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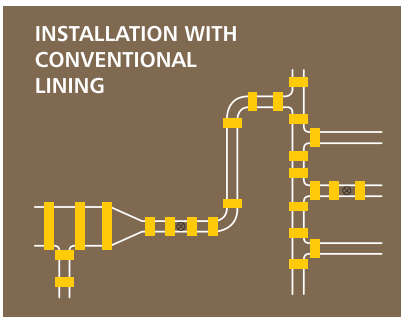

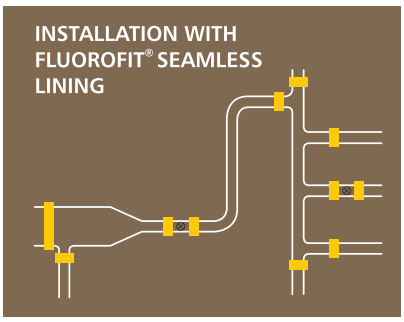

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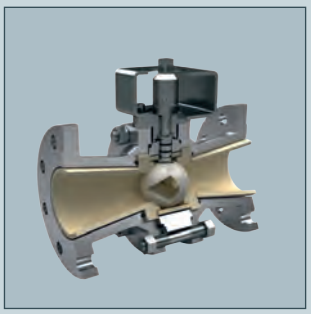

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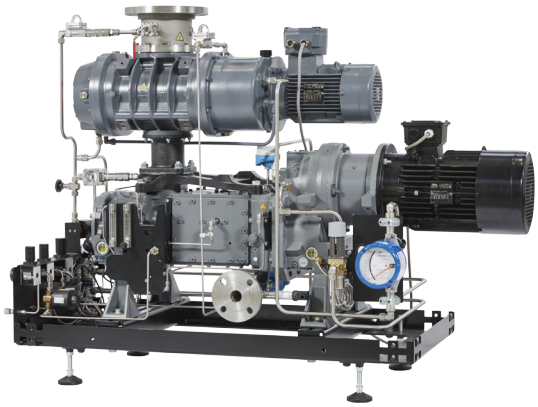

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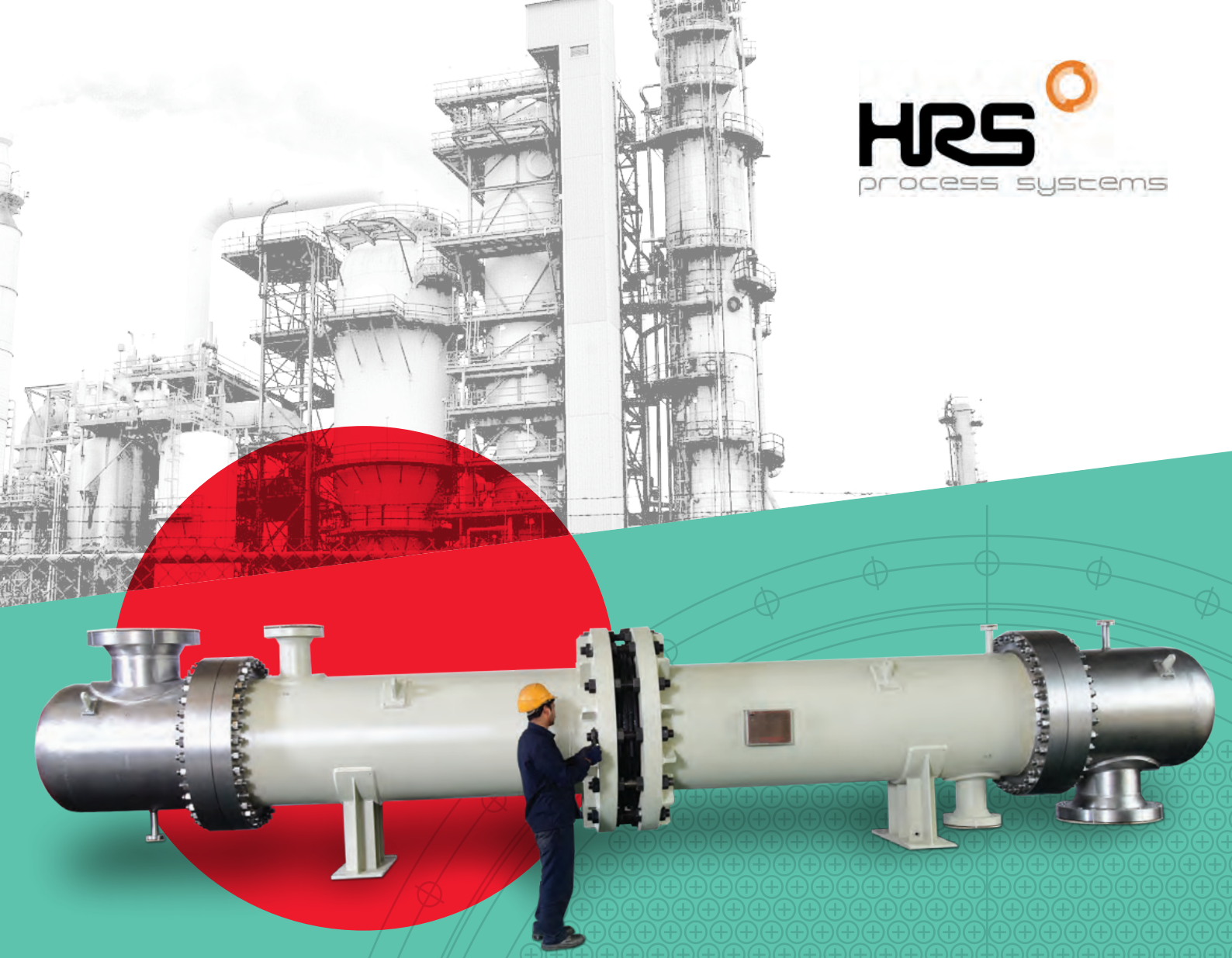

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COP26 Should Be the COP of Action and Implementation: Bhupender Yadav

Bhupender Yadav, Union Cabinet Minister of Labour and Employment, Environment, Forest and Climate Change, Govt. of India

New Delhi, India: India and UK to work towards facilitating the collective R&D of cutting-edge technologies and the transfer of proven technologies to drive low carbon pathways. New Delhi, India: Union Minister for Environment, Forest and Climate Change, Shri Bhupender Yadav assured India's full support to the UK COP Presidency for the meaningful outcome of COP, and said that the upcoming COP26 should be the COP of action and implementation.

Shri Bhupender Yadav, had a bilateral meeting with Right Honourable Ms. Elizabeth Truss, UK Foreign Minister, toady in New Delhi. In the meeting, they discussed crucial issues COP26, UK COP26 initiatives, India UK Roadmap-bilateral cooperation, Commonwealth Declaration on Climate Change, and other related issues.

In the Meeting, Shri Yadav said that the huge expectations in COP 26 include arriving at a consensus on unresolved issues of the Paris Agreement Rule Book, long-term climate finance, market-based mechanisms, etc.

World needs Rapid and Transformative Actions

New Delhi, India: Participating virtually in the Like Minded Developing Countries (LMDC) Ministerial meeting titled "Preparations for COP 26 on Climate Change – Expectations and Challenges', Union Minister for Environment Forest and Climate Change, Shri Bhupender Yadav called for rapid reduction of emissions by developed countries in this decade.

Shri Yadav in his address noted that world needs rapid and transformative actions, in view of the fact that the remaining global carbon budget is meager and will be exhausted within this decade at the current rate of global emissions. He also noted that the commitments of carbon neutrality and to raise ambitions in nationally determined contributions to be in line with climate justice and principles of equity and common but differentiated responsibilities and respective capabilities (CBDR-RC).

Joint Statement on Italy-India Strategic Partnership in Energy Transition

Rome, Italy: H.E. Mr. Mario Draghi, President of the Council of Ministers of the Italian Republic and H.E. Mr. Narendra Modi, Prime Minister of India, had a bilateral meeting on the sidelines of the G20 Leaders' Summit hosted by Italy in Rome.

The two Leaders acknowledged significant progress in bilateral relations since the adoption of the Action Plan for an enhanced Partnership between India and Italy (2020

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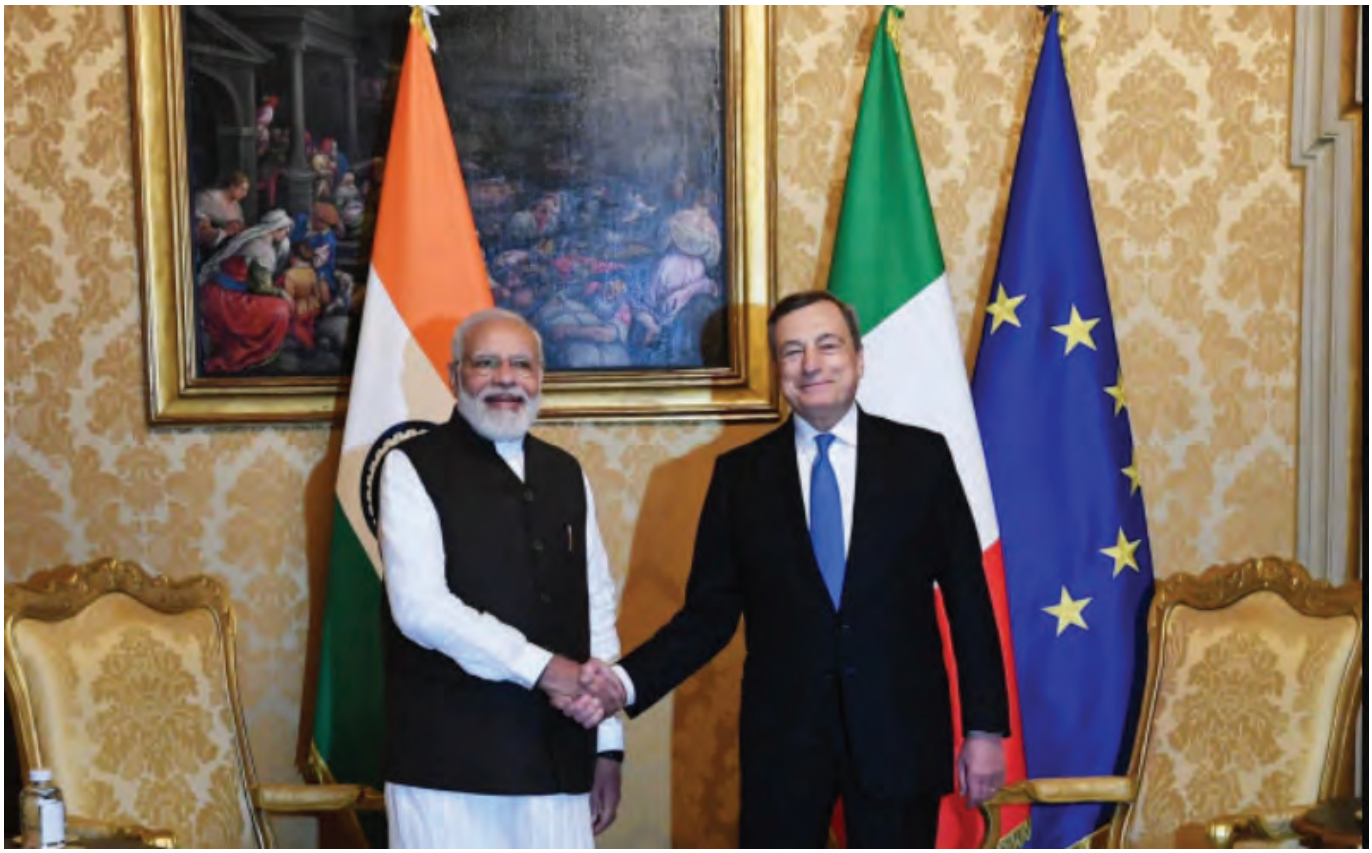

–2024) on November 6th, 2020. They expressed their resolve to strengthen cooperation in the strategic sectors addressed by the Action Plan, including the cross-cutting issue of accelerating the clean energy transition to fight climate change, central to both the G20 Leaders Summit in Rome and the COP26 in Glasgow.

Such a partnership could build on existing bilateral mechanisms, including by giving new impetus to the cooperation on renewable energy and sustainable development between the Italian Ministry of Ecological Transition and its Indian counterparts, namely the Ministry of New and Renewable Energy, the Ministry of Power and the Ministry of Petroleum and Natural Gas.

In order to promote their partnership in energy transition, Italy and India will-

Task the "Joint Working Group" established by the Memorandum of Understanding on Cooperation in the field of Energy, signed in Delhi on October 30, 2017, to explore cooperation in areas such as: Smart Cities; mobility; smart-grids, electricity distribution and storage solutions; gas transportation and promoting natural gas as a bridge fuel; integrated waste management ("waste-to-wealth"); and green energies (green hydrogen; CNG & LNG; bio-methane; bio-refinery; second-generation bio-ethanol; castor oil; bio-oil –waste to fuel).

Initiate a dialogue to support the development and deployment of green hydrogen and related technologies in India.

Consider working together to support a large size green corridor project in India to capitalize on India's target to produce and integrate 450 GW of renewable energy by 2030.

