March 2026

International Integrated **Energy** Industry Magazine

Oil Gas & Power

www.jasubhaimedia.com

SPECIAL INTERVIEW

Dr. Alok Sharma

Director (Research and Development)
Indian Oil Corporation Limited

इंडियनऑयल
IndianOil

Oil Gas & Power
World Expo 2027
3-5 March 2027, Mumbai, India

Jasubhai MEDIA

seal.tech

sealmatic®

MECHANICAL SEALS

Oil & Gas
Refinery
Petrochemical
Chemical
Power
Fertiliser
Pharmaceutical
Paper
Aerospace
Marine

Sealmatic India Ltd.
Bldg A, Indiplex IV, Survey No-12, Hissa No-9A,
Village Ghodbunder, Shanti Vidya Nagri Road,
Mira Road (E). Thane - 401104. India.

T : +91 22 50502700
E : info@sealmaticindia.com

TÜVRheinland®
European Directive 97/23/EC
QS-System (Module H)

TÜV INDIA
CE Ex II 3 G/D c T2
ATEX - 2014/34/EU

UKAS MANAGEMENT SYSTEMS
ISO 9001:2008
ISO 14001:2004
BS-OHSAS 18001:2007

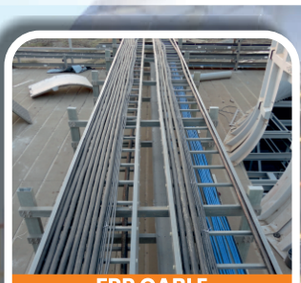
Q1 API Spec Q1 Registered

sealmaticindia.com

More than
800+
Satisfied
Clients

CORROSION FREE
COMPOSITE SOLUTIONS

Save Project Costs
Without Compromising Strength



FRP CABLE MANAGEMENT SYSTEMS

FRP GRATINGS

FRP HANDRAIL

FRP REBAR

FRP TANK

FRP CUSTOM SOLUTIONS

FRP TRENCH COVER

Approved with all major consultants and EPC Contractors for Oil, Gas and Process Plants

- Corrosion/Chemical Resistance
- High Strength
- Light Weight
- Electrical Non Conductivity
- Thermal Non Conductivity
- Ease of Fabrication
- Low Life Cycle Cost
- Sustainable
- Flame Retardant

MANUFACTURER OF FIBERGLASS / FRP / GRP

Cable Trays I Gratings I Structural Profiles I Ladders I Pitt Cover I Crossovers I Fencing
Handrails I Staircases & Platforms I Safety Marker Line I Cable Cleats I FRP Rebar I FRP Tank

Aéron©
THE COMPOSITE EXPERT...
www.aeroncomposite.com

AERON COMPOSITE LIMITED

Survey No. 170 to 174, Jornang - Akhaj Road, Via Ambaliyasan,
Jornang, Dist. - Mehsana, Gujarat - 382732 (INDIA)
T : +91-99099 88266, +91-90331 58500 | F : +91-79-26561238
E : info@aeroncomposite.com | W : www.aeroncomposite.com

Dealers & Distributors Inquiry Solicited

International Integrated ENERGY Special Issue

Oil Gas & Power

CHAIRMAN
Maulik Jasubhai Shah

PUBLISHER & CEO
Hemant K. Shetty

DEPUTY EDITOR
Reshmi Menon

CREATIVES
Arun Parab

GENERAL MANAGER SALES
Prashant Koshti
Amit Bhalerao

BRAND MANAGER
Sudhanshu Nagar

SALES
Godfrey Lobo
Chandrahas M Amin
Yonack Pradeep

JASUBHAI MEDIA PVT. LTD.
Registered Office: 26, Maker Chambers VI, 2nd Floor, Nariman Point, Mumbai 400 021, INDIA.
Tel.: 022-4037 3737 Fax: 022-2287 0502
E-mail: sales@jasubhai.com

PUBLISHED BY:

Jasubhai MEDIA

AD INDEX

GUEST COLUMN

H. Vishvanathan
Former Dy. Director General, DGFASLI,
M/o Lab and Emp. Govt. of India
Proprietor, Meenakshi Safety
Consultancy Services

FEATURE

Mr. Pratik G Bhagat
Lead Process &
Technical Safety Engineer
NPCC Engineering Pvt. Ltd., Mumbai

Mr. Karthik Sathanur
Technical Safety Engineer
NPCC Engineering Pvt. Ltd., Mumbai

SAMSON

AND
EVERYTHING
FLOWS

NEXT VALVE GENERATION

TYPE 251GR

India.samsongroup.com

SAMSON CONTROLS PVT LTD
D-281, MIDC Ranjangaon, Ta.Shirur,
Dist, Pune, Maharashtra,India- 412220
E-mail: sales-in@samsongroup.com

CONTENTS

SPECIAL INTERVIEW

CASE STUDY

IMPACT FEATURE

NEWS FEATURE

CAREER ORIENTED TRAININGS AS PER CURRENT JOB REQUIREMENTS IN THE FIELD OF ENGINEERING

For...**Engineers, Designers & Draughtsman of all Disciplines**

OIL, GAS & POWER

PETRO-CHEMICAL

CHEMICAL

PHARMACEUTICAL

WATER

SOLAR

Training to Enhance Skills in...**Engineering Design, Procurement & Construction**

And also in...**3D Modelling, Drafting, Inspection & Testing & Erection & Commissioning**

PROFESSIONAL TRAINING IN

- Piping Engineering
- Mech. Design of Process Equipments
- Process Engineering
- Process Instrumentation & Control
- Electrical System Design
- Air Conditioning System Design (HVAC)
- Structural Engineering
- Water & Waste Water Engineering
- Advance Pipe Stress Analysis (Software)
- PDMS (Software)
- HVAC Design & Drafting
- Rotating Equipment
- MEP Engineering
- Solar PV Power System
- Civil / Structural Design & Drafting
- HSE (Health, Safety, Environment)

PROVIDER OF SKILLED PROFESSIONALS IN THE FIELDS OF ENGINEERING AS PER INDUSTRIAL REQUIREMENTS

Skill India
कौशल भारत-कुशल भारत

N·S·D·C
National Skill Development Corporation
Transforming the skill landscape

For More Details Please Contact :

SIT
SUVIDYA INSTITUTE OF TECHNOLOGY
ISO 9001 : 2015 CERTIFIED ORGANISATION

Suvidya Institute of Technology Pvt. Ltd.
Regd. No. : U809004MH2010PTC208677
18/140, Anand Nagar, Nehru Road, Vakola, Santacruz (East), Mumbai - 400 055.
Phone : (022) 2668 1979 / 2668 1983 / 2668 2290 / 098215 69885
E-mail : enquiry@suvidya.ac.in **Website : www.suvidya.ac.in**

IndianOil

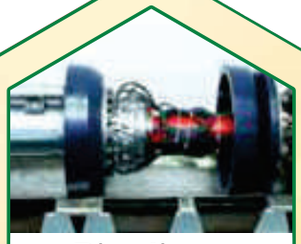
The Energy of India

Lubricants

Refining Technology

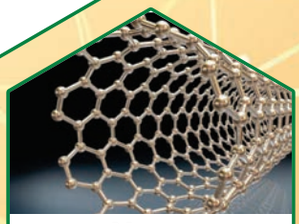
Petrochemicals

Catalyst



Pipelines

Differentiated Fuels



Nano Products

Emerging Areas

Alternative Energy

Bio-Tech

Energy Storage

Nano Technology

About Us

IndianOil is India's flagship national oil company with business interests straddling the entire hydrocarbon value chain - from refining, pipeline transportation and marketing of petroleum products to exploration & production of crude oil & gas as well as marketing of natural gas and petrochemicals. India's highest rank Energy PSU in Fortune 500 list.

IndianOil's Major Offerings

Refining Technologies

INDMAX Technology
Light Olefins maximization from residual hydrocarbon streams

Octamax
C4 olefinic stream to high octane gasoline blending stock

indJet
Production of ATF through hydrotreating

indeDiesel
Production of ultra-low sulfur diesel

Ind-Coker[AT]
Minimization of coke yield in thermal cracking

Delayed Coker
Conversion of residue to distillate

indDSN
Deep desulphurization of naphtha

indLPet
Conversion of LCO to mono-aromatics

Sustainability

- eCO_2Sorb: Enzymatic CO_2 capture Technology
- IBG-Plus: Bio-methanation of organic waste and biomass
- Biomass Gasification: Production of green Hydrogen from biomass
- CBR: Bio reactor based treatment of oil contaminated soil and oily sludge

Catalyst

- IndiCAT: Hydrotreating Catalyst
- i-Max: ZSM-5 additive for improving LPG/olefins in Catalytic Cracking unit
- RUA: Residue upgradation additive for Catalytic Cracking unit
- i-ZN22: Poly propylene catalyst
- IV-IZOMax[CAT]: Light naphtha Isomerization catalyst
- i-Cat[OM]: Catalyst for Octamax Unit

Products

- Servo Lubricants: Lubricants for Industrial applications
- STORM: Gasoline for two wheeler racing vehicles
- STORM-X: Gasoline for four wheeler racing vehicles
- AgriElite: Enrichment of fermented organic manure
- NanoKoat-I: Nano additized epoxy- based coating for thermal & corrosion resistance
- NanoKoat-A: Nano additized epoxy-based coating for acid corrosion
- IPIG: Inline inspection tool for pipelines
- XtraFlo: Drag Reducing additive
- StubVorous: Insitu decomposition of crop residue
- XtraTej: Nano additized Indane with higher flame temperature for domestic use
- Nanocut: Nano additized LPG for metal cutting
- XTRABoost: Nano additized auto LPG with higher flame temperature
- SuyaNutan: Indoor solar cooktop

Specialized Services

- Applied Metallurgy: Material failure analysis, Remaining life assessment, Fitness for service
- Mechanical Engineering: Service on stress analysis of equipment and piping
- Performance evaluation of refining process catalyst: Catalytic cracking, hydro-processing, steam reforming
- Optimization, process improvement & troubleshooting process unit
- IPIG services for inline inspection of Pipelines: Magnetic flux leakage based IPIG tools for inline–inspection of crude & product pipelines
- Borescope inspection: In service inspection of internals of running equipment for change/damage assessment
- Crude oil Assay: Generation of assay for crude oil

Proprietary Hardware

- Ind-Spray: Feed atomizer for Catalytic Cracking unit
- Ind-RAD: Regenerator air distributor for Catalytic Cracking unit
- I-Oxyjet: Oxygen sparger for SRU

Research & Development Centre
Indian Oil Corporation Limited,
Sector-13, Faridabad-121007 | Email: inforndiocl@indianoil.in

India–UK offshore wind taskforce launched

New Delhi: Union Minister of New and Renewable Energy Shri Pralhad Joshi addressed the launch of the India–UK Offshore Wind Taskforce in the presence of Rt Hon Deputy Prime Minister of the United Kingdom Mr. David Lammy and British High Commissioner to India, Ms. Lindy Cameron.

Calling the Taskforce a "Trustforce," Shri Joshi said it reflects the confidence that India and the United Kingdom can work together to address real execution challenges. He urged that the platform deliver time-bound workstreams, measurable milestones and visible progress, converting global lessons into solutions tailored to Indian conditions.

Describing the India–UK Offshore Wind Taskforce as a working mechanism rather than a symbolic platform, the Minister said it has been constituted under Vision 2035 and the Fourth Energy Dialogue to provide strategic leadership and coordination for India's offshore wind ecosystem. He observed that while the United Kingdom has demonstrated global leadership in scaling offshore wind and developing mature supply chains, India brings scale, long-term demand and a rapidly expanding clean energy ecosystem.

He outlined three practical pillars for cooperation: ecosystem planning and market design, including refined seabed leasing frameworks and credible revenue-certainty mechanisms; infrastructure and supply chains, including port modernisation, local manufacturing and specialised vessels; and financing and risk mitigation through blended finance structures and mobilisation of long-term institutional capital.

To support early projects, the Government has introduced a Viability Gap Funding scheme with a total outlay of ₹7,453 crore. Shri Joshi noted that offshore wind is among the most complex segments of the global energy transition, requiring specialised port infrastructure, marine logistics, robust seabed leasing frameworks, clear risk allocation and bankable commercial structures.

With clarity of purpose and shared commitment, he concluded, offshore wind can emerge as a strong pillar of India's clean, reliable and self-reliant energy future, and a flagship of India–UK cooperation under Vision 2035.

