved product quality.

All of our mobile vacuums and air cleaners are delivered as standard with Hepa H13 filtration and built to Application Class H for hazardous dusts and the most demanding

environments. Their vacuums all feature cyclone-based separation and are fitted with pleated cartridge filters to provide high and consistent performance in the most energy-efficient way. Reverse pulse filter cleaning also means filters can be kept clean without the need for removing them in the workplace. All machines are designed to be as ergonomic as possible, so they are easy to handle, move around and transport, as well as being simple to maintain.

Dustcontrol has over 45 years' experience in developing high-efficiency dust extraction solutions including machines, capture hoods for hand-held power tools and fixed equipment and a wide range of cleaning accessories.

For details contact:

Dustcontrol UK Ltd

7 Beaufort Court
Roebuck Way Knowlhill
Milton Keynes MK5 8HL
U.K.
Tel: 01327 858001
Fax: 01327 858002
E-mail: sales@dustcontrol.co.uk

Gastech 2019**Date:** 17-19 September 2019**Venue:** Houston, Texas

Event: For over 45 years, the Gastech exhibition and conference has been at the forefront of the international gas, LNG and energy market. This world renowned event is regarded as the most significant meeting place for upstream, midstream and downstream gas, energy and LNG professionals, where they convene to do business.

Gastech has fast become a next generation energy event, hosting major NOCs, IOCs, integrated energy companies, global utilities, EPC contractors, shipbuilders, pipeline companies, manufacturers, technology providers and service companies all of whom play an active role in the global energy value chain.

For details, contact:

Aideen Mannionquinn

Operations Enquiries

Tel: +44 (0) 203 615 5901

Email: operations@gastechevent.com

OPES 2020**Date:** 8-11 March 2020**Venue:** Oman Convention & Exhibition Centre Muscat, Oman

Event: OGWA is a biennial international exhibition and conference that brings together local and international oil and gas companies from the GCC, technology and service providers, equipment suppliers, and other companies directly serving the industry's requirements.

It is a platform for discussing the latest developments and directions of the industry, as well as for trade and business opportunities among the local and international oil and gas companies. Launched in 1998, it has since been under the patronage of the Ministry of Oil & Gas and has consistently received the support of Petroleum Development Oman (PDO), Oman LNG, and many other leading oil and gas companies.

For details, contact:

Ebrahim Taher Exhibition Director

OmanExpo

P.O. Box: 20, PC:117 Wadi Kabir 1st Floor, SABCO Building, Wattayah, Muscat, Sultanate of Oman

Tel: +968 24660124 Fax: +968 24660125/126

Email: ebrahim.taher@omanexpo.com

ADIPEC 2019**Date:** 11-14 November 2019**Venue:** Abu Dhabi International Petroleum Exhibition & Conference, Abu Dhabi

Event: ADIPEC 2019, the largest Oil & Gas in Middle East, will bring together the global leaders of Energy, Power, Oil and Gas, Petroleum, Drilling, Offshore and Natural Gas, and Marine industries in a single platform to discuss and deliberate the current issues and trends in entire hydrocarbon industry and the future opportunities laying in the industry. Since its inception in 1984, ADIPEC has provided an unrivalled platform for industry experts to come together and share knowledge and meet with peers.

The multi-disciplinary conference is intended for international and regional oil and gas professionals, who are involved in both the technical and non-technical functions within the industry.

For details, contact:

DMG Events

5th Floor, The Palladium,

Cluster C, Jumeirah Lakes Towers,

P.O. Box 33817

Dubai United Arab Emirates

T: +971 4 438 0355

E: info@dmgevents.com

SPE Oil and Gas India Conference and Exhibition**Date:** 9-11 April 2019**Venue:** Mumbai, India

Event: The SPE Oil and Gas India Conference and Exhibition is a well-recognised event which aims to bring together the latest advances and best practices in the oil and gas industry.

The previous edition in April 2017 was organised with the theme, "Managing E&P Business in the Changing Environment" and was very well-received by local and international oil and gas professionals. We received more than 600 delegates from 121 companies, and 23 countries.

The conference offers a unique platform to raise your company's profile within the industry and creating greater awareness of your brand. Take advantage of this opportunity to promote new and existing products and services to key professionals in the industry.