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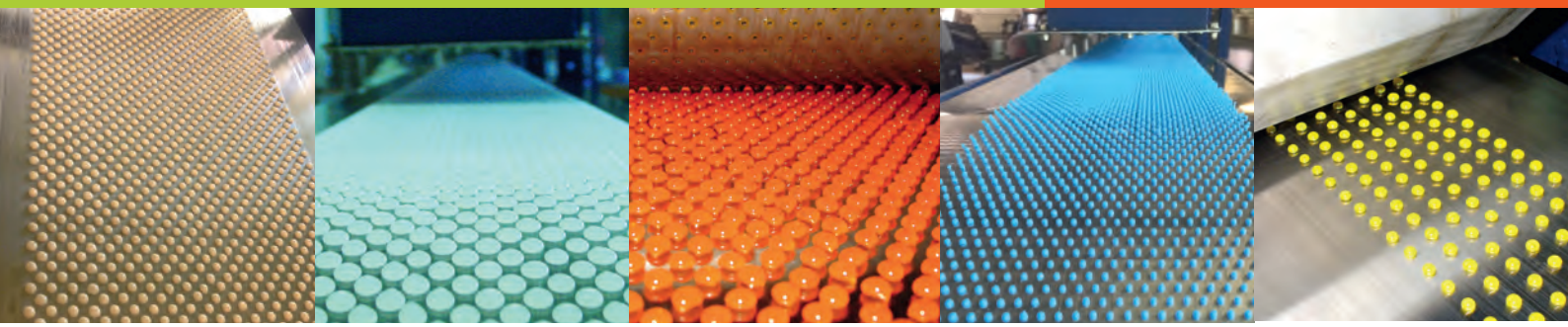

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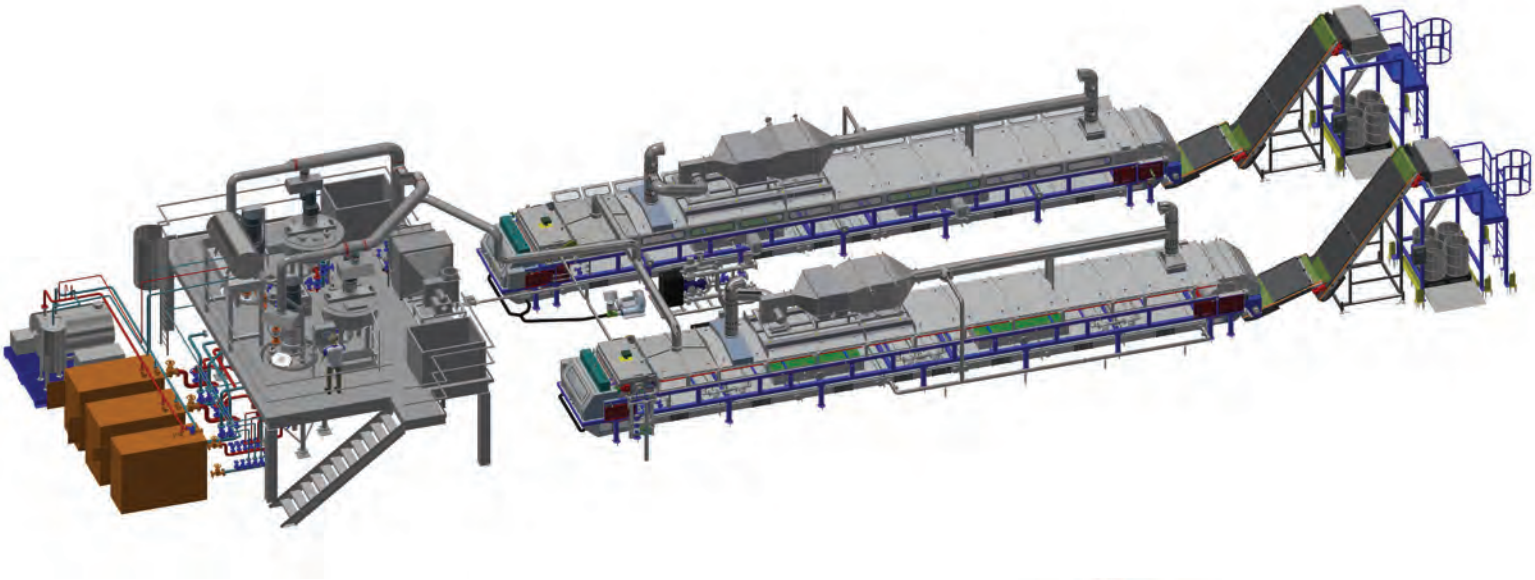

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Encourage Italian and Indian companies to develop joint projects in natural gas sector, technological innovation for decarbonisation, Smart Cities and other specific domains (i.e.: electrification of urban public transport).

Encourage joint investments of Indian and Italian companies in energy transition-related fields.

Share useful information and experiences especially in the field of policy and regulatory framework, including possible means to facilitate the transition to cleaner and commercially viable fuels/technologies, long-term grid planning, incentivizing schemes for renewables and efficiency measures, as well as with regard to financial instruments for accelerating clean energy transition.

Numaligarh Refinery Inks Pipeline 'Right to Use' Sharing Agreement with Indradhanush Gas Grid

New Delhi, India: A pipeline 'Right to Use (RoU)' sharing agreement was inked between Numaligarh Refinery Limited (NRL) and Indradhanush Gas Grid Limited (IGGL), which is a joint venture of NRL with Indian Oil Corporation (IOCL), Oil & Natural Gas Corporation (ONGC), Gas Authority of India Limited (GAIL) and Oil India Limited (OIL).

The agreement, a mutually beneficial arrangement for both organizations, was signed by General Manager (Project), NRL Shri P J Sarmah and Chief Project Manager, IGGL Shri Pankaj Patowary in the presence of Director (Technical), NRL Shri B J Phukan; Director (Finance), NRL Shri Indranil Mittra; CEO, IGGL Shri A K Thakur and senior officials from both organizations.

NRL is in the process of laying the 1,630 KM long ParadipNumaligarh Crude Pipeline (PNCPL), a crude pipeline originating from Paradip Port in Odisha and traversing through West Bengal, Jharkhand, Bihar, before terminating at its refinery in Numaligarh (Assam).

The pipeline project is a crucial part of NRL's mega Integrated Refinery Expansion project for capacity expansion from 3MMTPA to 9 MMTPA, which is being executed with an investment of more than Rs. 28,000 crores.

NRL and IGGL's pipeline sharing agreement leverages synergies between the PNCPL project and NER Gas Grid project as the pipelines share a common route from Baihata (North Guwahati) to Numaligarh for around 386 KM. The RoU model streamlines land acquisition and resource sharing for optimal execution of pipeline laying work and subsequently, efficient operations of the pipeline. This pact follows NRL's earlier pipeline RoU sharing agreement with GAIL, signed on 14th October 2020, for a 550 KM stretch from Purnia in Bihar to Baihata, also a part of the Pradhan Mantri Urja Ganga Project.

These agreements form important milestones in the Government of India's Hydrocarbon Vision 2030 for North-east India which seeks to leverage the region's hydrocarbon potential

Collaboration

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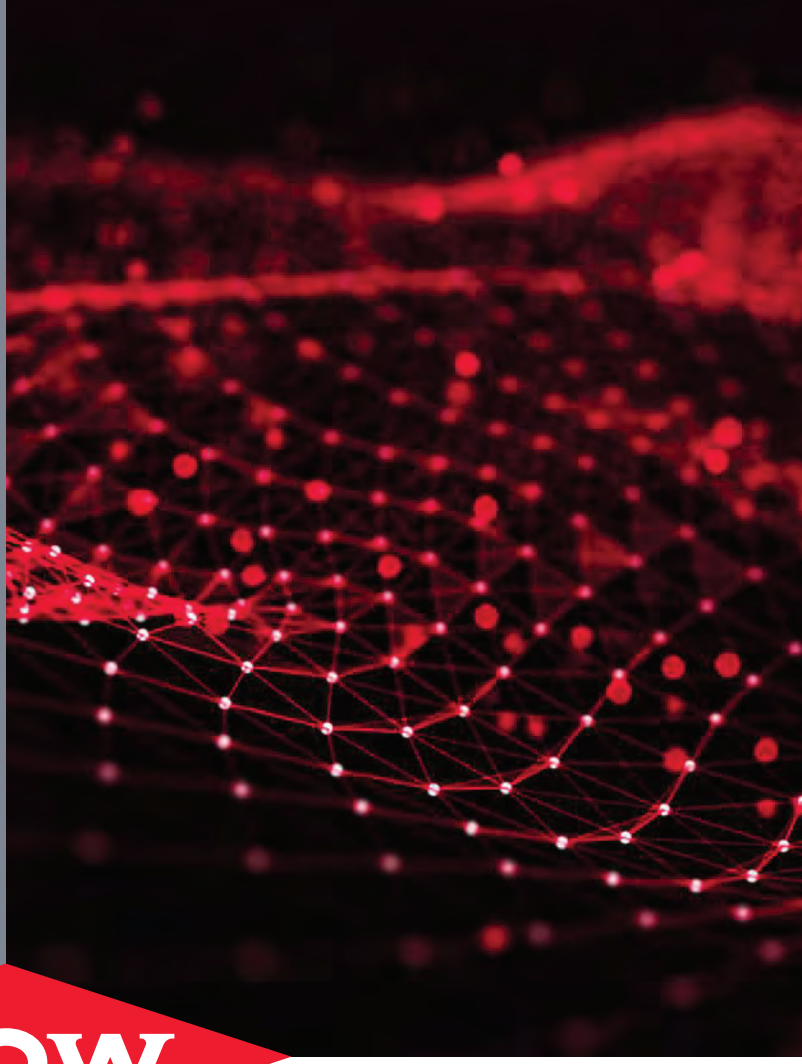

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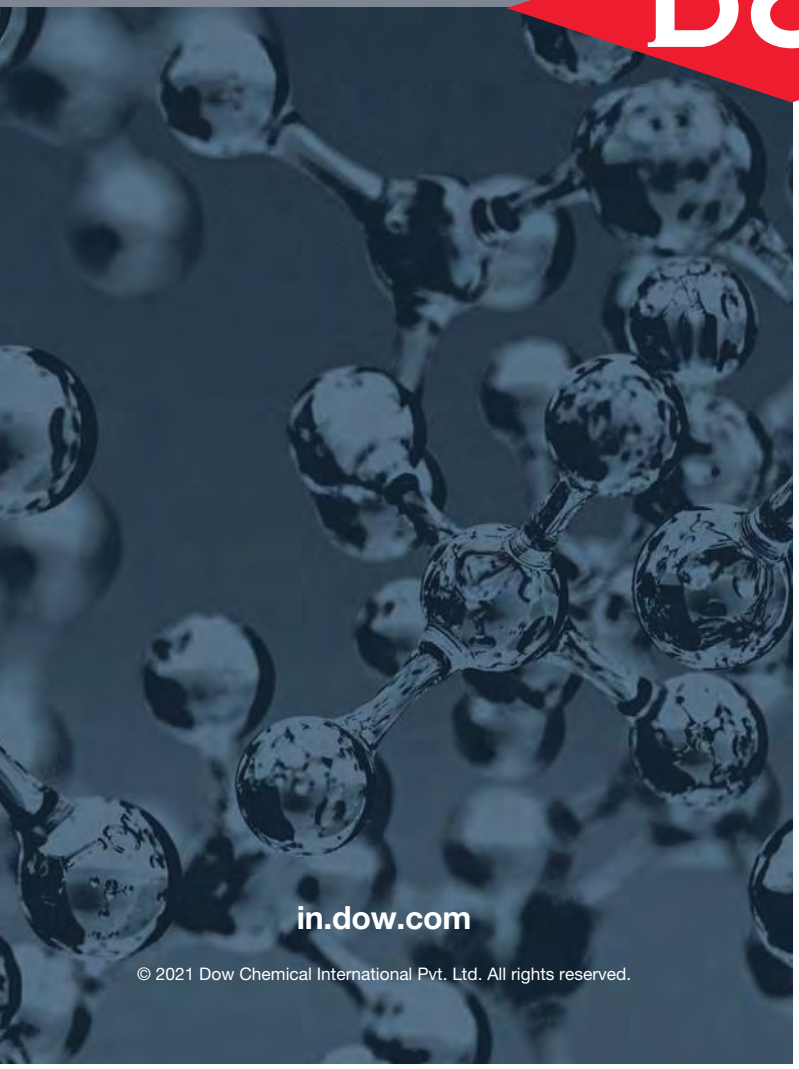

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How VR & AR Can Augment Training in the Chemical Sector

Immersive training can help the chemical industry empower and engage with the next generation of operators and engineers. Not only does it enable plant-specific learning, it reduces risks and cost while speeding up training time says Stephen Reynolds, Industry Principal – Chemicals, AVEVA.

The understandably risk-adverse chemical sector was already well down the path to digitalization when Covid-19 hit. The restrictions ushered in to limit the spread of the pandemic accelerated the pace of change as the industry needed to ramp up safe and reliable remote operations and working wherever possible.

Adapting to today's 'new normal', chemical businesses understand that many of the changes the pandemic brought to working practices are here to stay, and those who've invested in digital transformation are already seeing the benefits digitalization can bring to this highly complex industry, such as process optimization and risk reduction.

Stephen Reynolds, Industry Principal – Chemicals, AVEVA

Immersive Learning

Technologies such as artificial intelligence (AI), machine learning (ML) and cloud computing are being used to gather, store

and analyze data, which is then turned into actionable insights that drive operational efficiency and safety performance. But there's another area that's also piquing interest: immersive training.

As experienced operators and engineers retire, the chemical industry is facing a generational shift in the workforce and a growing need to pass expertise onto younger workers. However, until recently the sector has been largely reliant on traditional training methods that don't truly engage the digital natives now joining their workforce.

In a high-risk sector such as chemicals, it's imperative that all staff are engaged in and retain their training in order to do their job well and safely. The answer lies in immersive training, which brings learning to life in an environment this generation understands and embraces.

Engaging Staff

Today's young workers have grown up with immersive 3D environments in which they can interact, explore, make mistakes and then try again. This may have taken the form of playing video games with their friends, but these kinds of virtual worlds can also be used for industrial training.

Immersive training uses technologies such as augmented and virtual reality (AR and VR) to offer engaging, experiential learning in a safe and controlled, realistic virtual environment. Here bespoke training systems come together with off-the-shelf gaming peripherals such as console controllers and VR headsets like the Oculus Rift, to support the learning of both new and experienced staff.

AR and VR training can be used in a variety of ways, and is critical for plant safety and performance, as it reduces the risk of accidents and the need to shut down plants for real-world training. New operators can learn and practice high risk industrial procedures in safe training simulators, while teams 'learn by doing' through the use of dynamic simulation-based learning scenarios.

The Benefits of Unification

Generic VR and AR training environments have their place, but by unifying an organization's many systems into a single, secure data hub, chemical companies can reduce the time and effort involved in sharing detailed engineering data and step-up learning by enabling training scenarios specific to their business.

For example, connecting with a company's digital twin enables organizations to drop trainees into immersive, 3D versions of their real-world plants, and even makes it possible for the training environment to mimic the dynamic process behavior of the plant.

By using these unique virtual environments, businesses can be confident their staff know their way around plants, and understand both the impact of wrong decisions and the performance improvements that come from correct safety and reliability practices without affecting plant and employee safety and productivity.

Consider a Solution in the Cloud

When looking to invest in immersive training solutions it's worth considering a cloud-based solution wherever possible.