Zero customs duty to transform nuclear energy economics: Dr. Jitendra Singh

New Delhi: Zero customs duty on the import of goods required for nuclear power projects is set to accelerate the pace of nuclear energy development in the country while also bringing down the overall project cost and per-unit cost of electricity, making such projects more viable, particularly those involving foreign cooperation with substantial import content.

Union Minister of State (Independent Charge) for Science & Technology, Earth Sciences, and MoS PMO, Personnel, Public Grievances, Pensions, Atomic Energy and Space, Dr. Jitendra Singh stated that the exemption of customs duty on nuclear fuels and reactor components up to the year 2035 will contribute to reducing both project costs and electricity generation costs, thereby improving the economic viability of nuclear power projects.

On strengthening the domestic supply chain for the 10 newly approved 700 MW Pressurized Heavy Water Reactor (PHWR) units, the Minister informed that Nuclear Power Corporation of India Limited (NPCIL) has taken several steps. These include placing bulk orders to ensure continuity, expanding the vendor base with necessary support, promoting indigenous equipment for import substitution, reserving certain equipment for class-1 local suppliers, and organising vendor meets with a focus on encouraging MSMEs and giving them preference in bids.

Regarding enhanced funding for research and development at Bhabha Atomic Research Centre (BARC), the Minister said that the increased allocation is being utilised for multidisciplinary technology development aimed at achieving self-reliance. The focus areas include development of new research reactors, isotope production facilities especially for cancer treatment, advanced reactor technologies including Small Modular Reactors (SMRs) and hydrogen production, accelerator technologies, laser-based applications, and advanced materials and manufacturing technologies.

The Minister further informed that, at present, there is no proposal to integrate the PM Gati Shakti framework with the construction and logistics of upcoming nuclear parks in coastal states.

CONTROLS INDIA

SECURITON

Linear Heat Detection Cable

Safety is Non-Negotiable.

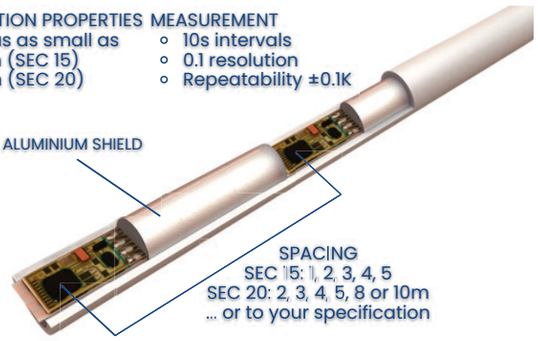
HT PANEL | BATTERY STORAGE AREAS- BESS | CONVEYOR BELT

Precision Monitoring Of Thermal Run away

- Semi conductor chip Based Linear Heat Detection Cable
- Extremely low failure rate
- Temperature monitoring system with fire detection certification
- Pre-alarm (default 90% for Max. Alarm, 50% for Diff. Alarm)
- Interfaces with RS232, RS485 and LAN
- Protocol: MODBUS RTU & TCP
- Maximum cable length of 2 x 320 m per controller

INSTALLATION PROPERTIES
- Radius as small as
- 25cm (SEC 15)
- 30cm (SEC 20)

MEASUREMENT
- 10s intervals
- 0.1 resolution
- Repeatability ±0.1K



Zero Hassle Setup – Easily Repairable on Site

Normal cable properties
- no specialists needed
- field repairable
- no limits to cuts & repairs

Performs Self-Test Automatically
- Built-in diagnostics continuously check cable health
- No Manual Maintenance Testing

Point Accuracy
- Radiant Heat sensitive sensors
- Clear sensor position
- Measurement Resolution 0.1C

Mechanically and chemically resistant
- Water / Moisture
- Gases / Pollution
- Tensions / Shocks

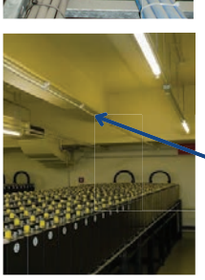
Sensor Control Unit
SCU 835

Max. 750 m, 200 Sensors

SCU 835





Threshold Alarm of 2nd Detector	3	Fire 2 2nd Detector
Rate of rise alarm	2	Fire 1
Rate of Rise Pre-Alarm	1	Action

Linear Heat Detection Cable

CONTROLS INDIA

For Detailed Presentation Connect With Us

Controls India Private Limited

Website: https://controlsindia.asia

Email : marketing@controlsindia.asia

Contact : +91 98250 64784

Cabinet approves scheme on Small Hydro Power Development Scheme for the period FY 2026-27 to FY 2030-31

New Delhi: The Union Cabinet chaired by the Prime Minister Shri Narendra Modi has approved the 'Small Hydro Power (SHP) Development Scheme for the period FY 2026-27 to FY 2030-31' with an outlay of ₹2,584.60 crore for installation of Small Hydro Power (SHP) projects of an approximate capacity of 1500 MW.

The scheme will support small hydro projects (between 1-25 MW capacity) to come up in different states and will especially benefit hilly and North Eastern states with high potential for such projects. In North Eastern States and in districts with international border, central financial assistance to the tune of ₹3.6 crore per MW or 30 per cent of the project cost, whichever is lower with an upper limit of ₹30 crore per project will be available.

In other states ₹2.4 crore per MW or 20 per cent of project cost, whichever is lower with a cap of ₹20 crore per project would be available. This will help in tapping the small hydro potential in remote and difficult to reach locations. An amount of ₹2,532 crore has been earmarked for such projects. This is likely to bring in ₹15,000 crore of investment in the small hydro sector giving a boost to the clean energy initiative, investment in remote and rural areas and creating significant employment opportunities. The investment will also leverage 100% of the plant and machinery from indigenous sources fulfilling the objective of *Atmanirbhar Bharat.*

The scheme will also incentivise the states to prepare the detailed project report for about 200 projects to create a pipeline of small hydro projects in future. An amount of Rs.30 crore has been kept to support state and central government agencies to prepare such DPR.

The scheme will support 51 lakh person days of employment during the project construction and will also enable employment in maintenance and operation of these SHPs which will come up in largely rural and remote locations. SHP projects being decentralized in nature, the requirement of long transmission line is minimal, which also reduces the transmission losses.

Launching of this Scheme will rejuvenate the Small Hydro Power sector and will help in exploiting the available potential at a much faster pace. SHP projects are environmentally sustainable, as they avoid large-scale land acquisition, deforestation, and displacement of communities. It will also promote socio-economic development of remote areas by boosting local investment, apart from creating long-term employment with project lifespans typically ranging from 40 to over 60 years.

GAIL, 'K' LINE & J M Baxi Marine Services enter into term sheet for equity in a shipping company

New Delhi: GAIL (India) Limited, Kawasaki Kisen Kaisha, Ltd. ('K' LINE), and J M Baxi Marine Services have signed a term sheet for equity participation in the ship-owning company established in Singapore. The term sheet was signed in the presence of Shri Hardeep Singh Puri, Hon'ble Minister for Petroleum and Natural Gas, Government of India. GAIL has signed a long-term charter with the ship-owning company starting from 2027. The LNG vessel is currently under construction in Korean Shipyard. GAIL's investment in the ship-owning company, subject to approval of DIPAM, is planned through its wholly owned subsidiary company - GAIL Global IFSC Limited, which is registered in GIFT City, Gujarat.

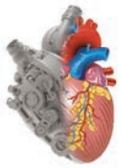
On the establishment of the partnership, Satoshi Kanamori, Senior Managing Corporate Officer, 'K' LINE said, "This partnership brings together the complementary strengths of three trusted companies to build a resilient and sustainable LNG shipping platform for India. 'K' LINE will continue to contribute our safety culture, technical expertise, and operational excellence to support reliable energy delivery and long term value for all stakeholders."

Dhruv Kotak, J M Baxi Group, said, "Our entry into clean energy transportation marks a defining step in J M Baxi Group's long-term vision for the future of Indian maritime and logistics infrastructure. Partnering with GAIL and our long-standing collaborator, "K" LINE, reinforces our commitment to the Hon'ble Prime Minister's vision of Aatmanirbhar Bharat and to building resilient, sustainable supply chains that support India's clean-energy transition."

Liquefied Natural Gas (LNG) shipping is fast becoming a cornerstone of India's energy and maritime strategy, underpinning national goals for energy security, economic resilience, environmental sustainability, and industrial growth. ■

Roto pumps since 1968

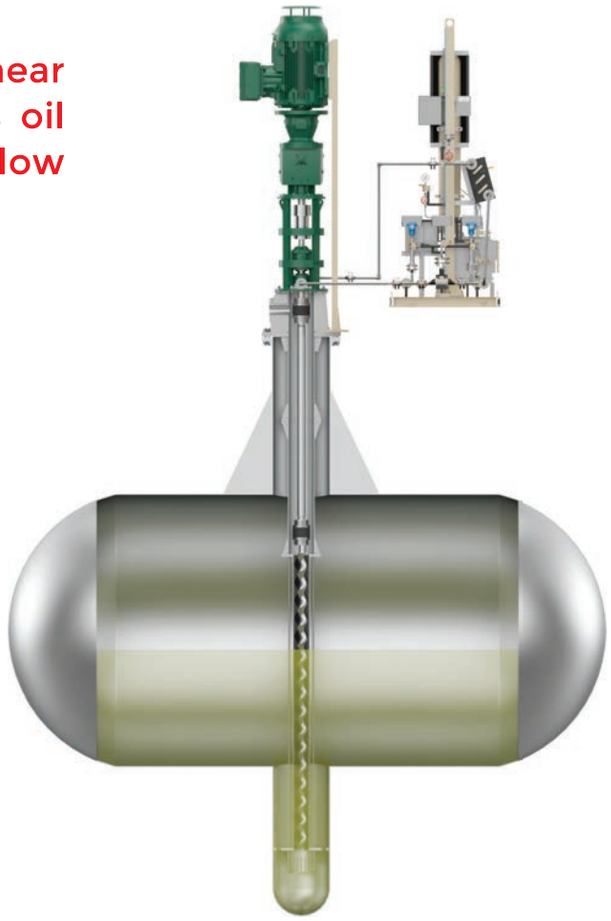
WE COMPETE WITH ONLY ONE PUMP



ENGINEERED SOLUTIONS FOR CLOSED/OPEN DRAIN OIL VESSELS

Proven performance in handling shear sensitive produced water with viscous oil and solids. Custom-Designed to suit low NPSH(R) requirements.

- **Rotor & Other Wetted Parts -** Carbon Steel, Duplex, Super Duplex, Inconel 825, 625 etc.
- **High Fluro Whiton or Elastomer -** NBR, HNBR & FPM.
- **Connections -** As per ANSI/ ASME B16.5 with various flange ratings.
- **Mechanical Seal & Support System -** As per API 682 4th Edition.
- **Coupling & Guard** - As per API 610/671, AGMA 9001.
- **Gear Box -** Conforming to AGMA 6010 standard.
- **Electric Motors -** As per IEC/NEMA standards.



Vertical Submerged Progressive Cavity Pump

Capacity : Up to 500 m³/hr (2200 GPM)
Pressure : Up to 120 bar (1740 PSI)
Temprature : -40° C to 150° C (-40° F to 302° F)

ROTO PUMPS LTD.
sales@rotopumps.com | www.rotopumps.com

OVERSEAS ESTABLISHMENTS

Australia | Germany | Malaysia | South Africa | USA | UK | UAE

APPOINTMENT NEWS

Deepak Gupta assumes charge as CMD of GAIL

Deepak Gupta has assumed the charge as Chairman and Managing Director (CMD) of GAIL w.e.f. 01.03.2026. Mr. Gupta, Mechanical Engineer from Delhi College of Engineering, has more than 35 years of deep and diverse experience across oil and gas value chain. He brings comprehensive blend of technical, strategic and board level leadership. His expertise spans project and construction management, contracts and global procurement, technology selection, business development, operations and maintenance. A thought leader and prolific writer, Mr. Gupta, has authored several technical papers/ articles on critical packages and fast-tracking project execution. His ideas on project acceleration, digitization and excellence have been institutionalized as best practices. ■

Praveen M Khanooja assumes additional charge of CMD of EIL

The Ministry of Petroleum & Natural Gas has informed that the Hon'ble Minister (PNG) has approved the entrustment of additional charge of the post of Chairman & Managing Director, Engineers India Limited to Shri Praveen M. Khanooja, Additional Secretary, MoPNG for a period of three months w.e.f 01.03.2026 or till the appointment of a regular incumbent to the post or until further orders, whichever is the earliest. Mr. Khanooja is working as Additional Secretary in the Ministry of Petroleum & Natural Gas since August 2022. He is a B. Tech in Chemical Engineering and M. Tech in Management & Systems. He belongs to 1994 batch of Indian Audit & Accounts Service and has worked in various capacities in Defence Audit, Railways Audit, State Government Accounts & Audit at many field and CAG Headquarters' postings. ■

Technip Energies appoints Jesse Stanley as President, Technologies & Products

Jesse Stanley, previously President, Operations Americas at Wood plc since 2024, will be joining Technip Energies as President, Technologies & Products and member of the Executive Committee. In this role, she will lead the company's technologies and products offering, accelerating innovation, strengthening its differentiated technology portfolio, and delivering on Technip Energies' strategic ambition for T&P's business growth.