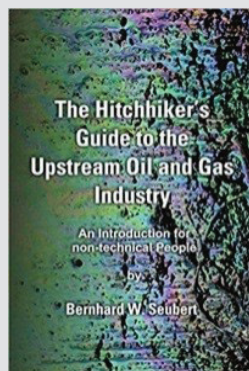
For details, contact:

Khushbu Rajwani

Tel: 022-66927777

Fax: 022-66928899

Email: dubprog@spe.org



The Hitchhiker's Guide to the Upstream Oil & Gas Industry

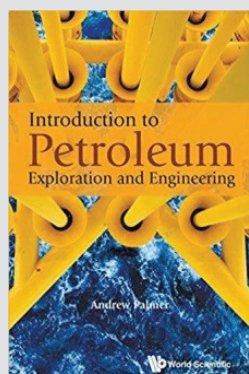
Author: Bernhard W. Seubert

Price: \$24.00

No of pages: 190 pages (Paperback)

Publisher: Independently published

About the book: This book has been written for laymen, for all those who would like to understand the business of oil and gas without having to read through the ballast of technical background. This book is easy to read and nearly free of technical jargon and mathematical formulas. To help with understanding, a glossary has been added as an appendix. The book is meant as an introduction to the large field of geology and upstream petroleum technology. It addresses investment people, students, non-technical managers in an oil company, journalists and all those who want to obtain a quick immersion into the oil and gas industry. If you are in the oil and gas business and need to explain to someone outside the field – this is intended for you. If you are a non-technical person in an oil company or are considering studying geology or petroleum engineering, this is the fastest way to read up on the subject matter. For the seasoned professional who is familiar with the subject matter, this book may come in useful to explain aspects of the business to outsiders. A special effort has been made to point out the stochastic nature of exploration, the value of information and knowledge and the economic and historic back-drop on which all commercial oil and gas operations take place. This book does not claim to be complete and correct to the last detail. Indeed, some aspects have been drastically oversimplified to make them easier to understand. For further study and for those who want to know more, there is a large body of books, teaching videos and webinars on the Internet in additions to commercial libraries. In fact, every aspect of the oil business is so rich in detail and profound in science that it requires study and specialists' knowledge. The subject of every chapter could be a full career or profession.



Introduction To Petroleum Exploration And Engineering

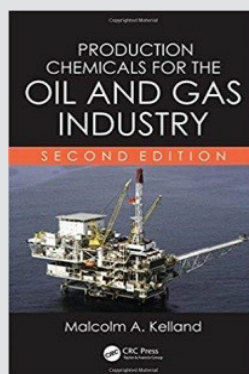
Author: Andrew Clennel Palmer

Price: Paperback \$38.00

No of pages: 154 pages (Paperback)

Publisher: WSPC

About the book: This book is an introduction to oil and gas designed to be both accessible to absolute beginners who know nothing about the subject, and at the same time interesting to people who work in one area (such as drilling or seismic exploration) and would like to know about other areas (such as production offshore, or how oil and gas were formed, or what can go wrong). It begins by discussing oil and gas in the broader context of human society, and goes on to examine what they consist of, how and where they were formed, how we find them, how we drill for them and how we measure them. It describes production onshore and offshore, and examines in detail some instructive mishaps, including some that are well known, such as Deepwater Horizon and Piper Alpha, and other lesser known incidents. It looks at recent developments, such as shale oil, and concludes with some speculation about the future. It includes many references for readers who would like to read further. Mathematical content is minimal.



Production Chemicals for the Oil and Gas Industry

Author: Malcolm A. Kelland

Price: \$120.73

No of pages: 454 pages (Hardcover)

Publisher: CRC Press (2nd Edition)

About the book: Production chemistry issues result from changes in well stream fluids, both liquid and gaseous, during processing. Since crude oil production is characterized by variable production rates and unpredictable changes to the nature of the produced fluids, it is essential for production chemists to have a range of chemical additives available for rectifying issues that would not otherwise be fully resolved. Modern production methods, the need to upgrade crude oils of variable quality, and environmental constraints demand chemical solutions. Thus, oilfield production chemicals are necessary to overcome or minimize the effects of the production chemistry problems. This book discusses a wide variety of production chemicals used by the oil and gas industry for down-hole and topside applications both onshore and offshore. Incorporating the large amount of research and applications, this new edition reviews all past and present classes of production chemicals, providing numerous difficult-to-obtain references, especially SPE papers and patents. Unlike other texts that focus on how products perform in the field, this book focuses on the specific structures of chemicals that are known to deliver the required or desired performance – information that is very useful for research and development. Each updated chapter begins by introducing a problem, such as scale or corrosion, for which there is a production chemical. The author then briefly discusses all chemical and nonchemical methods to treat the problem and provides in-depth descriptions of the structural classes of relevant production chemicals. He also mentions, when available, the environmental properties of chemicals and whether the chemical or technique has been successfully used in the field. This Edition includes two new chapters and nearly 50 per cent more references.

ANNOUNCING



International Exhibition and Conference



24-27, February 2021

Venue: Bombay Exhibition Center,
Goregaon (East), Mumbai, India.



4-6, December 2019

Venue: HITEX Exhibition Center,
Trade Fair Office Building, Izzat Nagar,
Kondapur PO, Hyderabad, India

www.chemtech-online.com

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Delhi Office: 803, Chiranjiv Tower, 43, Nehru Place, New Delhi - 110 019, India.

Tel: +91-11-4674 5555, **Fax:** 91-11-2642 7404, **Email:** sales@jasubhai.com

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