On-premise simulators carry a high upfront capital expense, but a subscription-based cloud solution shifts the cost to operating expenses that match training activity and budgets. Furthermore, on-premise solutions can only train one batch of employees at a time. Cloud-based options however, remove that constraint for both self-training and instructor-led modules.

OLEUM, the European training center for Total Group's oil and petrochemical business, was an early adopter of a cloud-based operator training simulator (OTS). By integrating the OTS with its corporate learning management system it found a modern scalable, flexible and economic solution that expanded its ability to train operators across the business without spending millions on travel, and lowering the time taken to train an operator from months to weeks.

Empowering New Recruits

BASF is another chemicals business that uses immersive training to teach its new operators, technicians and engineers. It created a virtual reality version of its regional training center, which enabled its apprentices to undertake the same training virtually. They would begin their training in the virtual environment, before later moving into the real pilot plant.

"They liked the VR training very much, as the system was similar to what they would use at home," says Alexander Karle, BASF Training Supervisor for chemical operators. "These were kids straight out of school with no experience in process technology, so they get to take their first steps in a virtual environment, learning to operate systems without any risk to themselves or the equipment. They feel much more confident when they then move into a real-world training environment," he adds.

The trainees return to the VR environment throughout their education, and BASF has been happy with the results of the platform. So much so, that it now hopes to develop it as a cloud-based solution so that the apprentices can continue their learning at home.

Maximize Training ROI

AR and VR enables businesses to deliver accelerated training that's sustainable, efficient, and effective, maximizing return on investment (ROI) in plant personnel training. Companies looking to the future would be wise to invest in immersive training now. This will ensure they get the most out of their next generation of operators and engineers by providing an engaging, interactive training environment that will enable them to excel.

The latest generation of immersive digital tools are enabling businesses to enhance the efficiency and development of their training programs in a cost-effective and flexible way. Companies looking to the future would therefore be wise to invest in immersive training now.

This will ensure they get the most out from the next generation of operators and engineers by providing an engaging, interactive training environment that will enable them to excel. ■

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Thermal fluid or Steam?

Stone, United Kingdom: Many of us start our day by walking to the kettle to make a tea or coffee. If you don't clean the kettle, after a while you'll probably see a build-up of limescale. If this happens to your kettle, you can repair or replace it for a low cost — when working with heat transfer systems, these options are far from inexpensive. Here Clive Jones, managing director of thermal oil supplier Global Heat Transfer gives advice on choosing the right heat transfer system for your application.

Manufacturers traditionally use steam for indirect heat transfer in industrial processes. Steam based systems heat water to boiling point by igniting a flame into tubes that are submerged in water, producing steam. The steam then condenses back into water that can be collected and used again. This system is often preferred because water is easy and cheap to acquire and has no perceived environmental impact.

Alternatively, thermal fluid-based heat transfer systems operate using a burner that heats a coil containing the fluid. A pump then circulates the fluid through the system and around the plant.

Steam-based systems require additional equipment such as a surge tank, water softener and blowdown heat recovery technology, to operate effectively. This is partly because, to operate at the high temperatures required for industrial processes, steam systems must operate at high pressures of about 85 bars or 8,500 kPa. Monitoring thermal fluid condition with regular sampling and analysis enables manufacturers to identify and solve issues before they negatively impact production, preventing risks to safety and costly downtime.

Thermal fluids also require monitoring and maintenance because they degrade over time, particularly if running at high temperatures for long periods. For example, during the degradation process, thermal oils can be broken down into carbon molecules, which can stick to the pipes and reduce heat transfer efficiency. Regularly analysing fluids enables operators to monitor fluid condition and take any steps to slow down the degradation process, ensuring optimum efficiency.

Operators should also implement a proactive maintenance programme, such as Thermocare, which can include a remote monitoring solution that regularly monitors fluid. This sends instant alerts to site engineers when a sudden change occurs that may affect productivity, enabling companies to better manage their heat transfer fluid.

Overall, thermal fluid heating systems are safer, more efficient, cheaper to maintain and

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have better temperature control than using steam. Investing in thermal fluid heating systems prevents additional costs to maintain safety and efficiency, providing they are well maintained over time. So, you can sit back, relax, and pop the kettle on.

ExxonMobil India announces New CEO and Lead Country Manager

Monte Dobson , CEO & Lead Country Manager, ExxonMobil

New Delhi, India: ExxonMobil India has appointed Monte Dobson as CEO and lead country manager, succeeding Bill Davis. As lead country manager, Dobson will be responsible for ExxonMobil subsidiaries in India. "India's huge growth potential and remarkable talent are competitive advantages for the country and for ExxonMobil," said Dobson. "India will play a critical role in the global energy transition. I'm excited to join a team that is already contributing to the country's brighter energy future, and committed to finding additional opportunities to help ExxonMobil advance India's energy goals."

Prior to the appointment, Dobson led technology development for unconventional resources at ExxonMobil's Upstream Integrated Solutions business. In this role, he led the development of new technologies to improve the environmental profile and cost-competitiveness of unconventional resources.

Before that, as senior vice president of development at ExxonMobil subsidiary XTO Energy, Dobson completed a series of creative commercial transactions to build the company's unconventional oil portfolio. Dobson holds a bachelor's degree in physics and a doctorate in mechanical engineering from the University of Illinois at Urbana-Champaign. Since joining ExxonMobil in 1994, he has worked in multiple positions with increasing responsibilities, including roles in engineering, business development and research. After more than 4 years as lead country manager in India, Bill Davis will transfer to Houston, Texas, to assume a new assignment in ExxonMobil's global LNG business.

Yokogawa Enhances Plant Safety with IEC 61511-Compliant Exaquantum Safety Function Monitoring

Tokyo, Japan: Yokogawa Electric Corporation announces a major upgrade to its Exaquantum Safety Function Monitoring (SFM) software, an OpreX™ Asset Operations and Optimization solution that helps identify whether actual operating performance meets safety design targets. Improving health and

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safety is one of Yokogawa's six sustainability focus areas. SFM R3.35 provides continuous monitoring and evaluation of safety data to highlight deviations or failures in plant safety system performance.

Already in use across the globe in industries such as oil and gas, SFM collects all safety-related data to track and analyze key performance metrics, including safety instrumented function (SIF) activations and maintenance (proof testing), independent protection layers (IPLs), and initiating causes and overrides.

This new version now supports the International Electrotechnical Commission (IEC) 61511* standard and includes several new features to help SFM users identify potential safety issues, optimize maintenance activities, and improve overall safety solution design.

SFM R3.35 enables users to monitor the effectiveness of the performance of defined safety instrumented systems against their design targets.

Safety systems are designed to ensure that process plants are operated within tolerable limits, reducing risks to humans, the environment, assets, and production continuity. To sustain the required safety integrity level, processing facilities must have a means for verifying the performance of their safety instrumented systems (SIS) 2

during operations. Procedures need to be established and information must be collected that will ensure the quality and consistency of proof testing, demand rates, and failure data of SIS. The challenge is determining if the real-time operating data can be verified against the analysis, design, and assumptions to highlight deviations or failures in safety system design performance.

Yokogawa recognizes the continuous challenges that plant owners face in trying to efficiently maintain process safety integrity over the entire life cycle of their plant facilities. As one component of a sustainable SIS solution, SFM automatically monitors operational safety data to quickly determine whether real-time operating data meets safety design targets and to track and analyze key safety performance metrics. Proof tests are recorded to track when they took place and identify when they reach their expiration date. SFM assists plant managers by identifying any potential safety issues, reducing unnecessary maintenance activities, and improving the overall safety solution design.

SFM R3.35 employs a cause & effect matrix to quickly verify the logic of SIF activations and final element (valves, vents, actuators, etc.) actuations to see if they match their configured or intended safety design, as required by the IEC 61511 standard.

A proof testing status function has been added to SFM R3.35 for the monitoring of the expiration dates of proof tests on SIFs and final elements. Users can also claim proof test credit based on actual demand on the SIS during operation, with the functionality to record when proof tests have taken place and their expiry date to help maintain the validity of the safety system.

Safety configuration data for layers of protection analysis (LOPA) using PHA-Pro® (a third-party software solution from Sphera) can be used to generate an initial SFM configuration file. A PHA-Pro export template

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exports information from the LOPA in a format that can be imported into SFM.

*IEC 61511: A regulatory standard for functional safety in the process industry. It covers the design and management requirements for SISs throughout the entire safety life cycle.

Major Target Markets- Oil and gas production, oil and gas midstream, refining, petrochemicals, chemicals, and power generation , Applications- Plant-wide monitoring, analysis and reporting of functional safety performance across SIS and final elements.

Bacteria Technology Removing Harmful Nitrogen in Water Wins the Icheme Global Awards 2021

Australia: A wastewater treatment technology using bacteria encapsulated in plastic lenses to remove nitrogen compounds and make safer drinking water has won the Institution of Chemical Engineers (IChemE) Global Awards 2021.

Australian water treatment solutions provider, Clean TeQ Water, was commended for chemical engineering excellence for their project Innovative Biological Technology for Nitrogen Removal. It won the Biochemical Engineering Award and was runner up in the Innovative Project category before receiving the top prize, the Outstanding Achievement in Chemical and Process Engineering Award.

Its patent pending BIONEX and BIOCLENS technologies provide a fundamental shift in how bacteria are applied in water treatment. Together, these consistently remove nitrate to very low concentrations, which both reduces the negative impact of nitrate for human health and wildlife and is a key enabler for recycled water use.

Compared to conventional methods to address excess levels of nitrogen, these technologies are more effective and cost efficient, meaning the future implications for global wastewater treatment and for the environment really is significant. Following many pilot plant tests, this combined technology is now being commercialised in a plant in China.

This year's awards showcased incredible achievements across 15 categories, with the winners announced in a series of webinars from 5–15 October 2021 where finalists presented their projects and took questions from the online audience. Saudi Aramco, Saudi Arabia scooped awards in both the Oil & Gas and Sustainability categories for its project Carbon Capture Utilisation and Storage (CCUS) and CO2-Enhanced Oil Recovery (EOR) Demonstration Project. The project is the first of its kind in the Middle East in scale and operation, and one of the largest in the world. It captures approximately 800,000 tons of carbon dioxide per year, which is compressed, piped and injected into a depleted oil reservoir, stopping it from being emitted into the atmosphere.

It included several novel, world-first technologies being developed and implemented to help monitor the process, such as carbon dioxide leaks, seismic activity and a suite of advanced logging techniques (including resistivity and pulsed neutron tools) implemented in a time-lapse manner. The judging panel commended them for their risk

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in the investment of taking a demonstration project to commercial scale.

Imperial College London, University College London and University of Oxford, UK took the Team Award for their project UK Future Vaccine Manufacturing Research Hubs. During a pandemic, and in record time, the organisations supported two COVID-19 vaccine candidates, including the licensed AstraZeneca vaccine being designed, trialled, and approved for emergency use in less than 12 months, potentially saving millions of lives. The Chartered engineer and sustainability enthusiast was commended for developing many novel innovations, including his statistical optimisation tool improving the performance of a waste-oil re-refinery plant in Malaysia. He has also collaborated in various national projects including evaluating the feasibility of a hydrogen production plant project, strategically determining optimal fertilizer formulation for a palm oil plantation, and contributing to Sarawak's state-wide green economy roadmap.

LANXESS India is now Great Place to Work-Certified™

Mumbai, India: Leading specialty chemicals company LANXESS India has been Great Place to Work-Certified™ in India (from October 2021 to October, 2022) by the Great Place to Work® Institute. The certification recognizes organization's efforts in building a High-Trust, High-Performance Culture™ and delivering an excellent employee experience for all.

Great Place to Work® is the global authority on workplace culture. Since 1992, they have surveyed more than 100 million employees worldwide and used those deep insights to define what makes a great workplace: trust. Their employee survey platform empowers leaders with the feedback, real-time reporting, and insights they need to make strategic people decisions. The Institute serves businesses, non-profits and government agencies in more than 60 countries and has conducted pioneering research on the characteristics of great workplaces for over three decades.

Commenting on the success, Neelanjan Banerjee, Vice Chairman and Managing Director, LANXESS India said, "It is an extremely proud moment for all of us. As an organization, we believe in continuously raising the bar and are committed towards creating a credible and fair workplace for our employees. We are thankful for this recognition and are delighted to become a Great Place to Work-Certified™ company." In India, the institute partners with more than 1100 organizations annually across over 22 industries to help them build High-Trust, High-Performance Cultures™ designed to deliver sustained business results. Hundreds of CEOs and CXOs from India Inc. are part of the great place community that is committed to the vision of making India a great place to work FOR ALL™.

The Institute's research shows that great workplaces are characterized by great leadership, consistent employee experience, and sustainable financial performance. These organizations are able to deliver a consistent experience to all their employees irrespective of their role, gender, tenure or level in the organization. Their leaders believe in the vision of creating and sustaining a Great Place to Work FOR ALL and role model being 'FOR ALL' Leaders.

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Aramco Expands Focus on Emerging Sectors at Future Investment Initiative

Dhahrun, Saudi Arabi: – Aramco announced plans to expand its focus on emerging sectors to drive private sector innovation and investment. During the Future Investment Initiative, it outlined potential new projects in green hydrogen, sustainable technology solutions, advanced nonmetallic building materials and digitalization. The Company is pursuing investment opportunities in projects that could potentially reduce Greenhouse Gas (GHG) emissions, following the recent announcement of its ambition to achieve net-zero Scope 1 and Scope 2 GHG emissions across its wholly-owned operated assets by 2050.

Details of new initiatives were outlined as global leaders and investors gathered at the Future Investment Forum to discusses the future of venture capital and key issues facing the world.

Amin H. Nasser, Aramco President and CEO, said: "Our plans illustrate our focus on developing innovative projects and investments, which support our long-term business strategy and aim to have a positive impact. Collaboration will be crucial in promoting economic development and creating new opportunities, as we expand our portfolio, diversify our business, advance low-carbon energy technologies and develop sustainable solutions." To move its program forward, Aramco has signed five Memoranda of Understanding (MoUs) with the following companies:

Modern Industrial Investment Holding Group and Intercontinental Energy – an MoU to develop a green hydrogen and ammonia project in Saudi Arabia; South Pole Carbon Asset Management Ltd. and Yousef Abdulrahman AlDhabyan Agricultural Est. (YADGREEN) – two separate MoUs to evaluate the feasibility of establishing a National Green Services Company to develop and innovate nature-based solutions (NBS) that help reduce greenhouse gas emissions, BFG – an MoU focused on localizing the manufacturing of advanced nonmetallic building materials, as well as collaboration in research and development, ABB – an MoU to explore localization of digital technologies for oil and gas applications, including domestic capacity building in the Process Automation System (PAS) and instrumentation fields, The MoUs are expected to complement Aramco's continued investments in oil and gas, with further announcements on its Jafurah gas program expected in the near future.