A graduate of the University of Cambridge and Stanford Graduate School of Business, Jesse Stanley began her career in consulting with Accenture in Germany from 2005 to 2007. She then joined Shell plc in 2007, where she held various positions across logistics, global sales and marketing in Europe and Asia until 2016. ■

Octave launches new brand, built around unleashing intelligence at scale

Huntsville, Alabama: Octave, the potential software spin-off from Hexagon AB, has unveiled its new brand identity, marking a major step toward its transition into an independent company. Comprising Hexagon's Asset Lifecycle Intelligence and Safety, Infrastructure & Geospatial divisions, alongside the Bricsys, ETQ and Projectmates businesses, Octave's brand signals a clear vision of purpose and mission to unleash intelligence at scale.

"Octave exists to help customers make better decisions when complexity is high and the stakes matter," said Mattias Stenberg, Chief Executive Officer of Octave. "We aren't just launching a logo; this is a commitment to help organizations achieve the outcomes that matter most. When failure isn't an option and success is essential, Octave provides the clarity and accountability leaders need to realize their most critical outcomes."

Industrial and infrastructure organizations are facing escalating complexity and uncertainty across their operations. Today's leaders face a world of operational chaos, fragmented systems and data they can't trust.

Octave meets these challenges by transforming fragmented data into decisive action, helping leaders cut through the noise and turn unpredictability into a competitive edge.

By connecting the flow of data into one contextualized platform and leveraging domain specific artificial intelligence, Octave solutions provide the intelligence required to optimize performance across four core pillars - Design (Supports 3D modeling, engineering analysis, simulation and geospatial intelligence. Allows teams to create information-rich digital representations that serve as the basis for downstream activities); Build (Connects engineering, procurement, fabrication, construction, and commissioning workflows. Octave solutions coordinate materials, track progress, manage changes and improve cost and schedule predictability.); Operate (Unifies operational data, historical information, maintenance activities, quality systems and worker tools. This enables real-time insight, predictive intelligence and improved asset and system performance.); Protect (Elevates public safety, physical security and industrial cybersecurity. This includes incident response, emergency management, situational awareness, digital security and regulatory compliance.)

As part of Octave's new brand, the company also launched its new website, *octave.com*, and a social media presence *(www.linkedin.com/company/octaveintelligence/)* to bring to life how Octave supports critical assets and people across the globe.

The spin-off of Octave remains subject to an ongoing separation process and final approval of the board and shareholders, as well as other conditions, consents and regulatory approvals. There can be no assurances a separation, spin-off or listing will occur.

TrueRE Oriana Power wins floating solar project in Jharkhand from Damodar Valley Corporation

New Delhi: TrueRE Oriana Power, one of India's largest and fully integrated renewable energy companies delivering clean energy solutions across the value chain, has won an EPC tender for a 234 MW Grid Tied Floating Solar PV power project in Jharkhand from Damodar Valley Corporation (DVC). The project, located at the Maithon Dam Reservoir in Jharkhand, is the largest floating solar project in the state, and one of the largest floating solar installations in the country.

The project, awarded through a competitive tender process floated by Damodar Valley Corporation, aligns with DVC's objectives of decarbonisation and long-term energy security. Once operational, the projects will generate around 500 million units of clean electricity annually and offset up to 4 lakh tonnes of CO_2 emissions every year. The project also aims to deliver operations and maintenance services for a period of 10 years.

The project will incorporate a customised anchoring and mooring system design capable of countering river currents, maintaining array alignment, and ensuring long-term structural stability, reflecting TrueRE Oriana Power's commitment to developing solutions that focus on reliability, constructability, and accelerated execution, while adhering to stringent technical and environmental standards.

Mr. Parveen Jangra, Founder, Chief Technical & Operating Officer, said, "This project represents a significant step forward in the deployment of utility-scale floating solar in India. Winning this tender reflects our engineering depth, execution discipline, and experience in delivering technically complex renewable energy infrastructure. Floating solar has an important role in optimising land use while supporting large-scale decarbonization."

Clariant Zeolites partners with Vertimass to scale-up innovative CADO biofuels technology

Munich: Clariant, has entered into a strategic collaboration with Vertimass LLC aiming to accelerate the development and commercialization of advanced zeolite catalysts for the catalytic conversion of biobased alcohols via Vertimass Consolidated Alcohols Deoxygenation and Oligomerization (CADO) process. The envisaged project combines Vertimass' novel technology with Clariant's six decades of expertise in zeolite catalyst development to advance sustainable processing.

Under the collaboration, Clariant intends to provide comprehensive technical support to scale Vertimass' technology to commercial production. This encompasses zeolite catalyst development expertise, industrial scale-up guidance, catalyst sample provision for development and testing, detailed characterization services to evaluate catalyst properties and performance, and ongoing technical consultation from Clariant's zeolite experts.

Vertimass' proprietary CADO technology enables the catalytic conversion of sustainable methanol, ethanol, and other alcohols into liquid fuels that are compatible with existing vehicles and aircraft, representing a significant advancement in sustainable chemical processing with environmental benefits. Founded in 2013 and headquartered in Irvine, California, Vertimass focuses on developing and licensing breakthrough processes for renewable fuel production.

"We are excited to collaborate with Vertimass on this innovative technology that represents a significant advancement in renewable fuel production," said Gene Mueller, Vice President and Head of Ethylene for Clariant Catalysts. "Vertimass' approach to converting renewable alcohols into biobased fuels has remarkable potential for commercial application and environmental benefit."

L&T wins order for setting up natural gas liquids plant in Middle East

Mumbai, India: The Hydrocarbon Onshore business (L&T Energy Hydrocarbon Onshore) of L&T has won an ultra-mega order for setting up a Natural Gas Liquids plant allied facilities in the Middle East. L&T has won the order in consortium with the Greece-headquartered Consolidated Contractors Group S.A.L. (Offshore) (CCC).

The scope of work encompasses engineering, procurement, construction, installation and commissioning of a Natural Gas Liquids plant and allied facilities for processing Rich Associated Gas (RAG). This also involves all associated utilities and offsite and integration with existing facilities.

Under the consortium arrangement, L&T, as the lead partner, will be responsible for engineering and procurement; CCC will handle the construction activities. The RAG sourced from offshore and onshore oil fields will be treated at the plant to remove impurities like H_2S, CO_2 and H_2O, producing value-added products such as lean sales gas, ethane, propane, butane and hydrocarbon condensate.

Avaada Group inks ₹36,000 Cr MoU with Gujarat Government

Gandhinagar, Gujarat: Avaada Group, a diversified energy conglomerate, has signed a Memorandum of Understanding (MoU) with the Government of Gujarat for investing an aggregate amount of ₹36,000 crore across solar, wind and Battery Energy Storage System (BESS) projects in the state.

Under the agreement, Avaada Group will establish 5 GW capacity of solar power projects, 1 GW capacity of wind power project and 5 GWh capacity of BESS projects across Kutchh, Banaskantha and Surendrangar districts of Gujarat. This will help enhance grid reliability by ensuring efficient storage and dispatch of green power.

All the projects are expected to commence between 2027-2030. The projects together are estimated to generate over 1,000 direct and 2,000 indirect green jobs in the state. Additionally, these projects are expected to generate employment opportunities for close to 5,000 people during the construction phase.

LNK Energy launched as integrated clean energy platform with an initial ₹10,000 crore investment plan

(L to R) Mr. Varun Karad, Mr. Paritosh Ladhani and Dr. Kushagra Nandan, Co-Founders of LNK Energy.

New Delhi: LNK Energy, a next-generation integrated clean energy platform, has announced its launch with an initial investment of ₹10,000 crore over the next five years. Backed by deep entrepreneurial experience and a long-term capital vision, LNK Energy's areas of operations include advanced manufacturing, green fuels, and renewable energy generation.

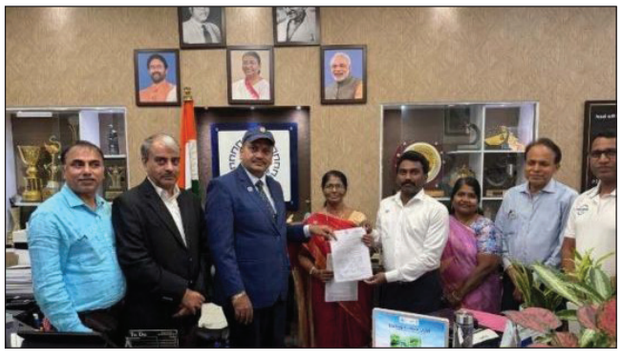
Co-founded by Paritosh Ladhani, Joint Managing Director of SLMG Beverages, the largest bottler of Coca Cola in India; Dr Kushagra Nandan, Co-Founder, Chairman and MD, REnergy Dynamics (RED), and Co-Founder & former MD of SunSource Energy; and Varun Karad, BioEnergy Entrepreneur and Co-Founder and CEO, RED, LNK Energy will focus on supporting sustainable growth, responsible industrial development, and long-term energy security for India.

LNK Energy's first major initiative is the construction of a 6 GW solar cell and module manufacturing facility with integrated ingot and wafer plant at Chhatrapati Sambhaji Nagar, Maharashtra, spread across 60+ acres. The facility will manufacture high-efficiency solar cells and modules using advanced technologies and global best practices. LNK Energy has recently signed an MOU with the Maharashtra Government for setting up the project.

Over time, LNK Energy will also manufacture key adjacencies such as junction boxes, battery platforms and related energy storage components, supporting the development of a robust domestic clean-energy ecosystem. Following the establishment of its manufacturing base, LNK Energy will expand into green fuels, with a strong focus on Green Hydrogen, aimed at enabling decarbonisation of hard-to-abate sectors through scalable, technology-led solutions.

In parallel, the company will build a renewable energy generation portfolio as an Independent Power Producer (IPP) and through hybrid open access solutions, integrating storage, solar and other forms of renewable energy, creating a fully integrated platform spanning manufacturing, fuels and operating assets.

Bondada Engineering secures ₹945.10 crore EPC order from NLC India Renewables



Hyderabad: Bondada Engineering Limited (BEL) has received a Letter of Award (LoA) from NLC India Renewables Limited (NIRL), on behalf of NLC India Limited, for Balance of System (BoS) works for setting up 810 MW solar power projects at the RVUNL Solar Park, Bikaner, Rajasthan.

The total order value stands at approximately ₹945.10 crore, further strengthening Bondada Engineering's position as a leading EPC player in large-scale, utility-scale solar projects. The scope of work includes design, engineering, site development, supply, installation, testing, and commissioning, along with associated evacuation systems up to the designated delivery point. The project also includes Operations & Maintenance (O&M) services for a period of three years. Execution is scheduled to be completed within 15 months from the acceptance of the LoA.

With this order, Bondada Engineering's total EPC order book now stands at nearly 3 GW, strengthening its medium-term growth pipeline and underlining its proven capabilities in utility-scale renewable energy execution. ■

"IOCL R&D Centre has evolved as one of India's leading petroleum sector research institutions"

Dr. Alok Sharma
Director (R&D)
Indian Oil Corporation Limited

Indian Oil Corporation Limited (IOCL) has taken a pioneering role in India in setting up its Research & Development (R&D) Centre at Faridabad, Haryana, which is equipped with state-of-the-art infrastructure and facilities. After establishing a strong super brand SERVO in the field of lubricants, IOCL diverted its focus on technologies and catalyst in the area of petroleum refining. Today, IndianOil has commercialized and perfected several of its technologies developed during the last three decades. It has also come out with several catalysts and additives with superior performance. In an exclusive interview with *Oil Gas & Power* magazine, **Dr. Alok Sharma, Director (R&D), IndianOil Corporation Limited,** throws more light on about the growth journey of R&D centre and its future plans.

Established since 1972 in Faridabad, Haryana, how would you describe the growth journey of IOCL's Research & Development (R&D) centre – from super brand SERVO to new technologies in petroleum refining?

The R&D Centre of Indian Oil Corporation Limited, established in 1972 at Faridabad, has evolved into one of India's leading petroleum sector research institutions. In alignment with India's long-term energy security and sustainability goals, as well as the Government of India's vision of *Atmanirbhar Bharat*, the Centre has played a pivotal role in supporting IndianOil's growth by developing indigenous technologies, enhancing process efficiencies, and creating high-value products for the energy sector.

In its early years, the R&D Centre focused primarily on product development, most notably the iconic SERVO range of lubricants. Over the decades, SERVO has grown into a super brand trusted across automotive, industrial, and defence sectors, establishing IndianOil's strong capabilities in formulation science and customer-centric innovation. IndianOil R&D has also pioneered the development of next-generation fuels and lubricants designed specifically for Indian conditions. Through years of research and product development, the Centre has created differentiated fuels that improve performance while reducing environmental impact. These include premium fuels such as: XtraTej, XP100, XP95, STORM-X, XtraGreen, Propane Plus, Nanocut, Xtraboost etc.

Over time, the Centre significantly expanded its scope to include advanced research in petroleum refining processes, catalysts, alternative fuels, petrochemicals, and emerging energy technologies. These world-class refining process and catalyst technologies boost product yields and performance and give refiners better flexibility and margins. INDMAX being our flagship refining technology, IndianOil R&D has a formidable portfolio of technologies for residue upgradation, product quality improvement, octane boosting, and sulphur reduction, as well as for production of petrochemical feedstock. Today, the Centre is actively developing and deploying indigenous refining technologies like INDMAX, OCTAMAX, INDELIN, INDJET, IndDSK etc advanced catalysts, cleaner fuels, and sustainable solutions including biofuels, hydrogen, and carbon management.

From building a strong lubricants brand to pioneering refining technologies and future energy solutions, the R&D Centre's journey reflects IndianOil's commitment to technological self-reliance, innovation-driven growth, and supporting India's evolving energy landscape.

Can you elaborate on the initiatives taken by IndianOil R&D centre in new areas such as Alternate Energy segments like Bio-Energy, Solar Energy, Hydrogen, Energy Storage, Battery, CCU Technologies etc.

The R&D Centre of Indian Oil Corporation Limited is actively expanding its research portfolio beyond conventional petroleum technologies to support India's clean energy transition. The Centre is pursuing several initiatives in emerging alternate energy domains such as bio-energy, hydrogen, energy storage, and carbon management.

- **Hydrogen Economy:** Developing advanced hydrogen production technologies such as Oxy-steam biomass gasification, solar-powered electrolysis, and bio-CNG reforming. Pilot projects are underway to establish scalable hydrogen production plants.
- **Green Hydrogen Mobility:** Conducting trials of hydrogen-powered commercial vehicles and supporting the adoption of hydrogen as a clean fuel for transportation.
- **Second-Generation Ethanol:** Commissioning a 10 TPD 2G ethanol demonstration plant to produce biofuels from agricultural residues.
- **Sustainable Aviation Fuel (SAF):** Co-processing of SAF in IndianOil refineries to address the global demand for low-carbon aviation fuel.
- **CO_2 Capture and Utilization:** Piloting enzyme-assisted CO_2 capture technology (eCO_2Sorb) to reduce greenhouse gas emissions and improve energy efficiency.
- **Bioenergy Solutions:** Advancing wastewater management and bioremediation techniques to promote environmental sustainability.
- **Battery and Storage Solutions:** Investigating advanced battery technologies to support renewable energy integration. Working to develop efficient components for different type batteries.
- **Nanotechnology in Agriculture:** Developing copper-based nano-fungicides to improve crop protection while minimizing environmental impact.

> **"By focusing on green fuels, circular economy models, hydrogen technologies, and advanced materials, IndianOil R&D is paving the way for a transformative and sustainable energy future. Through its robust research efforts, the organization aims to harmonize the nation's growing energy demand with global environmental priorities, ensuring a sustainable legacy for future generations."**

Through these initiatives, the R&D Centre is positioning Indian Oil Corporation Limited at the forefront of emerging energy technologies while supporting India's goals of energy security, sustainability, and net-zero transition.

What role has the R&D centre played in achieving the company's long-term sustainability goals?

The R&D Centre of Indian Oil Corporation Limited plays a central role in advancing the company's long-term sustainability goals and to achieve Net Zero target by 2046 by developing cleaner fuels, improving process efficiencies, and enabling the transition toward low-carbon energy solutions.

Advancing Sustainable Fuels and Additives:

- **Production of Sustainable Aviation Fuel (SAF):** IndianOil is co-processing SAF in refineries to decarbonize the aviation sector.
- **Innovative Lubricants for Green Mobility:** Developing advanced lubricants tailored for alternative fuels like hydrogen and electric vehicles, as well as indigenizing lubricant additives to reduce dependency on imports.
- **Circular Economy in Lubricants:** Creating formulations using recycled re-refined base oils (RRBO) for automotive and industrial applications, contributing to waste reduction.

2. Pioneering Hydrogen and Green Energy Technologies:

- **Hydrogen Production Innovations:** Setting up pilot plants for hydrogen production through Oxy-steam biomass gasification, solar-powered electrolysis, and reforming of natural gas and bio-CNG.
- **Hydrogen Mobility Trials:** Testing hydrogen-powered commercial vehicles to explore scalable green mobility solutions.
- **2G Ethanol Production:** Commissioning a 10 TPD 2G ethanol demonstration plant to support biofuel development.

3. Enhancing Refinery and Catalyst Technologies:

- **Catalyst Innovations:** Demonstrating and commercializing in-house catalysts like Octamax® to improve refinery efficiency.

- **Base Oil Recycling:** Conducting feasibility studies for producing Group II Base Oil from used lubricating oil, reducing waste and supporting a circular economy.

4. Driving Breakthroughs in Nanotechnology:

- **Nanocoatings for Renewable Energy:** Developing self-cleaning nanocoatings for solar panels to enhance efficiency and durability.
- **Industrial Applications:** Creating acid-resistant coatings for industrial plants and copper-based nano-fungicides for agricultural sustainability.

5. Revolutionizing Petrochemicals and Polymers:

- **Catalytic Pyrolysis:** Researching catalytic pyrolysis of waste polyolefins to convert plastic waste into hydrocarbon oils.
- **Commercial Polymer Trials:** Conducting trials for indigenized nucleating agents to enhance the quality of polymers and reduce import reliance.

6. Innovations in Pipeline Technology:

- **Intelligent Pigging Tools:** Expanding the deployment of in-house developed tools for enhanced inspection, safety, and operational efficiency in oil and gas pipelines.

These initiatives reflect IndianOil R&D's commitment to energy security and sustainability. By focusing on green fuels, circular economy models, hydrogen technologies, and advanced materials, IndianOil R&D is paving the way for a transformative and sustainable energy future. Through its robust research efforts, the organization aims to harmonize the nation's growing energy demand with global environmental priorities, ensuring a sustainable legacy for future generations. Through continuous innovation, technology development, and collaboration with industry, academia, and start-ups, the R&D Centre is enabling Indian Oil Corporation Limited to move toward a more sustainable, resilient, and future-ready energy ecosystem while contributing to India's broader climate and energy transition objectives.

How is Health, Safety & Environment practices becoming integral to efficient and profitable business management at IndianOil?

Health, Safety and Environment (HSE) practices are deeply embedded in the operational of Indian Oil Corporation Limited and are recognized as critical enablers of efficient, reliable, and profitable business management.

At IndianOil, HSE is not treated merely as a compliance requirement but as a core business value integrated into every stage of operations — from design and engineering to refining, transportation, and marketing of petroleum products. Robust safety management systems, risk assessment protocols, and continuous monitoring help minimize operational risks, prevent incidents, and ensure safe working environments across refineries, pipelines, terminals, and retail networks.

The company also places strong emphasis on process safety, asset integrity, and operational excellence. Advanced monitoring systems, predictive maintenance, and digital technologies are increasingly being deployed to enhance plant reliability, reduce downtime, and improve overall efficiency. These measures not only strengthen safety performance but also contribute directly to improved productivity and cost optimization.

From an environmental perspective, IndianOil has implemented several initiatives to reduce emissions, improve energy efficiency, and promote responsible resource management. Investments in cleaner fuel technologies, energy-efficient refinery operations, waste minimization, and water conservation reflect the company's commitment to sustainable and environmentally responsible growth.

By embedding HSE principles into its corporate culture, Indian Oil Corporation Limited ensures that safety, environmental stewardship, and operational excellence go hand in hand with long-term business sustainability and stakeholder trust.

Achieving a milestone of 1,800+ patents filed, what would you attribute this success to?

Achieving the milestone of 1,800+ patents is a reflection of the strong innovation culture nurtured at the R&D Centre of Indian Oil Corporation Limited. This success can largely be attributed to a combination of sustained investment in research, a highly skilled scientific workforce, and a well-structured intellectual property management framework.

IndianOil has consistently encouraged a research-driven and innovation-oriented environment, where scientists and engineers are motivated to develop indigenous technologies and solutions for the energy sector. The organization actively promotes idea generation,

knowledge sharing, and multidisciplinary collaboration, which often leads to novel process technologies, catalysts, product formulations, and emerging energy solutions.

Another important factor has been the company's strong focus on intellectual property management. Dedicated mechanisms are in place to identify patentable innovations, support patent filing, and protect technological advancements developed within the organization. This systematic approach ensures that valuable research outcomes are translated into protected intellectual assets.

In addition, collaboration with academia, research institutions, start-ups, and industry partners has significantly strengthened the innovation ecosystem. Such collaborations bring diverse expertise and accelerate the development of breakthrough technologies. Together, these efforts have enabled Indian Oil Corporation Limited to build a robust patent portfolio, reinforcing its position as a technology-driven energy company while supporting India's vision of technological self-reliance and innovation-led growth.

Recently, Indian Oil Corporation Limited has been honoured with the South Asia Innovation Award in the PSU category by Clarivate Plc, a global leader in IP asset management solutions. This prestigious recognition places IndianOil among the top innovators in India, reaffirming its strong commitment to research, development, and technological excellence.

Indian Oil is planning to build a Petrochemical Complex in Paradip at an investment of ₹61,077 crores. Could you throw more light on this new project?

Indian Oil Corporation Limited is undertaking a major expansion of its petrochemical footprint through the development of a world-scale Petrochemical Complex at Paradip, with an estimated investment of about ₹61,077 crore. This project represents one of the largest investments by IndianOil in the petrochemical sector and is aligned with the company's long-term strategy of enhancing value addition from refining operations.

The proposed complex will be integrated with the existing Paradip Refinery and will significantly expand IndianOil's petrochemical production capacity. The project will include advanced units for the production of key petrochemical building blocks and downstream products such as polypropylene, polyethylene, and other high-value petrochemical derivatives that are widely used in packaging, textiles, automotive components, and consumer goods.

This integrated complex will help IndianOil move further towards a refinery-to-petrochemicals transformation, enabling the company to increase the share of petrochemicals in its product portfolio and improve overall margin resilience in a changing energy landscape.

In addition to strengthening India's petrochemical manufacturing capabilities, the project is expected to boost regional economic development, generate significant employment opportunities, and support the growth of downstream plastic and chemical industries in eastern India.

Overall, the Paradip Petrochemical Complex represents a strategic step by Indian Oil Corporation Limited to diversify its business portfolio, enhance value creation, and position itself strongly in the rapidly growing petrochemical sector.

What are the future R&D plans of the company?

The future R&D roadmap of Indian Oil Corporation Limited is focused on strengthening technological leadership in refining while simultaneously accelerating the transition toward cleaner and sustainable energy solutions.

A key priority is the development of advanced refining technologies and catalysts to enhance refinery efficiency, maximize value from crude, and support the production of cleaner fuels and petrochemical feedstocks. The R&D Centre is also working to further expand indigenous process technologies to reduce technology dependence and strengthen India's energy self-reliance.

Another major focus area is energy transition technologies, including green hydrogen production and utilization, biofuels such as Sustainable Aviation Fuel (SAF), and advanced bio-products. These initiatives are aligned with India's long-term decarbonization and energy security objectives.

The company is also investing in emerging energy solutions such as advanced battery technologies, energy storage systems, and electric mobility-related innovations. In addition, research efforts are underway in carbon capture, utilization, and circular carbon technologies to reduce the carbon footprint of refinery and petrochemical operations.

In alignment with India's long-term energy security and sustainability goals, as well as the Government of India's vision of Atmanirbhar Bharat, a new state-of-the-art R&D–II Campus of Indian Oil Corporation Limited is under construction. This initiative represents one of the largest R&D infrastructure investments undertaken by any Public Sector Undertaking (PSU) in the country. The development of the new campus marks a significant milestone in strengthening the organization's innovation ecosystem.