Amin H. Nasser, Aramco President and CEO, added: "The Ministry of Energy, led by HRH Abdulaziz bin Salman, Minister of Energy of Saudi Arabia, has enabled a business-friendly investment environment for strategic initiatives and programs, including advancing our work on the Jafurah gas field, which will play an important role in the expansion of our gas operations, support diversification of our portfolio and benefit the Kingdom's business sectors."

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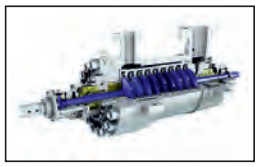
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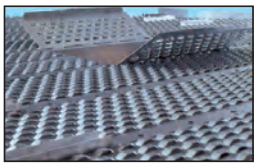
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New VDMA Robotics Board Elected

Andrea Alboni, General Manager Western Europe
Universal Robots GmbH

Frankfurt, Germany: At the VDMA Robotics Group meeting, which took place online within the VDMA Robotics + Automation Members' Assembly, a new board was elected for the period 2021-2024. Volker Spanier was confirmed as chairman of the board.

After a sharp decline in sales last year, robotics is undergoing a positive turnaround with a high increase in sales for the current year. Significant application potential for robotics exists in the area of small and medium-sized enterprises and in human-robot collaboration. According to Volker Spanier, the Executive Board expects the positive development to continue in 2022.

The new board of the VDMA robotics department is composed as follows:

Andrea Alboni, General Manager Western Europe, Universal Robots (Germany) GmbH, Munich, Daniel Bunse, CEO, Rethink Robotics GmbH, Bochum, Dr. Klaus Kluger, General Manager Central East Europe, Omron Electronics GmbH, Langenfeld, Martin Kullmann, Head of Customer Service, ABB Automation GmbH, Friedberg (Hesse), Alexander Mühlens, Head of business unit low cost automation, igus GmbH, Köln, Michael Otto, Chief Sales Officer Robotics, KUKA Deutschland GmbH, Augsburg, Volker Spanier, Head of Manufacturing Solutions, EPSON DEUTSCHLAND GmbH, Meerbusch, Ralf Winkelmann, Managing Director, FANUC Deutschland GmbH, Neuhausen a.d.F.

ABB Technology to Improve Quality & Lower Production Costs for Tata Steel Plant

Mumbai, India: Global technology company ABB will provide electromagnetic brake systems (EMBR) for two compact strip production (CSP) casters at Tata Steel's flagship plant in Jamshedpur, India, working under contract from engineering and construction organization SMS Group.

Jamshedpur, located in the eastern state of Jharkhand, is India's first planned industrial city and was established following the founding of Tata Iron and Steel Company by Jamsetji Tata and his son Dorabji Tata in the 1900s.

ABB's scope of supply also includes DCS800 DC drives, dry type transformers, water cooling systems, commissioning services and metallurgical performance evaluation. ABB is contracted through SMS which specializes

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The contract builds on ABB's large installed base with premier steel producers globally. ABB EMBR is installed on 40 percent of thin slab casting strands worldwide and allows for higher quality and faster throughput. This well-established technology, invented by ABB in 1985, enables steelmakers to achieve steel cleanliness similar to conventional vertical bending casters, improves casting speed and increases mold copper plate lifetime. By generating a static magnetic field, which decreases meniscus metal flow speed and turbulence, the ABB EMBR provides a whole range of metallurgical improvements including elimination of mold powder entrapments, a more even molten mold powder layer and a meniscus which is flatter, hotter and less turbulent.

"The project at Tata Steel in Jamshedpur is a key order for ABB," said Raghu Badrinathan, Area Sales Manager – ABB Metallurgy. "It builds on our large installed base with premier steel producers around the world."

"Tata Steel is a highly-valued customer for ABB and it is our continuous endeavor to provide the best-in-class technology and solutions to them," said Vipul Gautam, Group Vice President, Global Account Executive for Tata Group, ABB. "We believe that our metallurgy solutions and particularly the ABB EMBR solution will help them to achieve superior performance of their casters in minimum time, lowering their cost of production while improving quality."

The Energy Transitions Commission Calls for 40% Methane Emissions cuts by 2030

New Delhi, India: The Energy Transitions Commission (ETC) published its latest report, Keeping 1.5°C Alive: Closing the Gap in the 2020s. The report identifies six sets of actions which could keep the world on a path to limit global warming to 1.5°C and which could be catalysed by commitments made at COP26.

One of those actions is particularly crucial – cutting methane emissions by 40% by 2030. Methane is a hugely powerful greenhouse gas, which the IPCC estimates has accounted for about 40% of global warming since preindustrial times. Measured over a 100-year period a tonne of methane produces as much global warming as 28 tonnes of CO2, but over 20 years as much as 84 tonnes. As the world runs out of time to prevent potentially catastrophic climate change, cuts in methane emissions are therefore the most effective way to limit further warming. But many national climate action plans do not focus enough on this crucial priority.

The ETC report therefore outlines actions to achieve methane emission reductions of 140 million tonnes per year by 2030 (40% of the current level), which would be

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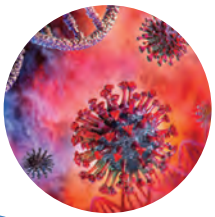

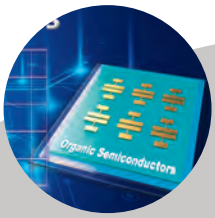

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equivalent to 3.5Gt -11Gt per year of CO2 emission reductions (depending on the time period considered).[1] This could be achieved through a 60% cut in fossil fuel related methane emissions and a 30% cut in emissions from the agriculture and waste sectors.

Fossil fuel related methane emissions are estimated at around 120 million tonnes with about 40 million from coal and 80 million from oil and gas. Detailed analysis by the IEA shows that the latter could be cut dramatically via low-cost actions to reduce leaks. Targeted action by major emitters such as US, Russia, China, and Canada would have a big impact. Agreement at COP26 to set target maximum methane leakage rates associated with oil and gas extraction, supported by national regulation and internationally agreed monitoring and reporting systems, could deliver a high proportion of the technically feasible reduction. Given the vital importance of reducing methane emissions fast, COP26 should therefore be used as an opportunity to launch initiatives to reduce annual emissions by at least 40% by 2030, or 150 Mt CH4 per year, building on (but importantly, strengthening) the Global Methane Pledge. ■

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KBR Technology Selected for Breakthrough Green Ammonia Project by ACME Group

Manoj K Upadhyay, Founder & Chairman, ACME Group

KBR announced today that its leading ammonia technology has been selected by ACME Group for its breakthrough green ammonia project to be built in Oman. Under the terms of the contract, KBR will provide technology license, engineering, proprietary equipment, catalyst, and commissioning services for a plant to produce 300 metric tons per day of ammonia. The plant will be an integrated facility using solar and wind energy to produce green ammonia.

"We are honored to be selected by ACME Group for this ambitious project," said Doug Kelly, KBR President, Technology. "Energy transition driven by green ammonia is a reality and KBR will play a pivotal role in helping innovative companies like ACME establish early-mover advantages through our industry leading technology.This facility, aimed towards exporting green ammonia to Europe and Asia, will be the first project of this scale," said Manoj K Upadhyay, Founder & Chairman, ACME Group. "We selected KBR technology because of its high yields and lowest energy consumption and look forward to a successful project implementation."

KBR is the world leader in ammonia technology with around 50% share of licensed capacity and holds the industry records for the largest capacity plants with a single converter, best energy-efficiency and longest runs without shutdowns. Since 1943, KBR has licensed, engineered, or constructed 244 grassroot ammonia plants worldwide. ■

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in house

Ramky Enviro Inaugurates India's largest Compressed Bio-Gas Plant

Ramky Enviro, Asia's leading integrated waste management today inaugurated one of the World's first and India's largest Landfill Gas to Compressed Biogas Plant at Hyderabad Integrated Municipal Solid Waste (HiMSW) site. The project is focused on Conversion of Landfill Gas into Compressed Biogas as an automotive fuel. The project offers significant benefits such as carbon sequestration and reduced emissions of GHGs into the environment and contributes to the greening of the automotive industry.

Speaking on the inauguration, Masood Mallick, JMD, Ramky Enviro stated, "At Ramky Enviro, sustainability forms the bedrock of our business and founding principles.

This project responds to one of the biggest strategic imperatives of today – how can we make India's infrastructure development more sustainable, whilst supporting our strategic energy security priorities. For us, the answer lies in mainstream green innovations that help scale and deliver circular economy and resource recovery solutions. We are delighted that this first of its kind, large scale Landfill Gas to CBG project has been recognised as the Most Innovative Environmental Project and we are confident that this project will be the first of many path-breaking projects that will accelerate not only India's sustainable waste management journey but also greening of the Indian automotive sector. The successful transformation of one of the largest municipal waste dumpsites in India to a significant source of sustainable energy and green auto fuel, is a great example

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of circular economy innovation at scale, one that is unprecedented globally."

Highlights of the plant:

HiMSW undertook to purify and convert the captured gas from a capped landfill into compressed biogas for use as a clean fuel in automobiles under the Sustainable Alternative Towards Affordable Transportation (SATAT) scheme launched by the Government of India in 2018.

Contributing to the accomplishment of Ramky Enviro's sustainability goals, a processing plant that converts 600 Nm3 of landfill gas per hour to CBG, duly meeting IS 16087:2010 requirements, has been commissioned.

The project offers significant benefits such as carbon sequestration and reduced emissions of GHGs into the environment and contributes to the greening of the automotive industry.

The compressed biogas will be sold to Bhagyanagar Gas Limited through its retail outlets in Hyderabad. ■

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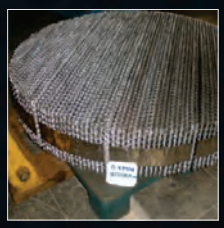

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NH3 Injection Control for Stack NOx Scrubbers Relies on Precision ST100 Mass Flow Meters

The engineering team at a coal-fired electric power plant utilizing ammonia (NH3) for nitrous oxide (NOx) removal by its pollution control system installed the ST100 Series Thermal Flow Meter from Fluid Components International (FCI) based on its superior repeatability in measuring NH3 under harsh operating conditions.

The ST100 Series Flow Meter allowed the plant team to optimize its selective catalytic reduction (SCR) system. This step improved performance while substantially reducing NH3 consumption and costs. The meter, with its rugged thermal dispersion sensor head, provides a highly repeatable measurement solution to control vaporized NH3 in such applications.

The engineers at the electric power plant were experiencing problems with inconsistent measurement of the vaporized NH3 injected into their flue gas as a means to reduce NOx emissions. The original system utilized a volumetric flow sensor, which wasn't well suited for controlling the NH3 gas injection system. Switching to the mass flow sensing ST100 Series Meter, as opposed to taking a volumetric measurement, solved the false readings issue.

Given the ST100 Flow Meter's standard wide flow turndown ratio of 100:1 (up to 1000:1 based on application), and the ability to measure mass flow, instead of volumetric flow, the engineers decided to conduct a pilot test. They installed the insertion style ST100A thermal flow meters on the primary vaporized ammonia feed lines to their nozzle grid for the test.

With the resulting improved measurement reliability, they took the project one-step further and installed in-line style ST100AL thermal flow meters at each of their nozzle locations. After proving out the benefits

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in one operating unit, they eventually instrumented the ammonia injection systems for all of the units within the facility.

The ST100 Meter can be factory calibrated to measure virtually any popular process gas as well as mixed gases. The technology is suitable for use in wet and dirty gas applications,

having no small ports prone to fouling. The basic insertion style air/gas meter features a thermal flow sensing element that measures flow from 0.25 up to 1000 SFPS (0.07 NMPS to 305 NMPS) with accuracy of ±0.75 percent of reading, ±0.5 percent of full scale. The basic in-line style meter is available for 2-inch and smaller line sizes.

The ST100 Series Meter's transmitter is unsurpassed in meeting both a plant's current and future need for outputs, process information and communications. Whether the output required is traditional 4-20 mA analog, frequency/pulse or advanced digital bus communications such as HART, Modbus, PROFIBUS, or FOUNDATION Fieldbus, the ST100 Series will meet your instrumentation integration needs. Its advanced bus communications are all third party certified and registered.

Developed with a graphical, multivariable backlit LCD display, the ST100 Series Meter brings new meaning to the term "process information". Its sophisticated readout continuously displays all process measurements and instrument status for easy on-site viewing by technicians, and it has the ability to query for service diagnostics via an integral, optical HMI that does not require declassification of hazardous areas.

Designed for extreme industrial process and plant conditions, the ST100 Meter can be used in service up to 850°F (454°C) and is available with both integral and remote (up to 1000 feet [300 meters]) electronics versions. The ST100 Meter is agency approved for hazardous environments, including the entire instrument, the transmitter and the rugged, NEMA 4X/IP67 rated enclosure.

Global approvals include: ATEX, CPA, CRN, EAC/TRU CU, FM, FMc, FDT, GOST, IECEx, Inmetro and NEPSI. Third party failure rate data per IEC 61508 is available that demonstrates suitability of the hardware architecture for SIL 1 (HFT=0) applications.

Fluid Components International is a global company committed to meeting the needs of its customers through innovative solutions for the most challenging requirements for sensing, and measuring the flow, pressure and temperature of gases. ■

Climate Action Matters Now

Rajiv Ramchandra
Founder & Director
Recreate India Research Foundation

Let me start by confessing that the title of this article went through several revisions before I arrived at something that simply acknowledged that this is important, and that we need to act responsibly and with urgency. The use of the word 'Now' does not intend to downplay that it has mattered for decades and that we've known about the looming crisis for over a century. But we are running of time, and fast. Another version of the title had the word 'crisis' in it. But I decided to avoid the usage of that word because I sense that our collective psyche has been experiencing crisis fatigue. Besides, when everything is perceived as a crisis, nothing is, which is to say that it becomes increasingly difficult to prioritize what matters and to act in rational and meaningful ways.