The modern infrastructure will support emerging research areas including energy transition technologies, advanced fuels, petrochemicals, hydrogen, battery systems, and digital innovation, thereby propelling Indian Oil R&D into its next phase of scientific and technological leadership.

The campus is envisioned as a next-generation research and innovation hub that will accelerate the development, deployment, scale-up, and commercialization of indigenous technologies for the petroleum, petrochemical, and allied sectors. The strategic impact of the New Energy Campus for both the company and the nation will be significant as follows:

- Strengthen indigenous technology development and reduce import dependence
- Enable faster commercialization through integrated pilot and demonstration facilities
- Support clean energy transition, decarbonization, and circular economy initiatives
- Serve as a national innovation asset for the Ministry of Petroleum & Natural Gas, PSUs, industry partners, and academia

Through these initiatives, the R&D Centre of Indian Oil Corporation Limited aims to remain a key technology driver for the company while supporting India's transition toward a cleaner, more sustainable, and secure energy future. ■

IndianOil R&D – Power of Possibilities

Driving India's Energy Innovation for a Sustainable Tomorrow

India is witnessing an extraordinary surge in technological advancement, transforming industries and accelerating innovation across sectors.

At the heart of this transformation in the energy domain stands Indian Oil Corporation Limited R&D Centre, a pioneering institution that has served as the technological backbone of India's energy ecosystem for more than 54 years.

From strengthening refining capabilities to enabling next-generation energy solutions, IndianOil R&D has played a pivotal role in building a self-reliant and technologically empowered India.

With an unwavering commitment to innovation, the Centre continues to drive breakthroughs that shape the future of energy, mobility, and sustainability.

A Legacy of Innovation

Established as one of the premier industrial research hubs in the country, the IndianOil R&D Centre has consistently delivered cutting-edge technologies that support India's rapidly evolving energy landscape. With over 1,850 patents filed, the Centre has built a robust intellectual property ecosystem that reflects its strong culture of innovation and research excellence. Over the decades, its scientists and engineers have developed a wide range of indigenous technologies and products tailored to meet the unique requirements of the Indian market.

Today, IndianOil R&D is a powerhouse of innovation, offering world-class technological capabilities across multiple domains including Lubricant technology, Refinery processes and catalysts, Pipeline transportation, Petrochemicals and polymers, Nanotechnology, Renewable and alternative energy solutions, Energy storage systems and batteries, Carbon capture and utilization.

A dedicated team of scientists, technologists, and engineers continues to work tirelessly to develop and deploy technologies that strengthen India's energy security while ensuring environmental sustainability.

Transforming Refining with Indigenous Technologies

In the course of time, we have created formidable research infrastructure in the domain of refinery processes that has resulted in development of a sizeable basket of refinery technologies. IndianOil has developed & commercialized a large number of cutting-edge technologies for refinery processes and catalysts, for setting up greenfield and brownfield refineries. These world-class refining process & catalyst technologies boost product yields & performance and give refiners better flexibility & margins. INDMAX being our flagship refining technology, IndianOil R&D has a formidable portfolio of technologies for residue upgradation, product quality improvement, octane boosting, and sulphur reduction, as well as for production of petrochemical feedstock. These include breakthrough process technologies such as:

- **IndMax:** Maximizing propylene yield from refinery streams
- **INDALIN:** Light Olefins maximization from olefinic HC streams
- **OCTAMAX:** Enhancing gasoline octane value
- **IndeDiesel :** Production of ultra-low sulfur diesel
- **IndJET:** Improved aviation turbine fuel processing
- **IndDSK:** Production of Ultra-clean Kerosene

These technologies are supported by indigenous catalyst formulations, with more than 19,000 MT of in-house catalyst recipes being consumed across refineries.

A major milestone in this journey is the dedicated catalyst manufacturing unit at the Indian Oil Panipat Refinery, ensuring large-scale deployment of indigenous catalyst technologies and strengthening India's technological self-reliance.

Excellence in Fuels and Lubricants

IndianOil R&D has also pioneered the development of next-generation fuels and lubricants designed specifically for Indian conditions. Through years of research and product development, the Centre has created differentiated fuels that improve performance while reducing environmental impact. These include premium fuels such as: XtraTej, XP100, XP95, STORM-X, XtraGreen, Propane Plus, Nanocut, Xtraboost etc.

These advanced fuels incorporate specialized additives and oxygenated blends that enhance engine performance and reduce emissions.

Equally remarkable is the global success of SERVO Lubricants, the flagship lubricant brand of Indian Oil Corporation Limited. Developed through extensive in-house research at IndianOil R&D, SERVO represents decades of technological excellence in lubrication science. Today, the brand offers a comprehensive portfolio of lubricants, greases, and specialty fluids serving diverse sectors including automotive, industrial, aviation, and marine applications across the world.

Backed by strong research capabilities, the SERVO portfolio reflects an impressive scale of innovation — over 7,000 formulations, more than 750 OEM approvals, and over 800 commercial grades have been successfully developed and commercialized. These advanced formulations are designed to deliver superior engine protection, improved fuel efficiency, extended equipment life, and reliable performance under demanding operating conditions.

Building the Energy Systems of Tomorrow

As the global energy landscape shifts toward sustainability, IndianOil R&D is actively expanding its research into future energy systems. The Centre is working extensively in emerging areas such as: Hydrogen and Hydrogen-CNG technologies, Biofuels and bioenergy, Solar energy solutions, Battery technologies for energy storage systems and Carbon capture & utilization.

Green hydrogen, widely regarded as the fuel of the future, is a major focus area. IndianOil R&D is exploring technologies that will enable hydrogen production, storage, and utilization across sectors such as transportation, industry, and domestic energy use. This research is laying the foundation for a hydrogen economy, where cleaner fuels reduce emissions and improve air quality.

Advancing Petrochemicals and Advanced Materials

Petrochemicals and polymers form the backbone of modern manufacturing and everyday life. Indian Oil Corporation Limited R&D is actively developing advanced materials and specialty chemicals that enhance industrial efficiency and product performance. Key innovations include Drag Reducing Agents (DRA) — an innovative solution for improving pipeline flow and transportation efficiency — as well as advanced materials such as Ziegler–Natta catalysts, carbon nanotubes (CNT), graphite, and needle coke. These cutting-edge developments are strengthening India's petrochemical ecosystem and enabling improved performance across critical sectors while supporting the development of high-performance and sustainable materials for future applications.

Innovations in Pipeline Integrity

Ensuring safe and efficient transportation of petroleum products across thousands of kilometers of pipelines is a critical challenge. IndianOil R&D has developed IPIG (Instrumented Pipeline Inspection Gauges) technology, an indigenous solution for in-line pipeline inspection. This advanced technology enables accurate detection of defects and corrosion in pipelines transporting crude oil and refined petroleum products, enhancing operational safety and reliability.

Waste-to-Wealth and Biotechnology Solutions

IndianOil R&D is also leading efforts in sustainable waste-to-wealth technologies through biotechnology-driven solutions.

Among its notable innovations are:

- **eCO_2 Sorb -** Enzyme assisted CO_2 capture
- **IBG-Plus -** Bio Methanation of organic waste
- **2G Ethanol -** Production of Ethanol from biomass
- **CBR technology -** Treatment of oil contaminated sludge in bioreactor

- **eBioAT -** Enzyme assisted waste water treatment
- **AgriElite -** A soil-enhancing product improving agricultural productivity
- **StubVorus -** A microbial solution that helps address the challenge of crop residue burning

These technologies not only promote sustainable agriculture but also contribute to improving air quality and soil health.

Scaling Innovation through World-Class Facilities

A distinguishing strength of IndianOil R&D is its state-of-the-art laboratories and pilot plants, which enable seamless transition from laboratory research to commercial-scale deployment. This capability has allowed IndianOil to successfully scale up technologies developed in-house and deploy them across refineries, pipelines, and petrochemical facilities.

A Net-Zero Vision for the Future

In a major step toward sustainable innovation, IndianOil is developing the world's largest net-zero energy R&D campus in Faridabad. This next-generation research ecosystem will house specialized centres dedicated to: Alternative and renewable energy, Corrosion research, Nanotechnology & Synthetic biology.

The strategic direction of Indian Oil Corporation Limited R&D is guided by five key priorities that align with India's evolving energy needs and corporate SPRINT the global transition toward sustainable technologies. These Top Five Strategic Objectives define the roadmap for innovation, technology leadership, and long-term value creation.

1. **Process Efficiency & Asset Integrity:** Enhancing operational reliability and efficiency across refineries and pipelines through advanced process engineering, digital monitoring, and asset integrity solutions, ensuring safer operations and optimized performance of critical infrastructure.

2. **Refining Technology & Catalyst Leadership:** Strengthening indigenous capabilities by developing and deploying advanced refining technologies while positioning IndianOil as India's leading catalyst manufacturer and supplier for the refining sector, supporting both internal requirements and broader industry needs.

3. **Fuels, Lubes & Additives:** Designing next-generation fuels, lubricants, and additive technologies that improve engine performance, fuel economy, equipment durability, and overall customer value across automotive and industrial sectors.

4. **Decarbonisation & Circular Economy:** Advancing carbon capture technologies, RRBO (Re-refined Base Oil) solutions, and circular economy initiatives aimed at reducing carbon intensity, improving resource efficiency, and enabling low-carbon growth pathways.

5. **Alternate & Renewable Energy and New Materials:** Driving innovation in hydrogen, biofuels, biochemicals, sustainable aviation fuel (SAF), carbon and nano-materials, and specialty chemicals, thereby expanding IndianOil's clean and future-ready energy portfolio.

Together, these strategic pillars position IndianOil R&D at the forefront of technology-driven energy transformation, enabling the organization to deliver sustainable solutions for India's growing energy demands. ■

"We are gearing up to meet growing global demands"

Mr. Vijay Rajpurohit
Managing Director
Chemical Process Piping Pvt Ltd

Mumbai-based Chemical Process Piping (CPP), established by industry veteran BS Rajpurohit, designs, manufactures, and installs Glass Reinforced Plastic (GRP) piping, Glass Reinforced Epoxy (GRE) piping, and thermoplastic-lined FRP piping, along with manufacturing headers, ducts, stacks, special fittings, and thermoshield piping systems. **CPP is India's only third-generation owner-driven FRP piping company.**

The company is gearing up for the dream launch of its new facility 'B.S.Rajpurohit Composite Centre of Excellence' in Dahej. Mr. B. S. Rajpurohit, Chairman Emeritus, CPP, is the recipient of the 'Business Leader of the Year' Award in the MSME category at Chemtech Leadership & Excellence Awards 2026.

In a free-wheeling interview with *Oil Gas & Power,* his son **Mr. Vijay Rajpurohit, Managing Director, Chemical Process Piping Pvt Ltd,** takes us through the company's successful growth journey since inception in 1964, he also throws light on the new centre of excellence, to be set up soon.

From humble beginnings: Chemical Process Piping began its journey with a small fabrication shop in Mumbai

Current CPP office in Mumbai.

Tell us more about the inception of CPP.

It was in 1964, that my father started CPE, after completing his BSC (Tech) in Plastic technology (from UDCT now ICT). He set up a small fabrication shop in Mumbai. This was indeed a pioneering effort as it was the first Fiberglass Reinforced Plastic (FRP) fabrication shop in the country! In the beginning, we focused only on equipment and piping.

I joined my father in 1989 and worked with him for 15 years. Later in the year 2005, he split the business into two – handing over the new entity CPP to me. CPP is focused on design, manufacture and installation of GRP/ GRE piping. Earlier, I was in the main company, handling both sales and projects.

How did you get into desalination?

In the beginning we worked mainly in the chemical industry and non-ferrous metallurgy (copper and zinc smelter piping). After the split, we got into newer markets starting with desalination plant piping.

Our vision was to enter all sectors where GRE/ GRE piping can be used. We realized that Desalination plants need considerable GRP piping. We began our journey in this sector with our first project being for the city -state of Singapore. The first desalination plant piping for the city-state of Singapore is from CPP! This was just the beginning. Soon thereafter, we executed two more desalination plant piping in Singapore. We followed this up with Melbourne in Australia. Subsequently, we did Perth 1, Perth 2 and now we are doing Perth 3. Desalination plant piping is sizable business for us now. We have executed desalination plant piping in Chile; in the Middle East and India. Reliance Industries Ltd Jamnagar, Chennai's first desalination plant piping

Changi NEWater plant in Singapore.