However, make no mistake – Climate Change is an existential threat. So much so that The Guardian newspaper updated its style guide to introduce terms that more accurately describe the environmental crises facing the world. Instead of "climate change" the preferred terms are "climate emergency, crisis or breakdown"1, for example. While I agree with characterizing Climate Change as an existential threat, those aren't my words. In recent years, several leaders on the world stage have used this phrasing, most famously perhaps the UN Secretary-General António Guterres during his keynote address to the global gathering, known as the R20 Austrian World Summit in 20182.

But let's unpack all this a little. While many of you may be aware of Climate Change and the state of climate action globally – especially with the 26th UN

Climate Change Conference of the Parties (COP26)3 taking place in Glasgow, Scotland this year, it may be worthwhile to establish a strong foundation in this subject.

What is Climate Change?

According to the Intergovernmental Panel on Climate Change (IPCC) 4 – the United Nations body for assessing the science related to climate change5:

"Climate change refers to a change in the state of the climate that can be identified by changes in the mean and / or the variability of its properties and that persists for an extended period, typically decades or longer"

"Climate change may be due to natural internal processes or external forcings such as modulations of the collar cycles, volcanic eruptions & persistent anthropogenic changes in the composition of the atmosphere or land in use."

While accurate, that definition can seem a little abstract and difficult to relate to, especially in terms of what it means for our day-to-day lives, our communities, our families, or our businesses.

So, let's establish something as a baseline to build our understanding. The phenomenon of Climate Change i.e., changes to the climate system, is a naturally occurring phenomenon. In fact, changes to our climate system over millions of years have, in part, made our beautiful planet habitable for life. However, the evidence is clear that anthropogenic (human-caused) emissions, especially carbon dioxide, have been the primary driver of climate change since the beginning of the industrial revolution in 1760.

But what does Climate Change, or a change in the climate system entail? And how is 'climate' different from 'weather'? According to the Australian Academy of Science:

"Climate change is a change in the pattern of weather, and related changes in oceans, land surfaces and ice sheets, occurring over time scales of decades or longer.

Weather is the state of the atmosphere—its temperature, humidity, wind, rainfall and so on—over hours to weeks. It is influenced by the oceans, land surfaces and ice sheets, which together with the atmosphere form what is called the 'climate system.' Climate, in its broadest sense, is the statistical description of the state of the climate system. Climate change is a change in the statistical properties of the climate system that persists for several decades or longer—usually at least 30 years."

Climate Change is probably most frequently associated with Global

Warming, and the uninitiated may use the two phrases interchangeably. But Global Warming is only one of the effects of, and evidence for changes to the climate system. According to the National Aeronautics and Space Administration (NASA), the evidence7 for Climate Change includes:

Global Temperature Rise: The planet's average surface temperature has risen about 1.18 degrees Celsius since the late 19th century, a change driven largely by increased carbon dioxide emissions into the atmosphere and other human activities. Most of the warming occurred in the past 40 years, with the seven most recent years being the warmest. The years 2016 and 2020 are tied for the warmest year on record.

Warming Ocean: The ocean has absorbed much of this increased heat, with the top 100 meters (about 328 feet) of ocean showing warming of more than 0.33 degrees Celsius since 1969. Earth stores 90% of the extra energy in the ocean.

Shrinking Ice Sheets: The Greenland and Antarctic ice sheets have decreased in mass. Data from NASA's Gravity Recovery and Climate Experiment show Greenland lost an average of 279 billion tons of ice per year between 1993 and 2019, while Antarctica lost about 148 billion tons of ice per year.

Glacial Retreat: Glaciers are retreating almost everywhere around the world — including in the Alps, Himalayas, Andes, Rockies, Alaska, and Africa

Decreased Snow Cover

Sea Level Rise: Global sea level rose about 8 inches (20 centimeters) in the last century. The rate in the last two decades, however, is nearly double that of the last century and accelerating slightly every year.

Declining Arctic Sea Ice

Extreme Events

Ocean Acidification: Since the beginning of the Industrial Revolution, the acidity of surface ocean waters has increased by about 30%. This increase is the result of humans emitting more carbon dioxide into the atmosphere and hence more being absorbed into the ocean. The ocean has absorbed between 20% and 30% of total anthropogenic carbon dioxide emissions in recent decades (7.2 to 10.8 billion metric tons per year).

Why is Climate Change an Existential Threat?

This question is perhaps best answered by examining the impacts of Climate Change. According to the India Meteorological Department8, 2020 was the eighth warmest year on record since nation-wide

records commenced in 1901. In addition, according to the Global Climate Risk Index 2021 published by Germanwatch9:

In 2019, the floods caused by the heavy rains were responsible for 1,800 deaths across 14 states and led to the displacement of 1.8 million people. Overall, 11.8 million people were affected by the intense monsoon season with the economic damage estimated to be USD 10 billion, also in 2019

The year 2019 was one of the most active Northern Indian Ocean cyclone seasons on record. The worst was Cyclone Fani in May 2019, which affected a total of 28 million people, killing nearly 90 people in India and Bangladesh and causing economic losses of USD 8.1 billion, National Geographic highlights some of the impacts of Climate Change on people10, Drought and chronic water shortages, Crop declines could lead to undernutrition, hunger, and higher food prices, Power outages in extreme weather could cripple hospitals and transportation systems when we need them most, Occupational hazards such as risk of heatstroke will rise, especially among farmers and construction workers, Trauma from floods, droughts, and heat waves can lead to mental health issues, Mosquito-borne dengue fever has increased 30-fold in the past 50 years. Three-quarters of those exposed so far live in the Asia-Pacific region, Senior citizens and poor children — especially those already afflicted with malaria, malnutrition, and diarrhoea — tend to be most vulnerable to heat-related illnesses, Rising sea levels can threaten freshwater supplies for people living in low-lying areas. More severe storms can cause city sewage systems to overflow.

The McKinsey Global Institute's "Climate risk and response" report11 published in 2020 highlighted that:

"As of 2017 [in India], heat-exposed work produced about 50 percent of GDP, drove about 30 percent of GDP growth, and employed about 75 percent of the labor force, some 380 million people."

"India may become one of the first places in the world to experience heat waves that cross the survivability threshold for a healthy human being resting in the shade." If this isn't enough to be convincing on the issue of characterizing Climate Change as an existential threat, an article published on the Massachusetts Institute of Technology (MIT) Climate Portal12 says this:

"Kieran Setiya, an MIT professor of philosophy who co-teaches a course on the ethics of climate change, offers a basic and a more nuanced definition. First: In the worst-case scenarios in scientists' climate models, human-caused climate change

is a threat to the continued existence of our species. If humans do nothing to slow climate change, then global temperatures may increase by 4 degrees Celsius or more by the year 2100. This may not sound like much, Setiya says, but "it is quite cataclysmic." Earth has not been that warm in millions of years, and such temperature spikes in our planet's history are connected to mass extinction events that killed off a large percentage of species that existed at the time.

"There is a genuine possibility that within the coming century, we will hit temperatures that are deeply incompatible with the continued existence of human life," he says. Even if humanity does reduce greenhouse gas emissions enough to stave off the worst effects of climate change—and learn to adapt to some warming that is already inevitable—Setiya says that climate change remains an existential threat to a host of human cultures, traditions, and languages."

...How the human species responds to this crisis, Setiya says, will not only guide our future but also reveal much about our nature. Climate change could worsen worrying trends such as anti-democracy uprisings and migrant crises as people flee areas that are increasingly hit by natural disasters that will be exacerbated by climate change—rising sea levels, more frequent powerful hurricanes, and droughts that threaten freshwater supplies, for example.

What can you do?

On the whole, the goal we are aiming for is to limit average global surface temperature increase to 1.5°C. We have already increased by 1.2°C13. This means we must go from emitting ~51 billion (51,000,000,000) tons14 of global GHG emissions annually to zero. Even the global Covid-19 lockdowns in 2020 barely made a dent, reducing global emissions by only 5-7%. India is the 3rd largest emitter of carbon emissions in the world with annual emissions of about 2.6 billion tons15 based on 2019 estimates. This number needs to drop to zero.

Based on the SR 15 [2019]16 IPCC budget estimate of 420 billion tons of CO2 for a two-in-three chance to keep warming below 1.5°C from 2018 onwards, we currently have a global carbon budget of about 270 billion tons of CO2. At current emission levels, that gives us less than five years of time.

In his book The Great Derangement: Climate Change and the Unthinkable, author Amitav Ghosh points out that "...the climate crisis is also a crisis of culture, and thus of the imagination." This is important to recognize because solving the climate crisis is in danger of being viewed as something that has a formulaic solution

i.e., better, or more technology, greater efficiency, more investment, and so on.

I'm not suggesting that these aren't important or necessary, but they are not and should not be considered as the fulcrum of change. That fulcrum lies within us, in our character, in living our lives with integrity around governing principles that put at the center the understanding that we live in an interconnected world, that our planet and our natural world are the gifts from which we have constructed our civilization, that we have an ethical and moral responsibility to protect and be stewards of these gifts, and that our actions have consequences that go beyond our immediate surroundings and much further into time that we had previously imagined.

In adversity, also lies opportunity. According to The World Bank18, a shift to low-carbon, resilient economies could create over 65 million net new jobs globally out to 2030 and the International Finance Corporation (IFC) estimates that the Nationally Determined Contributions (NDCs) – the national climate actions countries commit to, in order to achieve the goals of the Paris Agreement – of 21 emerging market economies alone represent USD 23 trillion by 2030 in investment opportunities.

Energy efficiency measures, renewable energy, supply chain emissions reductions, product design considerations, rethinking your business model, purchasing carbon credits, investing in carbon sequestration projects are among the many choices companies can make.

There's a Japanese proverb that says "Vision without action is a daydream. Action without vision is a nightmare."

The time is now. What choices will you make? ■

References:

1 https://www.theguardian.com/environment/2019/may/17/why-the-guardian-is-changing-the-language-it-uses-about-the- environment ;2 https://news.un.org/en/story/2018/05/1009782; 3 https://ukcop26.org/ ; 4 https://www.ipcc.ch/sr15/chapter/glossary/ ;5 https://www.ipcc.ch/; 6 https://www.science.org.au/learning/general-audience/science-climate-change/1-what-is-climate-change; 7 https://climate.nasa.gov/evidence/; 8 https://internal.imd.gov.in/press_release/20210104_pr_975.pdf; 9 https://germanwatch.org/sites/germanwatch.org/files/Global%20Climate%20Risk%20Index%202021_1.pdf; 10 https://www.nationalgeographic.com/climate-change/how-to-live-withit/health.html; 11 https://www.mckinsey.com/businessfunctions/sustainability/our-insights/climate-risk-and-response-physicalhazards-and- socioeconomic-impacts; 12 https://climate.mit.edu/ask-mit/why-do-some-people-call-climate-change-existential-threat; 13 https://climateanalytics.org/briefings/15c-key-facts/; 14 https://www.gatesnotes.com/Energy/My-new-climate-book-is-finally-here; 15 https://www.climatescorecard.org/2020/12/india-has-seen-greenhouse-gas-emissions-increase-by-a-staggering-335-since- 1990/ ; 16 https://www.ipcc.ch/sr15/chapter/chapter-2/ ; 17 https://ghgprotocol.org/corporate-standard ; 18 https://www.worldbank.org/en/topic/climatefinance#1

Opportunities for Specialty Chemicals

Devinder Chawla, Partner, National Head, Ernst & Young, talked about unlocking opportunities for Specialty Chemicals- the Atmanirbhar Bharat plan. Topics like sustainability that needs to take a key element of the growth roadmap, challenges, solutions, and way forward were discussed. Nilesh Kulkarni- Director Commercial of Gharda Chemicals, Samir Somaiya- CMD of Godavari Biorefineries, Anand S- President of Fine & Speciality, Dr. GVG Rao-President of Atul Industries, joined the panel discussion touching on various key points.