Desalination project at Perth in Australia

and several others have CPP piping. Thus desalination became our third line of business.

We are now registered with the best and the biggest in the world for desalination plant piping. We keep doing work for them on a regular basis.

Project Maitree for BHEL in Bangladesh – transport of twin 7.6 meter diameter x 245 mt tall Stack liners.

How did the foray into power plants happen?

Moving ahead, we got into piping for power plants. We did flue gas desulphurization piping with abrasion resistant pipes. CPP supplied FGD piping to German power plants and later to several India thermal power plants. Later, we made the largest FRP structure in this part of the world - twin 7.6 meter diameter x 245 mt tall Stack liners for BHEL in Bangladesh. This was the first time in this part of the world that anybody made FRP Stack liner of that size for a flue gas desulphurisation plant. This is how we made our foray into power plant. This was our fourth industry that we started serving.

Which are the new areas that CPP is looking at?

Oil & Gas is fifth industry that we focus on. Here, we mainly deliver GRE piping for Offshore and Onshore. Oil and gas has become a key business area with projects such as a 50 Km fire water service line for Petronas for their project in Malaysia– the largest ever GRE piping ever sold out of this country.

CPP serves these five industrial areas. Besides, we also do work for water conveyance. This is our growth journey. We have grown from a very small company to a sizeable one in our industry and now CPP brand is known globally in these five industries.

What are your thoughts on Make in India?

We commenced 'Make in India' right in 1960's. FRP was a new product in the 60's. We are the first ones, who started it off in India. CPP has been making in India much before the whole concept of 'Make in India' became a buzz word. My father Shri B.S.Rajpurohit is a pioneer who started the entire FRP revolution for the chemical industry in India. He not only initiated a pioneering effort, but he excelled in it. We became known due to his efforts. We have been supplying in Germany and you would know that Germany is the Mecca of fiberglass and plastics. We have supplied to US, Canada, Australia, and Japan. So we have been in the 'Make in India' mode since very long.

Are there plans to get into green hydrogen?

Yes, we are already serving the green hydrogen industry. CPP completed GRP and FEP-GRP piping for one of the largest green hydrogen projects in the world - 2,200 MW green hydrogen plant in Saudi Arabia for

Glass Reinforced Plastic (GRP) Duct

Project site

Air Products, USA. We did the entire plant piping and electrolyser piping from here in India. They (clients) could have gone anywhere in the world. But they chose us and one of the main reason is that we could bond Teflon (FEP) to GRP. As you are aware, nothing sticks to Teflon however, we stuck Teflon to GRP. That was the key for the American company to come to India and give us the order. So that's how clients push us to next levels. Green hydrogen is a growing business for us. We have done several green hydrogen projects in the U.S. We are executing GRP piping for a green hydrogen project in Europe. We believe, green hydrogen will drive our growth in coming years.

What are the challenges in Green Hydrogen?

The problem with green hydrogen is that it can't be conveyed over long distances. Not that it is not possible, but it is difficult. So the endeavour is to convert it to ammonia, convey it as liquid and then convert it back as hydrogen. This is one method. The other method is to convey it utilising existing pipes CNG network by adding 10% hydrogen to CNG/ LNG and then extracting out the hydrogen on the other side. We at CPP are working at developing RTP pipe system that can be inserted inside the existing steel pipes. The steel pipe will be used only as a carrier. You don't have to lay new lines. The pipes are already there. You just have to keep on pushing these RTP pipes in the existing network.

Wherever there are greenfield projects, we can straightaway use our RTP piping to convey green hydrogen. Compared to traditional materials, RTP piping will be more competitive with better properties corrosion resistance-wise, pressure-wise. Our RTP piping system is called CPP Flex.

What about the Chlor-alkali industry? How has the growth been in this industry?

We have a dominant position in the Chlor-alkali sector. When my father started serving the chlor-alkali sector in India, the plants were based on mercury cells technology. In the late eighties, Uhde brought in a technology where they removed the mercury cells and replaced it with membrane cells.

This much cleaner technology was more efficient and the chlorine would not have mercury as an impurity. So when I joined in 1989, we were involved in converting mercury plants to membrane cell. All the Chlor alkali plants that my father had supplied our piping to were converted to Membrane cell technology in the next 20 years. Till date, CPP has executed over 100 Membrane cell conversion and green field projects for the Chlor-alkali industry.

For green hydrogen, technology is similar. Alkaline water is passing through a membrane. Since we were already in the membrane cell market, the industry already knew us. It gave us a head start in the green hydrogen (alkaline water, piping business). I see a lot of growth in the near future.

Can you throw more light on the recent advancements by CPP?

We have started a hi-tech, high-pressure piping plant which is first of its kind in India. There are very few plants currently in the world of this scale. It is called Reinforced Thermoplastic Pipes (RTP)/ TCP spoolable pipes. We can make a single pipe length of two

> **"The new plant that we are putting up in Dahej, will be a quality center of excellence. It will be named after my father, B.S.Rajpurohit Composite Center of Excellence. The first production will start in the next financial year. Our aim is to continue doing good work while building scale and speed to match global demands."**

kilometers or more depending on the diameter and wind it like a cable. CPP Flex can be designed for up to five hundred bars. For special applications it can be designed for even higher pressure ratings. The sizes are 2, 4, 6, and 8 inches. One of the advantages over and above the pressure rating is that it will involve shorter installation time. Imagine erecting a two kilometer long pipe by just unrolling a cable!

One joint in half an hour, it is done. So the amount of kilometers of piping that you can lay in a day will be phenomenal compared to what we do with twelve meters of one pipe and then 2-3 hours of jointing. Compare that with a two-kilometer stretch, half an hour joint. This is a game changer. We are going to serve the oil and gas market to replace steel pipes. We are also looking at using this for green hydrogen conveyance.

What are your future plans?

We have always believed that that it's a journey. You never say we have reached. We have to always keep going. So in terms of quality also, we keep on upgrading ourselves with the client's requirements. We believe in gearing ourselves up and not only matching but exceeding client's requirements.

We observed that we were a little behind in scale when compared with our global competitors. We knew we have one of the best quality pipes in the world but now we have to match in scale for which we are now setting up a new plant in Dahej. Last year we purchased a 15 acre plot, which is equal to our factory size in Baroda. We do not wish to replicate what we are doing, instead we wish to manufacture using better technology and larger capacities. We are designing in-house robotic systems, which will use precise drilling and welding technologies and it will work 24x7.

This new plant that we are putting up in Dahej as the name itself suggests, will be a quality center of excellence. It will be named after my father, B.S.Rajpurohit Composite Center of Excellence. The first shed will be ready by March end. The first production will start in the next financial year. Growth is something that we always look forward to. The first factory that we are setting up in BSR complex is a green hydrogen piping plant. It will include robotics, and automated welding machines.

The new facility is being designed to include all of the latest technologies. This is in line with the vision, of our Hon'ble Prime Minister Shri Narendra Modi of, *Atma Nirbhar Bharat* and Make in India. Our aim is to continue doing good work while building scale and speed to match global demands. ■

SPECIAL INTERVIEW

"Oil Gas & Power industry can again be a frontrunner in pushing energy efficiencies in India"

Mr. Viraj Shah
Founder
Swa Consultancy

Ahmedabad-based firm, Swa Consultancy, is one of the leading companies in insulation of thermal, acoustic and passive fire safety solutions for industrial and commercial projects. The company is leading the way with strong technical expertise and client-focused design.

Mr. Viraj Shah, Founder, Swa Consultancy, in an exclusive interview with Oil Gas & Power, speaks about the industry potential given the current geopolitical situation and the way ahead.

What is the concept behind naming the company as – Swa? How would you describe the growth of the company, since inception?

Our brand is guided by the Sanskrit word 'Swa', meaning 'self'. To us, it signifies self-driven engineering that is conscious, competent, and responsible — towards clients, communities, and the climate.

Since inception in Q2 FY26, in Swa, we are working to create value for our customers in this gap in the market that we have identified. The company has successfully turned '0' into '1', '1' into '10' and now is working to make the '10' into '100'. We are still in the phase where only 2.5 per cent of early adopters are actually interested in what we have to sell.

Although there is early traction, it would still take us a couple of years to penetrate the Indian market.

How would you describe the growth of fire and safety industry over the years?

'Doodh ka jala bhi chaas phook phook kar peeta hai!" or in English, it means, 'Once you are burned by hot milk, you are careful of the cold water-yogurt as well!' That is the current scenario of fire safety where, driven by 'recent' incidents, more companies look to improve their fire safety and as fire engineering is one of the most complicated of the sciences, the right steps are being made but, at a painfully slow rate.

What are the challenges that you have faced and how have you overcome the same?

Speaking purely in the context of Swa, I would like to talk about a couple of challenges, first is the new generation of engineers, with whom, mostly all of the readers would have experience with, the early days and large part of the 2025, has been to create a culture in the startup of growth and learning, and uplifting everyone to be able to work in the industry.

The second challenge, which is not primarily in my control is that on paper, everything sounds good, and people appreciate the work that we are trying to do but, there is a lack of power residing in them to make actual change so, where initially we thought of going bottoms up, we are also blending in top-down strategy in our approach.

How is the current geopolitical crisis similar to or different from the 1973 oil shock that hit the Oil Gas & Power (OGP) industry in India?

I work in the domain of insulation, and frankly, the refinery *Babus* of 1970s formed the foundation of adoption of insulation in India. These were the members of the Indian economy that came up with the insulation charts or tables you see in play today, and even the BIS standards of 1980s were created out of the pioneering work of them.

Cut back to 2026 – these same tables and charts, that were disruptive in the pre-liberalization era, should not have survived in the contemporary era. They were good at the time, because of the absence of technological capabilities, as they required complicated differential calculations but now, with modern computers, the same can be done in seconds or minutes.

Thus, the OGP industry can again be a frontrunner in pushing energy efficiencies in India and allowing India to reach the UN SDG Target 7.3.

What are your reactions on Budget 2026? How do you think it will impact the growth of your company?

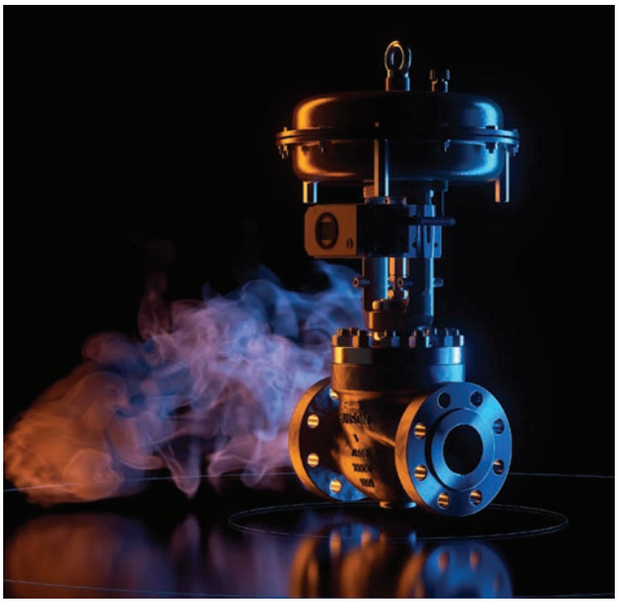
The budget was focused on resilience and that is what we are getting, it is a hot topic in the operations classrooms of IIMs as well – how to build resilience for geopolitical breakdowns or pandemics like Covid-19. The China + 1, or these deep reserves of oil keeping the Indian economy alive in crisis, and the India's strategic autonomy doctrine, it all boils down to resilience.

What are the future plans of Swa?

The future looks optimistic, whereas in the short term, we want to do more meaningful work for the industry, in the long run, startups like Swa are poised to ride the AI wave, and it is going to be exciting to see what the future has in store for us. And yes, whereas India is being positioned for renewable energy, according to strategic doctrines, energy efficiencies should be the primary mode of cost cutting before transitioning to renewable energies. ■

SAMSON CONTROLS: Specialists in Control Valves & Automation Systems

SAMSON CONTROLS PVT LTD is a global company specializing in the development and manufacturing of high quality control valves and automation systems for industrial process controls. Founded in Germany, SAMSON has established a strong reputation for delivering precision – engineered solutions that enhance process efficiency, safety and reliability.



PRODUCT PORTFOLIO

The company product portfolio includes:

Control Valves: Designed for accurate regulation of fluids, gases and vapors in various process conditions.

Rotary Valves: Such as Butterfly Valves, Ball Valves, Segmented Ball Valves, Eccentric Rotary Plug Valves, Axial Flow Valves, Gate Valves, Check Valves.

API Monogram Valves

Speciality Valves: Which are used in Cryogenic, Hygienic, Aseptic, Nuclear Power and Toxic chemicals applications

SAMSON + HIMA: Integrated SIL 3 HIPS/HIPPS Solution & Hybrid Leak Detection System (LDS)

On-Off valves: Globe, Gate, Check, NRV, Ball, DBB and Butterfly valves

Actuators: Pneumatics, Electric actuators to drive the control valves

Positioners and controllers: Device that ensures precise valve positioning and process controls

Smart solutions: Digital tools for diagnostics, monitoring and prediction which can be easily integrated with your existing operating systems.

SAMSON CONTROLS in India operates manufacturing unit in Ranjangaon, Pune and maintains a network of various sales offices and service centers across India. Recently, the company has added an additional facility within the Ranjangaon facility, reflecting our commitment to meet the growing demand in Indian markets.

SAMSON India has set high standards for operational excellence with main focus on quality, safety, efficiency and delivery. Our plant is equipped with high quality machines and state-of-art latest equipment.

The company is now actively participating in High Integrity Protection System (HIPS/HIPPS) package under Atma Nirbhar Bharat initiative. It has entered into a strategic collaboration in India with M/s HIMA to deliver integrated, one-stop HIPS/HIPPS and Leak Detection System solutions.

SAMSON CONTROLS INDIA is well recognised in oil and gas industry and is serving them to their satisfaction. **SAMSON CONTROLS** will continue manufacturing these valves from India under Make In India initiative and ensuring local value addition.

The company serves a wide range of industries including Oil and Gas, Chemical, Pharmaceutical, Food and Beverages, Power, Steel Industry, Fertilizers, and Water treatment.

SAMSON GROUP COMPANIES

SAMSON CONTROLS, includes a group of specialized companies under its umbrella. Each of these companies contributes unique expertise:

CERA SYSTEM: Specializes in ceramic-lined valves for abrasive and corrosive applications.

LEUSCH: Known for butterfly valves and special control valves for extreme conditions.

PFEIFFER: PFA / PTFE lined control valves for corrosive media, suitable for highly corrosive chemical plants.

RINGO VÁLVULAS: Provides gate, globe, and check valves, axial flow valves.

SED: Produces diaphragm valves primarily used in sanitary and sterile processes.

STARLINE: Expert in ball valves for high-pressure and high-temperature environments.

VETEC: Recognized for rotary plug valves with high control accuracy and tight shut-off.

UBIX: Specializes in digitalization and smart valve technology for process automation.

PRECOGNIZE: Offers predictive analytics and machine learning tools for plant performance optimization. ■

For more details contact:

SAMSON CONTROLS PVT. LTD.
D-281, MIDC Ranjangaon, Taluka Shirur
District Pune 412220, India

Phone: +91 2138 665600
E-mail: info-in@samsongroup.com
Web: india.samsongroup.com

Building Trust with Engineering Excellence

Accent Techno Solutions – Delivering Value in Engineering

Mr. Santosh Dinkar Mestry
Director
Accent Techno Solutions

In the dynamic and highly demanding Oil & Gas, Chemical, Pharmaceutical and Energy industry, where precision, safety, and timely execution are critical, engineering organizations must continuously evolve to meet global standards. **Accent Techno Solutions**, an ISO 9001:2015 certified organization, stands as a trusted provider of Basic and Detail Engineering and Consultancy Services, delivering excellence across diverse industrial sectors. Established in 1996 (formally known by Design Technology), the company brings decades of experience, backed by strong ethical values, technical expertise, and a commitment to delivering value-added engineering solutions.

Over the years, Accent Techno Solutions has built a solid reputation for providing innovative and optimized solutions tailored to industries such as Oil & Gas, Petrochemicals, Refineries, Fine Chemicals, and Pharmaceuticals. The organization's strength lies in its highly skilled and professional team, particularly in piping engineering and plant design, managed by experienced industry experts. Their ability to combine proven methodologies with modern technologies enables them to deliver functional, efficient, and customized solutions for every project.

This holistic methodology enables engineers to understand how engineering concepts translate into real project execution, making them industry-ready from the beginning of their careers. The training focuses on developing core competencies across key disciplines such as piping engineering, process engineering, mechanical systems, electrical and instrumentation systems, and HVAC/MEP services, ensuring that professionals can effectively contribute to both Greenfield and Brownfield projects.

The company offers a comprehensive portfolio of services covering all major engineering disciplines, including Process Engineering, Equipment Design, Piping Engineering, Civil & Structural Engineering, Electrical & Instrumentation, HVAC, MEP, Fire Fighting Systems, and Skid Engineering.

In addition, their advanced capabilities in 3D modeling, stress analysis, intelligent P&ID drafting, piping layout design, and material take-offs ensure precision and efficiency in project execution. One of the key differentiators of Accent Techno Solutions is its adaptability and client-centric approach. With a flexible and dynamic working methodology, the company efficiently aligns with client requirements, ensuring timely delivery without compromising on quality. Their strong networking capability enables quick mobilization of resources, while their consistent focus on reliability and process optimization ensures successful project outcomes.

The organization is equipped with modern infrastructure, including a well-established design office, advanced licensed software such as S3D, E3D, AutoCAD Plant 3D, Cadmatic, SmartPlant P&ID, and CAESAR II, and robust data security systems. This technological backbone, combined with a structured organizational framework and experienced leadership, enables seamless coordination across multidisciplinary teams and enhances overall project efficiency.

Accent Techno Solutions has successfully contributed to numerous prestigious projects, including tank farms, LNG facilities, petrochemical plants, refinery units, and chemical processing units. Their ability to handle complex engineering challenges with precision and professionalism has made them a reliable partner for leading clients in the industry.

As the Oil & Gas sector continues to evolve with increasing emphasis on efficiency, sustainability, and digitalization, Accent Techno Solutions remains committed to innovation and continuous improvement. By combining technical excellence with a strong foundation of trust, quality, and customer satisfaction, the company is not only delivering engineering solutions but also building long-term partnerships.

Accent Techno Solutions has successfully contributed to numerous prestigious projects, including tank farms, LNG facilities, petrochemical plants, refinery units, and chemical processing units. Their ability to handle complex engineering challenges with precision and professionalism has made them a reliable partner for leading clients in the industry.

In a competitive global landscape, Accent Techno Solutions continues to set benchmarks in engineering consultancy — truly living up to its philosophy of "Building Trust with Satisfaction." ■

For more details, please contact:

Santosh Dinkar Mestry
Director
Accent Techno Solutions

Mobile: 9167217889
E-mail: santoshmestry@accent.net.in

Transforming Engineers into Industry-Ready Professionals

Suvidya Institute of Technology: Bridging the Skill Gap in Oil & Gas EPC Industry

Varsha Vasant Mestry
Managing Director
Suvidya Institute of Technologies Pvt. Ltd.

The Oil & Gas industry is a cornerstone of global energy infrastructure, encompassing refineries, petrochemical complexes, offshore platforms, and storage terminals that demand precision engineering, strict compliance with international standards, and seamless multidisciplinary coordination. Despite advancements in engineering education, a significant gap persists between academic learning and real-world industrial practices, impacting project efficiency, quality, and execution in Engineering, Procurement, and Construction (EPC) projects. Addressing this challenge requires a focused approach toward practical skill development and industry-oriented training. **Suvidya Institute of Technology Pvt. Ltd.** has been at the forefront of this transformation, playing a vital role in bridging the gap between academics and industrial expectations by delivering structured, real-world training aligned with current EPC requirements.

Engineering graduates often enter the workforce with strong theoretical knowledge but limited exposure to practical design execution, vendor coordination, interdisciplinary integration, and real-time problem-solving. Suvidya Institute of Technology Pvt. Ltd. addresses this gap through comprehensive training programs covering the complete lifecycle of EPC projects, including concept development, Front-End Engineering Design (FEED), detailed engineering, procurement, construction, commissioning, and maintenance.

This holistic methodology enables engineers to understand how engineering concepts translate into

A key strength of Suvidya Institute of Technology Pvt. Ltd. lies in its emphasis on practical, real-world learning. Training is delivered by experienced industry professionals with extensive project exposure, incorporating industrial case studies, hands-on design exercises, vendor drawing reviews, and performance evaluations such as mock interviews. This approach enhances critical thinking, reduces errors in real-life projects, and significantly improves productivity and efficiency.

real project execution, making them industry-ready from the beginning of their careers. The training focuses on developing core competencies across key disciplines such as piping engineering, process engineering, mechanical systems, electrical and instrumentation systems, and HVAC/MEP services, ensuring that professionals can effectively contribute to both Greenfield and Brownfield projects.

A key strength of Suvidya Institute of Technology Pvt. Ltd. lies in its emphasis on practical, real-world learning. Training is delivered by experienced industry professionals with extensive project exposure, incorporating industrial case studies, hands-on design exercises, vendor drawing reviews, and performance evaluations such as mock interviews. This approach enhances critical thinking, reduces errors in real-life projects, and significantly improves productivity and efficiency.

Organizations benefit from well-trained engineers through improved design accuracy, reduced rework, better coordination across disciplines, and faster project execution, ultimately leading to higher client satisfaction.

With a proven track record of training over 18,000 engineers through more than 650 batches and delivering 250+ corporate training programs across India, Suvidya Institute of Technology has made a substantial contribution to building a skilled engineering workforce for the Oil & Gas sector. As the industry continues to evolve with digitalization, automation, and sustainability-driven practices, the demand for highly skilled and adaptable professionals will continue to grow.

Bridging the gap between academic knowledge and industrial application is no longer optional but essential.

Institutions like Suvidya Institute of Technology Pvt. Ltd. are shaping the future of the EPC industry by transforming engineers into competent professionals who combine technical expertise with practical experience, ensuring excellence, efficiency, and sustainability in modern engineering projects. ■

For more details, please contact:

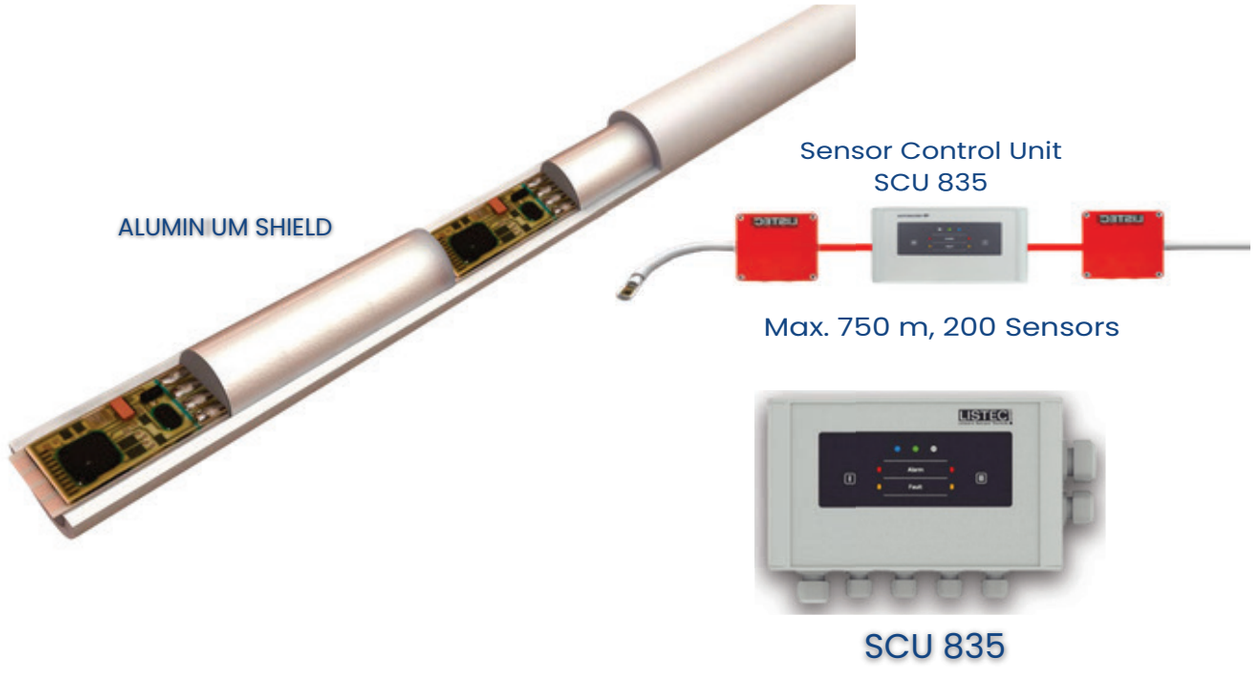
Suvidya Institute of Technology,
18/140, Anand Nagar,
Nehru Road, Vakola,
Santacruz (East),
Mumbai – 400 055

Tel: 022-26681979

E-mail: enquiry@suvidya.ac.in

Website: www.suvidya.ac.in

LISTEC Linear Heat Detection Cable from Controls India



LISTEC Linear Heat Detection Cable from Securiton is an advanced fire detection solution designed for continuous temperature monitoring and early fire detection in critical industrial environments. The system consists of a sensor cable with embedded temperature sensors, intelligent controllers, and monitoring modules that provide real-time temperature supervision and precise hotspot identification.