Devinder Chawla
Partner, National Head, Ernst & Young

Nilesh Kulkarni
Director Commercial
Gharda Chemicals

Samir Somaiya
CMD of Godavari Biorefineries

Anand S
President of Fine & Speciality
Deepak Group Co

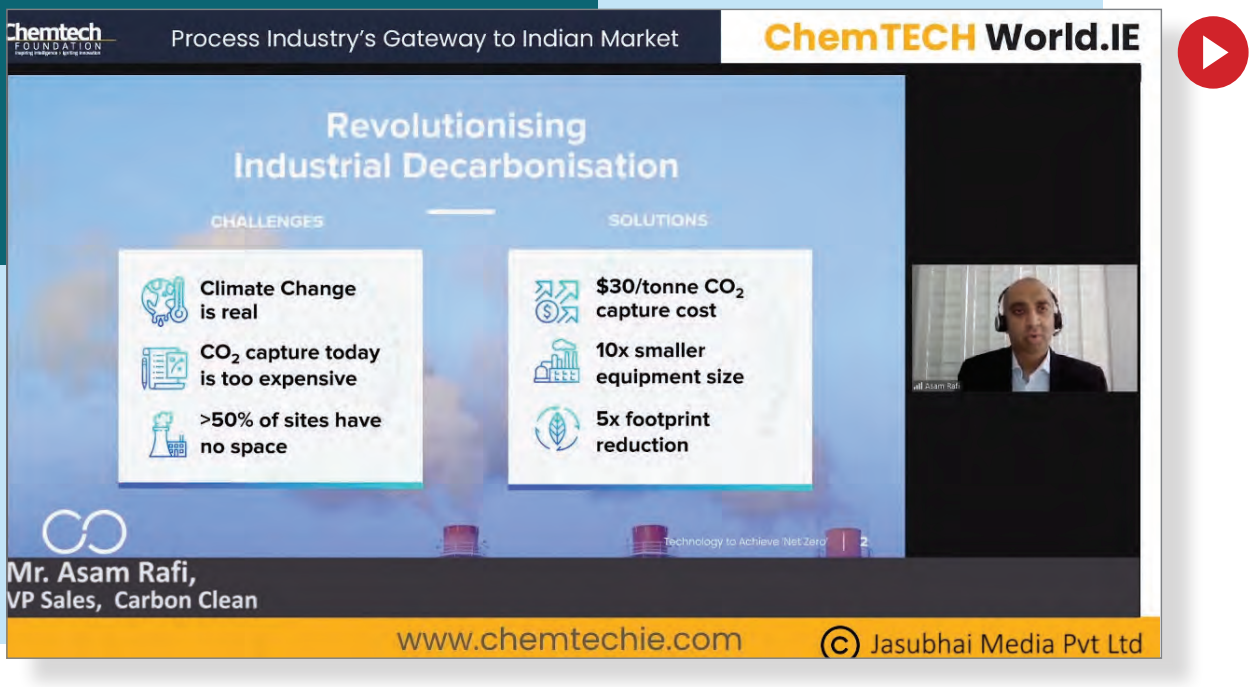
Dr. GVG Rao
President
Atul Industries

https://youtu.be/h-DlXjQ8WRE

Revolutionizing Industrial Decarbonisation

Asam Rafi
Vice President
Global Sales at Carbon Clean

https://youtu.be/YwL-gyCMzio

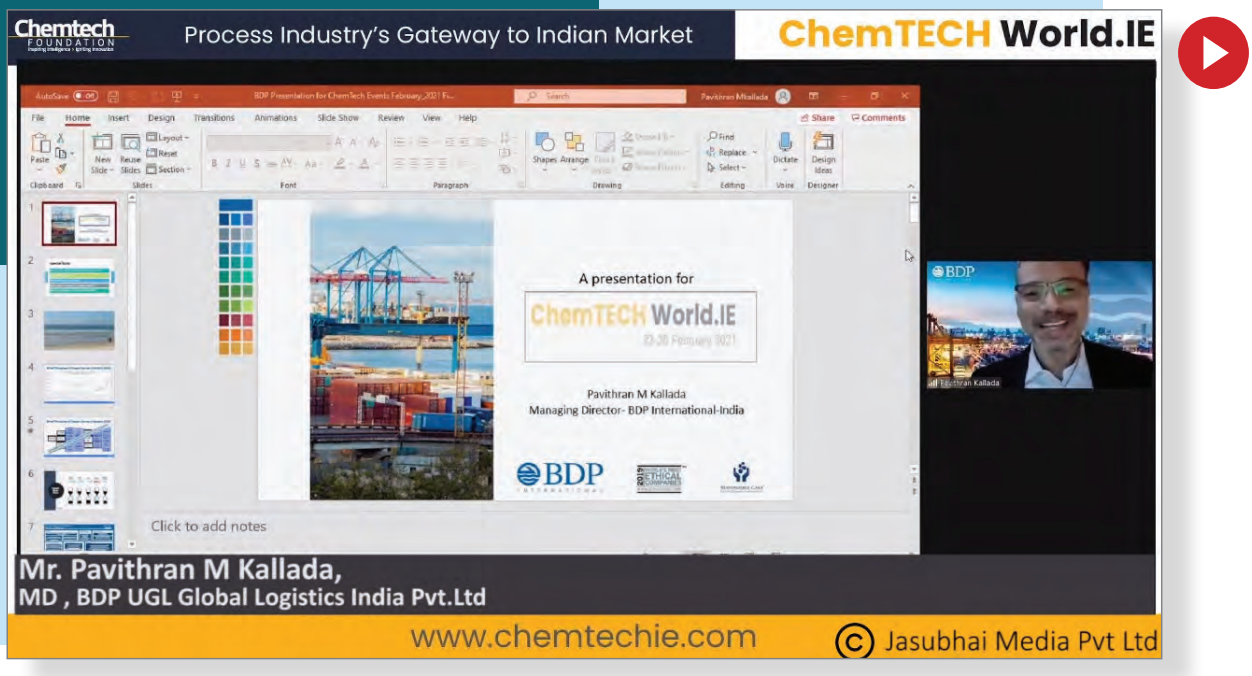


Asam Rafi, VP Sales, Carbon Clean, talked about revolutionizing Industrial Decarbonisation, its challenges, solutions like CDRMax Tecnology, Semi-Modular and Pilot Plants, Next Gen Technology. The company's product roadmap, economic advantages, the market opportunity was also shared

Shipping Volatility & Supply Chain Disruptions

Pavithran M Kallada
Managing Director
BDP International- India Region

https://youtu.be/Y46gNw0tgeY

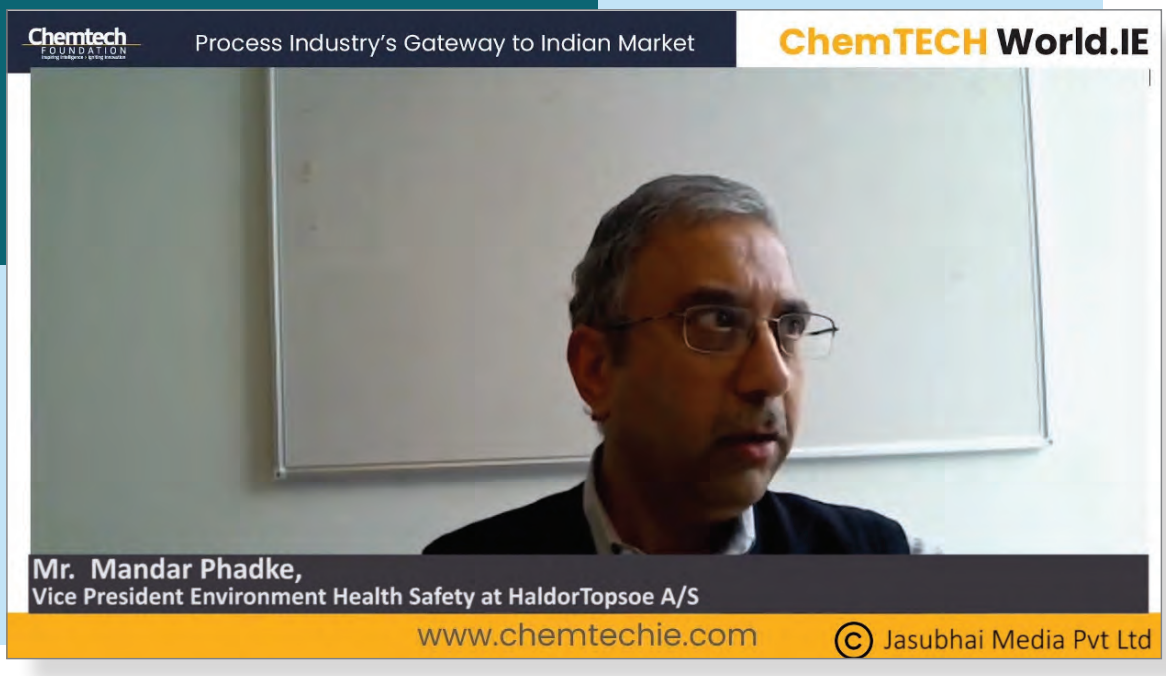


Pavithran M Kallada, MD , BDP UGL, talked about brief timeline of 2020 for the Ocean Carrier industry, the headlines in the market, market headlines to market reality, what should shippers and importers do, capacity bottle necks, the current market of international an domestic transport industry, the overview of the ocean carrier industry in 2021, guidelines and solutions to shippers and importers to improve forecasting and commitments

Aspects of Safety

Mandar Phadke
Vice President Environment Health Safety
Haldor Topsoe

https://youtu.be/76qFxvPr2Lo

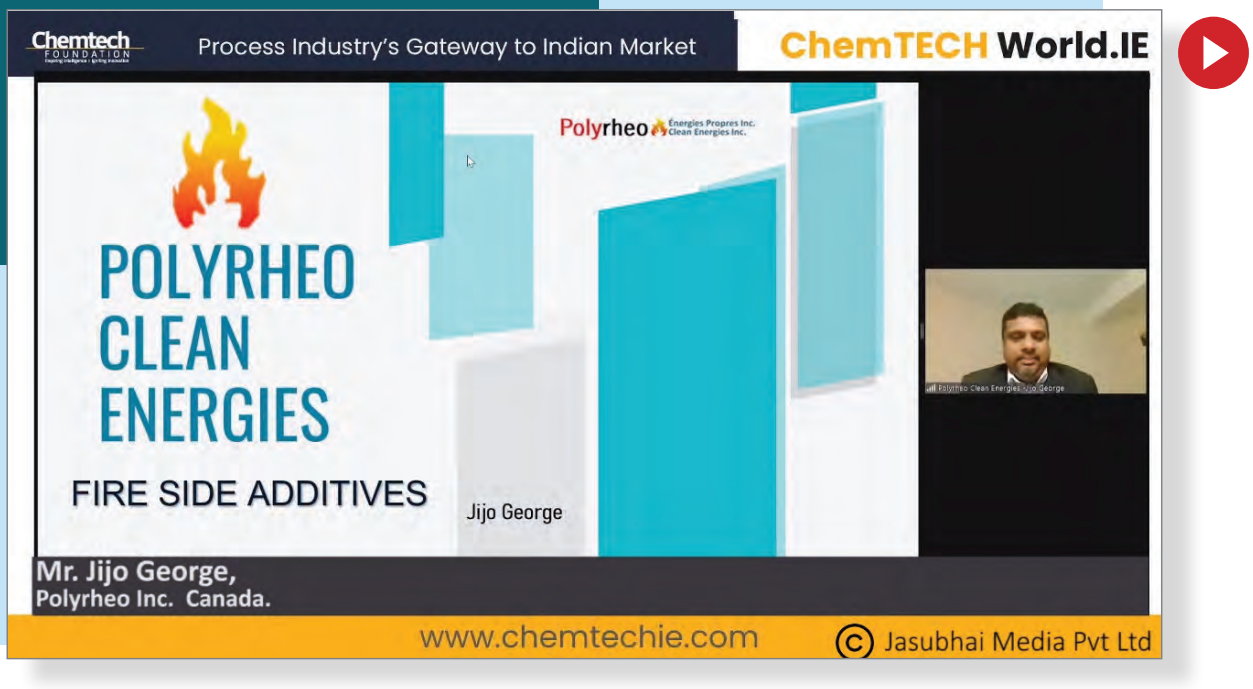


Mandar Phadke, Vice President Environment Health , Haldor Topsoe A/S, talked about Safety observed in the chemical industry. Talking about his personal experiences Mr Mandar spoke about manufactures facing issues in the industry, challenges tackled on field, customer retention, working with timeline and priorities, etc

Sustainability and Clean Energy Production

Jijo George
Director
Polyreho Inc.

https://youtu.be/7uACsYITnFg



Jijo George, Polyrheo Inc Canada, talked about sustainability and Clean Energy production. The common offering fire addictive, the industries they serve, specializations of chemicals and biomass, steps of data collection, EnergyAsh modification, addictive impact in pulping process, solutions, our reliability on coal power plants, etc was discussed.

Safety First, Last and Always

Amid the towering storage tanks, stacked pallets loaded with 55-gallon drums and scurrying forklifts, two signs loom over the CRODA Iberica SA chemical- manufacturing facility located north of Barcelona in Mevisa, Spain. Written in the Catalan dialect, the first declares, "Res del que fem justifica que ens accidentem," meaning "Nothing that we do justifies any accidents," while the second states, "Fabriquem qualitat amb la maxima seguretat," or "We manufacture quality with maximum safety."

For Carles Xiol, those declarations are much more than simple decorations. "At this plant, we have difficult [operating] conditions and it is important that we use pumps that are very robust and have ATEX certifications," said Xiol, who has worked at the Mevisa site for 15 years and is currently its Maintenance Manager.

At a facility that requires the use of more than 100 different pumps in its various production, transfer, handling and loading applications, identifying pump technologies that can meet the demands of working with potentially hazardous or dangerous raw materials or finished products is a critical concern. Fortunately for Xiol and CRODA, air-operated double-diaphragm (AODD) pumps from Almatec®, Duisburg, Germany, are able to satisfy the demands for safe and secure handling of the chemicals that are the stock and trade of the Mevisa site's manufacturing operations.

CRODA was the brainchild of two men back in 1925, an entrepreneur named Crowe and a chemist named Dawes (from whence the CRODA name was conceived). Headquartered in the town of Snaith in East Yorkshire, England, CRODA began life as a refiner of the grease that was extracted from sheep's wool into lanolin, which could be used as a rust-preventer in the engineering and automotive industries.

Carles Xiol (R), Maintenance Manager at CRODA's Mevisa site, Carlos Perez, (L), Commercial Manager,Jordi Ibarz, (C), Regional Sales Manager

Fifteen years later, the all-hands-on-deck demands of World War II production and supply in England saw CRODA branch out into the manufacture of such diverse products as camouflage oils, insect repellents and gun-cleaning oils. This newfound versatility helped establish a different path for the company upon WWII's completion. In the ensuing 75 years, CRODA has grown into one of the world's leading manufacturers of specialty chemicals, with a particular emphasis placed on creating chemicals that are manufactured from renewable sources and in the most environmentally friendly and sustainable manner possible.

CRODA's history is one of slow, but steady growth. The company expanded its operations to the United States with the opening of a sales office in New York City in the 1950s. The 1970s and 80s brought a series of acquisitions that enabled CRODA to further diversify its product portfolio and branch out into more and more markets. Today, CRODA employs more than 4,300 people globally and has manufacturing sites or sales

offices in 36 countries on six continents.

In 2018, CRODA marked 20 years since it launched its CRODA Iberica SA operation in Spain with a sales office in Barcelona and the manufacturing facility in Mevisa. The manufacturing plant produces a wide range of specialty chemicals and oleochemicals (chemicals derived from plant and animal fats) for use by a diverse client base.

"At this plant, we produce many different chemicals that are used in the production of pharmaceuticals and cosmetics," explained Xiol. The diversity of the customers that CRODA contracts with means that the plant must satisfy a plethora of individual manufacturing demands. Every customer has strict production schedules that must be consistently met.

"Our customers are very demanding and we must satisfy their needs in full and on time," continued Xiol. "It is important that we work with the right equipment suppliers." In CRODA's case, the supplier for pumping equipment at the Mevisa plant is Tecnica de Fluidos, or TDF, which is based in Barcelona and has been serving the chemical-manufacturing market since its founding in 1976.

"We have always been dedicated to the distribution of industrial pumps," said Alberto Maestre Hoffmann, son of the company founder, Aurelio Losada Maestre, and for the past 20 years TDF's Managing Director. "For us, it is very important to have long-term relationships with manufacturers because it takes time to learn this pump market, to learn about the applications and the products."

With that in mind, TDF has been a distributor of Almatec AODD pumps for about 25 years. Almatec, a product brand of PSG®, Oakbrook Terrace, IL, USA, a Dover company, is a premier manufacturer of solid-body, plastic AODD pumps for use in critical fluid-handling applications in the chemical, hygienic, paper, paint and varnish, and water-treatment industries.

Almatec AODD pumps meet the need for leak-free and low-maintenance operation due to a design innovation that uses housing bolts that are tightened against a diaphragm-sized ring on each side of the housing. This design spreads the pumping force more evenly and allows for increased permissible bolt torque, which results in improved product containment. Other operational benefits of Almatec AODD pumps are smooth, volumetrically consistent operation even at the highest pump speeds, increased capacity due to an optimized flow pattern, decreased air consumption and

a reduced noise level during operation.

At the CRODA Mevisa plant, a cadre of Almatec AODD pumps – most prominently, AHD Series and E-Series models – are used throughout the facility in a number of applications. One of the more notable ones is the transfer of titanium dioxide (TiO2), a white powder used in the production of pigments used in cosmetics and health- care products. In this instance, a 51 mm (2") E-50 model is used to pump upwards of 36 m3/ hr (600 L/min) of TiO2 at a time in an operation that requires the pump to be ATEX-certified.

The common denominator in performance for the Almatec pumps is that they all must adhere to the site's mantra regarding safe, accident-free operation. This means they have to meet the strict standards of a number of international regulatory agencies that govern sites that work with or produce hazardous or dangerous chemicals. These include the International Organization for Standardization (specifically the ISO 9001 and ISO 14001 standards) and EXCiPACT, a provider of third-party oversight of pharmaceutical manufacturers and distributors.

"We decided to use Almatec pumps because they are very safe, reliable and easy to use and maintain," said Xiol. Stretched over the main throughway at the CRODA Mevisa plant is a third sign, one that accurately sums up the facility's – and company's – driving motivation: "Treballem per un future responsible I etic," or "We work for a responsible and ethical future." It's an altruistic mission, but one that more and more companies are adopting as they seek to make their operations more environmentally friendly while continuing to reduce the risks placed on their employees. Almatec AODD pumps play a significant part in meeting these goals – and CRODA Mevisa employees like Carles Xiol are thrilled that they can rely on Almatec to provide the type of pumps that enable him to operate a plant that adheres to the highest levels of safe, sustainable and accident-free operation.

"Almatec pumps last a long time and are able to work when needed," he said. "They help me do my job." ■

Why to Invest In Natural Hazard Risk Management Now

Chris LeBoeuf is a Senior Director at ABS Group, with over 20 years of experience. He leads a team of over 50 engineers and scientists across the US and UK in managing risks to structures and equipment related to extreme loading events, including wind, flood, seismic and blast

From raging wildfires in Australia at the start of 2020 to the devastating flash flooding across much of Europe in July 2021, recent years have been scattered with natural hazard events that have destroyed property and infrastructure, devastated businesses and taken lives. In the US, Hurricane Ida brought back painful memories to the people of New Orleans, a city which is still rebuilding after Hurricane Katrina caused 1,800 deaths and $125 billion of damage back in 2005.

Unfortunately, natural disaster events such as hurricanes, cyclones, storms, floods and wildfires are occurring more often and with greater severity. This can be viewed in terms of economic cost increasing over time.

The Asia Pacific region tells a similar story. Here, average annual disaster event-induced economic losses between 2000 and 2009 stood at $56.7 billion – and for 2010-2019, that figure more than doubled to $117.9 billion. The Tohoku Earthquake which struck Japan in 2011 is largely responsible for this, but even when removing 2011 from the period, the nine remaining years average out at $89.1 billion in annual natural disaster damage.

In the US, meanwhile, the ten-year average annual cost of natural disaster events exceeding $1 billion increased more than fourfold between the 1980's ($18.4 billion) and the 2010's ($84.5 billion) Source: NOAA National Centers for Environmental Information (NCEI) U.S. Billion-Dollar Weather and Climate Disasters, 2021.

Such has been the impact of growing and more severe weather events, the magnitude of the 100-year and 500-year flood has undergone revision in Houston, a significant development that experts are keeping a close eye on.

Counting the cost

These concerning figures translate into a multitude of damages encountered by organizations that operate across a variety of industries, which notably include petrochemical, energy, chemicals, technology and other industrial sectors with large and highly valuable infrastructure bases.

Unplanned outages and economic losses from production downtime are major consequences of the disruption caused by extreme weather events.

Beyond this, there are many secondary and tertiary social and environmental impacts that stem from the primary damage done to these businesses.

But why are power and chemical plants particularly prone to natural disaster events?

Geography plays a critical role here. For instance, many petrochemical facilities are strategically located close to coastal and inland waterways to enable easy transportation of goods in and out of their sites. However, this makes them especially susceptible to hurricane and flood risks. In the US, many plants and industrial sites are located near the Gulf Coast, Atlantic Coast and Mississippi River. Earthquakes are another risk factor, primarily in the western states and other regions near fault lines. Key risk areas in Europe include sites along rivers and coasts, including those in regions which are at or only slightly above sea level.

As we head towards COP26, there is a greater sense of urgency among key political decision-makers, enterprises and wider society. Hosted in Glasgow, UK, the summit represents a defining moment for Britain's Prime Minister Boris Johnson, whose government is pushing ahead with some of the most ambitious climate targets a UK government has ever pledged.

But enterprises should not wait for more comprehensive legislation and regulation to prompt them into action. In many regions around the world, there are little or no regulatory drivers aimed at industrial facilities that require them to withstand extreme weather events. The onus currently is on organizations to determine any natural hazard risk management strategy, and given the growing frequency of these incidents, the time to act is now.

How to approach natural hazard risk management

The extent and nature of such action is largely dependent on each individual business's appetite for risk – in other words, the extent to which your business is prepared to deal with disruptions caused

by storms, hurricanes, wildfires, floods and other extreme events.

Direct concerns may include the reliability and resilience of your organization's equipment, facilities to provide worker safety and reduced unplanned outages.

However, it is also important to bear in mind that physical damage to buildings and equipment represents only the initial source of financial loss. Resultant business disruption and market displacement can also hit revenue figures hard, depending on the severity of the natural hazard in question. Concerns here can center around storing materials and disruption to feedstock supply, transportation availability and access, and cost and availability of energy.

To help quantify some of these risks, organizations should consider a range of factors.

What amount of revenue will be lost if I have to shut down my facility for an extended period of time? Can additional understanding of the risks help my company to manage our operations? Will improvements to preparedness and response reduce direct damage and limit revenue loss following an extreme weather event? Getting to grips with these questions is a good place to start, the answers to which may prompt a series of potential mitigation measures. Facility hardening, enhanced preparedness and response planning, and organizational measures to limit the impact of any single extreme event are among the risk mitigating steps companies can take, along with acquiring insurance policies.

Another option is to leverage the engineering and risk management expertise of third parties. Independent risk assessments and audits can serve as vital tools in quantifying actual risks, with engineering-based studies revolved around rigorous site-specific technical assessments enabling facilities to measure their exposure to numerous natural hazards. This can carry advantages over advice and subsequent cover offered by insurance firms, which may not offer this level of rigorous evaluation and technical understanding.

Regardless of what approach is taken, we advise companies to build risk into their cost of business and plan for a certain degree of extreme weather disruption every year.

Providing a helping hand

Some organizations may lack the in-house technical and engineering expertise to properly plan and execute an entire natural hazard risk management strategy. Expertise in the field of process safety (including accidental hazards such as

fires, explosions and toxic spillages) and structural engineering is critical for companies to get the support from the cradle-to-grave process.

Specific services, such as risk assessments and independent audits; equipment elevation audits (flood risk); natural hazard audits (from backup power systems to data protection); flood and storm surge risk analyses; reviews of emergency response plans; and much more – such as a Natural Hazard Risk Management Toolkits which offer insights and resources to assist industrial facilities in reducing their exposure to natural and man-made hazards. Knowledge sharing is crucial if organizations with assets prone to natural hazard risk are to futureproof themselves effectively.

In the UK, for example, there are a number of conference papers planned for the Hazards31 conference, a virtual event taking place in November that focuses on issues around process safety.

Here, flooding is the most frequent and damaging natural hazard, the risk of which is growing due to climate change and increasing regularity of extreme weather events. To help organizations understand and prepare for these risks, these types of conference papers look at vital lessons learned through the years, and how to navigate the UK's Control of Major Accident Hazards (COMAH) regulations.

With more industrial businesses in the UK, wider Europe and other regions around the world being impacted from natural hazards there is a clear message; risk from natural hazards is growing. As climate change continues to produce extreme weather events which may become more frequent and severe, the time to act is now. ■

Author

Chris LeBoeuf
Director
ABS Group

3D Printing with Precision Machined Quality

PERFECTION IN AUTOMATION
A MEMBER OF THE ABB GROUP

Roboze has equipped its flagship 3D printer – the ARGO 500 – with an advanced B&R automation solution. The printer integrates additive manufacturing into the industrial production workflow with repeatable high precision and full process control. It reduces lead times and lowers the cost of creating custom metal-replacement components used under extreme conditions in industries such as aerospace, energy and motorsport.

Additive technology shows great promise for helping manufacturers meet changing market demands. Until now, however, inconsistent results and lack of industrial integration have prevented 3D printers from assuming a position alongside traditional machine tools on the plant floor. “Our collaboration with B&R has proven that, if designed from the beginning as fully connected industrial machines, 3D printers can do far more than just prototyping,” says

Roboze's founder and CEO, Alessio Lorusso. "Thanks to the advanced automation solution we developed with B&R, Roboze's additive technology will lead the way into the future of adaptive manufacturing."

The ARGO 500 offers fully automated control of every step in the high-temperature printing process. Following each print cycle, it generates a comprehensive process data log to create a digital model and allow automatic certification of every part produced. Remote connectivity enables predictive diagnostics to maximize availability and productivity, while also allowing the ARGO 500 to evolve over time with easily updated features, parameters and intelligence.

The advanced control system and Roboze's patented beltless technology increase printing speed and deliver repeatable precision six times higher than can be achieved with belt-driven printers. That precision is critical, because the ARGO 500 prints super polymers and composite materials that replace metal alloys in applications where they are subjected to high temperatures, abrasive chemicals and extreme mechanical stress. The parts must meet exacting demands on material properties and dimensional tolerances that have previously only been achieved using traditional processes like injection molding or CNC machining.

"Thanks to our shared vision for the future of manufacturing and B&R's great experience in industrial control and automation, we are proud to say the ARGO 500 represents the state of the art of industrial 3D printing technology for super polymers and composite materials," says Lorusso. "Together, we are well on our way to achieving our goal of changing the way objects are produced." ■

For more information

www.br-automation.com

New 3000CS Chloride/ Sulfate Analyzer

METTLER TOLEDO Thornton is proud to introduce the NEW 3000CS Analyzer with Intelligent Sensor Management (ISM®) for chloride and sulfate measurement in pure water applications. The 3000CS analyzer expands our capabilities in serving the Power market and demonstrates our technology leadership in conductivity. It also further enhances our product portfolio and the one-stop shopping concept.

The 3000CS analyzer offers on-line ppb-level measurement of chloride and sulfate, key contaminants causing corrosion in power plants. With accurate and reliable trace level measurements, the 3000CS analyzer allows the customer to continuously monitor water/steam quality and react quickly to contamination events. The 3000CS analyzer provides:

- On-line measurement of trace levels of chloride and sulfate
- Unattended operation to minimize operator time commitment
- Automatic calibration for excellent repeatability and measurement accuracy
- Grab sample capability to measure other samples as well as QC checks.■

For more information

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Email: sales.mtin@mt.com
Website: www.mt.com/pro_power

ECTFE Piping System for Sulfuric Acid 98%

agru
The Plastics Experts.

Due to constant problems with existing piping systems in a power plant in Southwest Asia, the responsible management was looking for a long-term solution for the transport of aggressive chemicals. Until 2010, steel pipes were used for the transport of critical chemical media, but permanent maintenance was required and many steel parts had to be replaced within 2-3 years. This solution was totally unsatisfactory and alternatives were sought.

As a solution a double containment piping system was finally opted for. The double containment piping system supplied by AGRU uses an ECTFE material as media pipe and a PE 100-RC piping system as secondary protection pipe. The double containment piping system was additionally equipped with a leakage monitoring system.

The conditions of the application in detail- Sodium hypochlorite (concentration: 15%), Sulfuric acid (concentration: 98%), Temperature range: 50-60°C, Operating pressure: 5-6 bar.

Both chemicals are extremely aggressive.

ECTFE/PE100 RC double containment piping system with leak detection.

On the one hand, sulphuric acid with a pH value <1 is in use, on the other hand, sodium hypochlorite can form a highly alkaine environment (pH value 14). A piping system for sulfuric acid 98% and for sodium hypochlorite had to be found that could withstand these extreme conditions.

AGRU produces a most suitable piping system for sulfuric acid 98% and for sodium hypochlorite - an ECTFE / PE 100-RC black double containment piping system. The ECTFE inside pipe is a long-term solution for these critical conditions. In case of an unexpected problem, a leak

detection system and the outer PE 100-RC protective pipe guarantee the safety of people and the environment.

All components for this project - pipes and fittings in the dimensions OD 63/20 mm, OD 90/32 mm and OD 125/63 mm, leakage detection system and FFKM seals - were supplied by AGRU Kunststofftechnik from Bad Hall, Austria.

ECTFE (Halar®) Piping Systems: the premier league in thermoplastics

The excellent chemical resistance in combination with a higher temperature and pressure resistance makes ECTFE an essential material in the chemical industry.

AGRU Kunststofftechnik as a pioneer in the processing of technical plastic materials has more than 30 years of experience in manufacturing of pressure resistant ECTFE piping systems and semi-finished products made of ECTFE (Halar®).

ECTFE is offered by Solvay Speciality Polymers under the trade name Halar®. Halar® products consist of a copolymer with ethylene and chlorotrifluoroethylene arranged alternately.

ECTFE belongs to the group of the partly fluorinated polymers, which are characterized by a high mechanical strength. Thus, ECTFE is a perfect choice for pressure pipes in harsh environments. Due to the fact, that ECTFE is a copolymer with ethylene groups the impact strength properties are excellent. Thus, ECTFE is a material, which combines both properties, stiffness and elasticity in a perfect way.

ECTFE piping systems can be used in a pH range from 1 – 14, even 98 % concentrated sulphuric acid (H2SO4), 70 % hydrofluoric acid (HF), 50 % sodium hydroxide (NaOH) and 36 % hydrochloric acid (HCl) can be handled safely up to +120 °C. Also, for highly oxidative applications such as sodium hypochlorite (NaOCl), chlorine gas (Cl2), ozone (O3) ECTFE is the ideal solution. Compared to PVDF, ECTFE has a better chemical resistance, especially when exposed

to lyes. Furthermore, this material demonstrates excellent resistance to the corrosive influence of heat, strong radiation, and weathering.

Its excellent welding properties and thermoplastic formability make simple and cost-saving processing possible, both at the workshop and on-site. As a partially fluorinated polymer ECTFE shows a high flame retardancy and resistance to microorganism growth. Further properties are a high resistance to UV (sunlight) and gamma radiation and high insulation and electrical resistances. AGRU ECTFE piping systems are therefore a perfect choice for many demanding applications.

AGRU is able to offer the most comprehensive ECTFE delivery program in industry. ECTFE piping systems, fittings, valves, sheets and round bars, everything comes from one single source, made in Austria. Due to the special production processes, pipes can be produced in high purity up to a diameter of 110 mm as a standard item. Diameters up to 200 mm are available on request.

AGRU is not only producing ECTFE piping systems, but also semi-finished products, which are required for the construction of chemical resistant tanks and plant components. ■

For more information

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Leanbio optimises biologics manufacturing with WMFTG pump

WATSON MARLOW
Fluid Technology Group

Leanbio is a contract development and manufacturing organisation based in Barcelona that specialises in the design and optimisation of processes for the development of biological medicines. The company supports the entire development cycle through strain and cell line, process and analytical development, and manufacturing.

Leanbio works with a number of pharmaceutical and biotech organisations to scale up their biologics manufacturing processes. The pilot plant is therefore used for a wide range

of different products, requiring versatile equipment which also prevents cross contamination. Peristaltic pumps from WMFTG offered a versatile solution to reduce cleaning requirements while still preventing product contamination and facilitating equipment reconfiguration between batches.

Members of the Leanbio team were familiar with Watson-Marlow Fluid Technology Group (WMFTG) products through the use of 114 pumpheads integrated into their Bionet reactors. As the team had experienced the quality of WMFTG pumps first-hand, it made the company an easy choice to partner with. The 630S/R pump was chosen as it is a manual control pump and offers flow rates of up to 16 L/min at up to 2 bar pressure, satisfying the pilot plant's requirements.

Leanbio prioritises sustainability, promoting "lean bioproduction" in order to maximise project success and minimise time to market, costs and risks. A core part of this approach is quality by design, developing the most efficient processes to optimise its customers' biopharmaceutical production. WMFTG pumps are known for their reliability and long life, reducing the need for replacement during the lifetime of the process and hence minimising down-time, costs and the waste of obsolete machines.

By choosing a peristaltic pump to minimise contamination and facilitate process validation, Leanbio also required compatible tubing that was easy to install and use. WMFTG's expertise covers the entire fluid management pathway, enabling it to provide suitable tubing for use with the 630S/R. The pump also has retractable rollers for easy tube loading, simplifying the changeover process between products.

Leanbio is currently trialling the pump in a range of cleanroom filtration and fluid transfer applications. Following impressive results and further evidence of its ease of use and reliability, the team is excited to expand its use to more processes. ■

For more information

https://www.leanbiopro.com

Safeguarding Productivity with Quality

Productivity needs to be monitored carefully to minimize downtime to maintain good profitability in today's competitive nitric acid market. Optimizing your process with a suitable tube material in the heat exchanger, for example, can minimize the risk of corrosion in the re-boiling zone. It can also prevent stress corrosion cracking due to chlorides in the cooling water and more. The right selection can also help avoid unscheduled stops due to plugging or even replacing the entire heat exchanger unit.

Every production facility has its challenges and requirements. What are yours, and how can you capitalize on knowing which is most important to ensuring success? By specifying the correct stainless steel for your design, you can balance your needs to meet key criteria such as corrosion resistance, cost performance and mechanical properties. Knowing the alloys you chose are fit for purpose and will last the application's lifetime will give you peace of mind. In addition, replacement and maintenance costs for each material, including potential costly production losses due to shutdowns, need to be factored in. Having a relationship with the right R&D expert or technical sales contact to support you throughout the blueprint process of building or refurbishing your equipment could help you find the best solution to meet your specific needs.

When dealing with higher temperatures and nitric acid concentrations, you may notice some corrosion problems in the hot inlet of the cooler/condenser or tail gas preheater. As shown in the diagram below, corrosion can be initiated when nitrogen oxide (NOx) gases condense at temperatures of 120-130°C and the hot droplets re-boil. Re-tubing from 304 or 304L to a higher alloy material can prevent this and safeguard operations at about 20% higher temperature. Prevention is possible due to the material's low impurity levels and higher chromium content, which increases corrosion resistance.

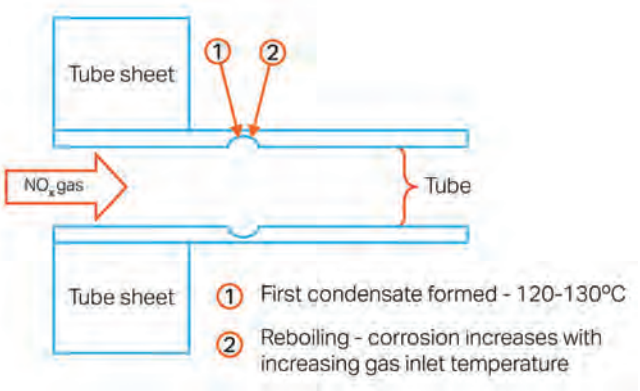

Figure 1 Corrosion challenges may occur in the inlet of shell and tube heat exchangers

As described, corrosion in the re-boiling zone can quickly decrease the efficiency and productivity of any shell and tube heat exchanger. The good news is that a new alternative superior solution will soon be available to combat this challenge: a bimetallic tube from Sandvik. The inner tube made out of zirconium, one of the most corrosion-resistant metals on the planet, prevents the inside of the tube from corroding. At the same time, the outer tube, which ensures the structural integrity and positive welding properties of the tube is made with high-alloy stainless steel, like Sandvik 2RE10. The two components are then mechanically bonded, creating a superior solution compared to other available alternatives currently being used.

The bimetallic tube also enables the use of stainless steel tube plate or even re-tubing of an entire stainless steel heat exchanger. Additionally, since welding is purely stainless-to-stainless, no post-weld heat treatment will be necessary.

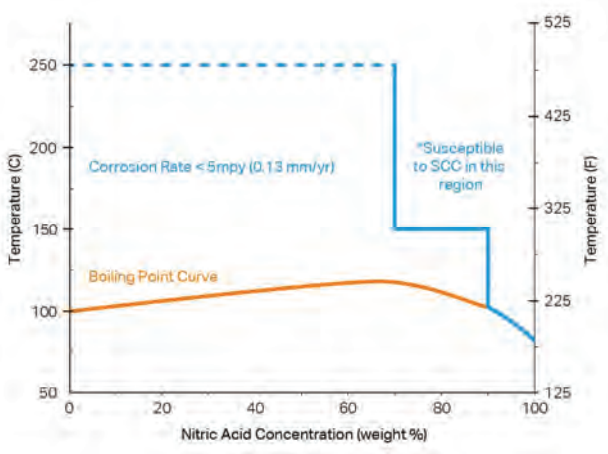

Figure 2 Corrosion performance of zirconium tube in nitric acid production

The beauty of a bimetallic tube is that you get all the benefits of pure zirconium in the inner wall without its considerably higher price tag. You also gain the positive metallurgical properties of the well-proven Sandvik 2RE10 tube. The benefits of zirconium can be seen in the Figure 2, which shows its tough corrosion resistance. In short, customers will now be able to benefit from the best of two metallurgical worlds. Product development of this new bimetallic tube is ongoing and expected to complete shortly.

Let's look at one example of a solution-based performance upgrade. For long-term process performance, it will always cost more to replace ASTM 304L tubing twice versus using a "modified" ASTM 310L material, like Sandvik 2RE10. The diagram below shows how the upgraded material sustains or exceeds a minimal 0.1 mm/year corrosion rate at considerably higher temperatures compared to other grades – expanding its operational window. In short, this austenitic material is designed to last much longer and can save on replacement costs over the lifetime of your equipment.

As everyone knows, technical standards are not scientifically exact – they are more values within a certain range. To be on the safe side, customers should select a supplier or materials

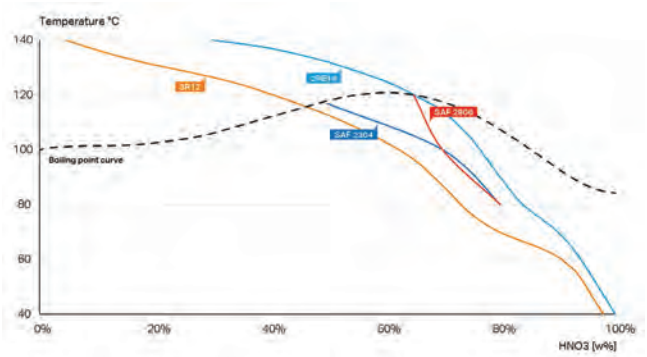

Figure 3 Sandvik 2RE10 offers 20% higher corrosion resistance at 60% concentration

partner that ensures their materials are produced according to the top values within a standard. At Sandvik, we call it "setting the standard within the standard". By selecting a partner that targets their materials in the upper range of a technical standard, customers can expect continuous production with fewer unexpected productivity losses and longer cycles between scheduled maintenance.

You might have heard the expression "Swedish high-quality steel" before. Naturally, as a Swedish-based company, we think it's true and are proud to be a part of this premium steelmaking legacy. Sandvik started its steel production more than 150 years ago and continues to fine-tune the production expertise and materials knowledge throughout the company, with more than 2,700 people working in R&D devoted to meeting and exceeding customer expectations. Even with global production, one constant remains: every initial melt is made in Sandviken, Sweden, and each batch is fully documented and traceable. Full traceability means that Sandvik has a complete supply chain overview and quality control from melt to finished, providing peace of mind to anyone who purchases this quality steel.

For more than 60 years, Sandvik has been solving material challenges for the global urea and nitric acid industries – leading to a vast reservoir of knowledge. Combining that knowledge with pioneering the development of new or improved materials helps our customers to boost their productivity and cut costs that arise due to material failures.

Whether you are refurbishing an older nitric acid plant or fabricating the process equipment to be used in one, selecting the right stainless steel tubing can be critical. A high-quality tube with low impurities and optimized corrosion resistance will not only reduce downtime and extend your plant lifetime but will allow for better welding and bending during manufacturing. ■

For more information

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Jasubhai MEDIA

Side Channel Magnetic Drive Pump - Perfect Solution for Liquids With Low Boiling Points

A Hardening plant earlier used 2 centrifugal pumps for pumping methanol for one of the processes. The tank where they were keeping methanol was located outside of the plant exposed to all weather changes and yearly seasons. The plant faced a problem especially in the summer when outside temperature increases and also the sun shines strongly.

Due to the Hot climate, in every summer season methanol starts to evaporate and convert to the vapor. Standard process pumps can not handle low NPSH conditions and high vapour percentage.

Customer started looking for solution and finally they found pump manufacturer M PUMPS srL, Italy which could give them proper solution.

Application specification: Methanol, Differential pressure 5bar, Capacity: 10 l/min, Temperature: 40 °C

M PUMPS PROCESS application solution

M Pumps Process has in his product range, pump SC MAG M which can handle NPSHa as low as 0.5 m.

The particular design of the hydraulic allows it to handle liquids close to boiling point. Pump can handle up to 50% of gas in the liquid.

M Pumps Process recommended to

customer side channel pump SC MAG M 20 / 4S.

SC MAG-M pump series are heavy duty side channel pumps, designed specifically for clean chemical processes, low boiling and highly volatile, explosive and dangerous liquids.

This pump range puts a milestone on side channel pump history, as it is the first API design made. That this pump range is not a common side channel pump range, is visible at a glance, as the pumps do not respect the outline imposed by EN 734.

The SC Mag-M range can work with low NPSHr of upto 0.5 mts, can deliver liquids with gas content to 50%, max flow rates to 40 m3/hr with heads upto 450 mts. The temp range of liquids it can handle is from -90 deg C to +250 deg C.

Features	Pump Model	SC MAG-M	20 / 4S
	Pump Type	Side Channel	
	Standard	M PUMPS STD	
	Atex		Yes
	Self Priming		Yes
	Rotation		CW
	Construction		Close Coupled
	Capacity	m^3/h	0.6
	Head	m	70
	Design Pressure	bar	40
	Min. Continuous flow	m^3/h	NA
	NPSHR	m	0,25
	Hydraulic Efficiency	%	NA
	Rated Power (mag losses include)	kw	1.55
	Impeller Type		SIDE CHANNEL
	Pump Curve Number.		15161
	Pump Speed	RPM	2900
	Connection		UNIV. (DIN PN.40/ANSI 300#)
Materials	Pump Casing		CF8M
	Impeller		AISI316/Duplex
	Rear Casing		HC276
	Internal Magnet		AISI 316 / NeFeBr
	External Magnet		NeFeBr
	Shaft		AISI 420B

Dimensions and working space around suction and discharge nozzles have been designed to allow the best condition for installation and maintenance.

A strong barrel construction has been adopted to increase operative safety in any condition, as these pumps are usually used in ATEX classified areas, for pumping dangerous and aggressive to the environment liquids.

SC MAG-M pumps are applied in the chemical and petrochemical industry, in the surface finishing and hardening, in the pharmaceutical industry, in the plastic and rubber industry, in the air conditioning and refrigeration engineering and in the food, beverage and tobacco industry.

These comparative advantages are the prime reasons for clients to consider mag. drive pumps against mechanical seal fitted pumps.

M Pumps deliver world-leading expertise in the design, application and manufacture of Magnetically Driven Pumps and associated equipment to API 685, ISO 2858, ANSI B73.3 and ASME for the Oil and Gas, Offshore, Petrochemical, Chemicals, Nuclear, Research Institutes, Pharmaceutical, Electronic and the General industry. ■

For more information

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