The LISTEC cable measures temperature every 10 seconds with a resolution of 0.1°C, enabling highly accurate detection of abnormal heat conditions. Each sensing segment is individually addressable, allowing precise identification of overheating locations. The cable is flame-retardant, halogen-free, mechanically strong, and resistant to dust, vibration, gases, and harsh environments.

With progressive alarm logic, the system provides early warnings before temperatures reach critical levels, allowing operators to take preventive action. LISTEC systems also support SCADA and industrial network integration via Modbus, RS-485, and Ethernet, enabling centralized monitoring and control. The system requires no recalibration, offers easy field repair, and provides long-term reliability with minimal maintenance.

Because of its continuous monitoring capability and high reliability, LISTEC is widely used in critical applications such as HT Panels, Cable Trenches, Battery Energy Storage Systems (BESS), and Conveyor Systems.

Key Applications

HT Panels: High-tension panels are prone to overheating due to loose connections, insulation failure, corrosion, or overloaded busbars. Traditional inspection methods like thermography are periodic and cannot detect sudden temperature rise. LISTEC cables installed inside panels provide 24×7 temperature monitoring, detecting abnormal heat early and generating alarms before a fire develops.

Cable Trenches: Cable trenches contain multiple power and control cables where short circuits, insulation failure, or overloads can cause fire hazards. Smoke detectors are often ineffective in dusty or poorly ventilated areas. LISTEC cables installed along the trench provide continuous linear monitoring, detecting overheating at any point and identifying the exact location of the hotspot.

Battery Storage Areas (BESS): Lithium-ion batteries can experience thermal runaway, leading to rapid temperature rise, toxic gas release, and severe fires. Detecting early heat buildup is critical. LISTEC cables installed on battery racks or storage areas continuously monitor temperature and provide early warnings before the situation escalates.

Conveyor Systems: Conveyor belts used in industries like mining, cement, and power plants are exposed to fire risks caused by friction, roller overheating, belt slippage, and dust accumulation. LISTEC cables run along conveyor lines to detect overheating instantly and trigger alarms, allowing operators to intervene before ignition occurs at unmanned areas. ■

For more details, please visit:

Website: https://controlsindia.asia
Email: marketing@controlsindia.asia
Mobile: +91 98250 64784

GUEST COLUMN

Occupational Safety & Health and Working Conditions (OSH&WC) Code, 2020 (37 of 2020): Salient Features

H. Vishvanathan
Former Dy. Director General, DGFASLI,
M/o Lab and Emp. Govt. of India
Proprietor, Meenakshi Safety Consultancy Services

The Code on Occupational Safety & Health and Working Conditions (OSH&WC) has been passed in both houses of the Parliament of India on 22/09/2020. The Code received the assent of the President on the 28th September 2020. It has been notified in the Gazette vide notification No 37 of 2020. The Code has come into effect on 21st Nov. 2025 vide Gazette notification 5145 dated 19th Nov. 2025. The OSH&WC Code proposes replacing 13 Central Acts related to Safety, Health and Working Conditions with a single Code. **H Vishvanathan, Former Dy. Director General, DGFASLI, M/o Lab and Emp. Govt. of India and Proprietor, Meenakshi Safety Consultancy Services, Navi Mumbai**, explains in detail the salient features of the code.

The Preamble of the Occupational Safety & Health and Working Conditions (OSH&WC Code) "is to consolidate and amend the laws regulating the occupational safety, health and working conditions of the persons employed in an establishment and the matters connected therewith or incidental thereto". The Code aims to provide a broader legislative framework to secure just and humane conditions of work with flexibility and to provide enabling provisions for making rules and regulations in tune with emerging technologies.

The OSH&WC Code, 2020 simplifies, amalgamates and rationalizes the provisions of thirteen enactments in the aforesaid areas with certain important changes. It consists of 14 chapters, having 143 sections and three schedules. It enables the Central Government to make Occupational safety and health standards under Sec. 18 for workplaces relating to factory, mine, dock work, beedi and cigar, building and other construction work and other establishments and includes 73 matters specified in the Second Schedule to this Code and

Rules under Section 23 and 24 of the Code relating to health, safety, working conditions and welfare for the employees and the State Government to make Rules under Section 138 relating to safety provisions and for the carrying out the various provisions of the Code.

Factories

- The Special provisions relating to Factories are about the Applicability of this Part of the Code are Approval and licensing of factories, Liability of owner of premises in certain circumstances, Power to apply the Code to certain premises, Dangerous operations, Constitution of site appraisal committee, Compulsory disclosure of information by occupier, Specific responsibility of occupier in relation to hazardous processes, National Board to Inquire into certain situations, Emergency standards, Permissible limits of exposure of chemicals and toxic substances, Right of workers to warn about imminent danger, Appeal against the order of Inspector-cum-Facilitator in case of factory, Power to make exempting rules and order.
- The Chapter XII deals with the procedure regarding the offences and penalties for non-compliance with the various clauses of the Code namely the general penalty for offences, punishment for causing obstruction to Chief Inspector-cum-Facilitator or Inspector-cum-Facilitator, etc., Penalty for non-maintenance of register, records and non-filing of returns, etc, punishment for contravention of certain provisions, punishment for falsification of records, etc, penalty for omission to furnish plans, etc. Punishment for disclosure of information, penalty for wrongfully disclosing results of analysis.

Some of the important new features of the code are:

- It extends to whole of India.
- Applicable to all establishments employing 10 or more workers and includes IT establishments or establishments of service sector except that in respect of factories the threshold is 20 workers with the aid of power and 40 workers without the aid of power.
- It stipulates one registration, one return for all establishments having 10 or more employees.
- Submission of various returns and maintaining of various forms in digital also.
- Mandatory Issue of appointment letter to every employee
- Migrant workers can register themselves in the portal by self-declaring, with Aadhar details.
- In case of death or serious bodily injury to any person, out of the amount so paid as penalty by the employer a part may be given to the victim or the legal heirs of the victim by the Court.
- Constitution of National and State Level Occupational Safety and Health Advisory Board.
- Constituting a Safety Committee in any class of establishment.
- Overriding power of the Central Government to regulate general safety and health of persons in the event of epidemic, pandemic situations.
- Power of the Central Government to make Standards, Rules related to Safety, Health, welfare and working conditions for uniformity in the adoption by the state Governments.
- Provision for Social Security Fund for unorganized workers.
- Third party audit and certification provision.
- Permitting Women to work beyond 7 PM and before 6 AM subject to the safety and security - with their consent for night work, to avoid misuse of the provisions.
- Independent director cannot be an occupier of the Factory.
- The Threshold for applicability made uniform under different Acts in respect of Ambulance Room, Safety officer, Welfare Officer, Safety Committee, Canteen, Crèche, Shelter, Rest Room, etc.

The Code applies to establishments employing at least 10 workers, and to all mines and docks. It does not apply to apprentices and other class of workers. Further, it makes special provisions for certain types of establishments and classes of employees, such as factories, mines, and building and construction workers, ports etc. All establishments covered by the

Code would be required to be registered with the registering officers.

Chapters

- Chapter I deals with the Preliminary, Short title, extent, commencement and application and Commencement and Definitions.
- Chapter II deals with the registration of certain establishments, appeal and notice by employer of commencement and cessation of operation.
- Chapter III deals with the duties of employer and employees, etc. namely duties of employer, duties and responsibilities of owner, agent and manager in relation to mine, duties of manufacturers, designer, importers or suppliers, duties of architects, project engineers and designers, notice of certain accident, notice of certain dangerous occurrences, notice of certain diseases, duties of employees, rights of employee and duty not to interfere with or misuse things.
- Chapter IV deals with the National Occupational Safety and Health Advisory Board, State Occupational Safety and Health Advisory Board, Occupational safety and health standards, Research related activities, Safety and occupational health surveys, Statistics, Safety Committee and safety officers etc. The National Occupational Safety and Health Advisory Board (hereinafter in this Code referred to as the National Board) shall be notified by the Central Government to discharge the functions conferred on it by or under this Code and to advise to the Central Government on the matters relating to—
  - Standards, rules and regulations to be framed under this Code;
  - Implementation of the provisions of this Code and the rules and regulations relating thereto;
  - The issues of policy and programme relating to occupational safety and health referred to it, from time to time, by the Central Government; and
  - Any other matter relating to this Code referred to, from time to time, by the Central Government.
- Chapter V deals with the Responsibility of employer for maintaining health and working conditions the employer shall be responsible to maintain in his establishment as may be prescribed by the Central Government.
- Chapter VI deals with the welfare facilities, the employer shall be responsible to provide and maintain in his establishment such welfare facilities for the workers as may be prescribed by the Central Government.
- Chapter VII deals with hours of work and annual leave with wages namely weekly and daily working hours, leave, etc., weekly and compensatory holidays, extra wages for overtime, night shifts, prohibition of overlapping shifts, restriction on double employment in factory and mine, notice of periods of work, annual leave with wages, etc.
- Chapter VIII deals with maintenance of registers and records and filing of returns these returns and registers could be filed online and maintained in soft.
- Chapter IX deals with Inspector-Cum-Facilitators and other authority namely, appointment of Inspector-cum-Facilitators, powers of Inspector-cum-Facilitators, powers and duties of District Magistrate, third party audit and certification, special powers of Inspector-cum-Facilitator in respect of factory, mines and dock work and building and other construction work, secrecy of information by Chief Inspector-cum-Facilitator or Inspector-cum- Facilitator, etc., Facilities to be afforded to the Inspector-cum-Facilitator, Powers of special officer to enter, measure, etc., in relation to mine and Medical Officer.
- The Chapter X deals with the Special Provision Relating to Employment of Women namely Employment of women in night subject to such conditions relating to safety, holidays and working hours or any other condition to be observed by the employer as may be prescribed by the appropriate Government.
- Chapter XI deals with Special Provisions for Contract Labour and Inter-State Migrant Worker, etc. in respect of Contract Labour and Inter-State Migrant Worker, Audio-Visual Workers, Mines, Beedi And Cigar Workers, Building And Other Construction Workers and Factories.
- Chapter XII deals with the procedure regarding

The OSH&WC Code, 2020 simplifies, amalgamates and rationalizes the provisions of 13 enactments in the aforesaid areas with certain important changes. It consists of 14 chapters, having 143 sections and three schedules. It enables the Central Government to make Occupational safety and health standards under Sec. 18 for workplaces relating to factory, mine, dock work, beedi and cigar, building and other construction work and other establishments and includes 73 matters specified in the Second Schedule to this Code and Rules under Section 23 and 24 of the Code relating to health, safety, working conditions and welfare for the employees and the State Government to make Rules under Section 138 relating to safety provisions and for the carrying out the various provisions of the Code.

the offences and penalties for non-compliance with the various clauses of the Code.

- Chapter XIII deals with the miscellaneous provisions namely relating to Delegation of powers, Onus as to age, Onus of proving limits of what is practicable, etc., Common licence for contractors, factories and to industrial premises and person, Effect of law and agreements inconsistent with this Code.

Repealed Acts

With the enactment of this Code, the following Safety and Health and Working Conditions Acts would be repealed

1. The Factories Act, 1948.
2. The Mines Act, 1952.
3. The Dock Workers (Safety, Health and Welfare) Act, 1986.
4. The Building and Other Construction Workers (Regulation of Employment and Conditions of Service) Act, 1996.
5. The Plantations Labour Act, 1951.
6. The Contract Labour (Regulation and Abolition) Act, 1970.
7. The Inter-State Migrant workmen (Regulation of Employment and Conditions of Service) Act, 1979.
8. The Working Journalist and other News Paper Employees (Conditions of Service and Miscellaneous Provision) Act, 1955.
9. The Working Journalist (Fixation of rates of wages) Act, 1958
10. The Motor Transport Workers Act, 1961
11. The Sales Promotion Employees (Conditions of Service) Act, 1976
12. The Beedi and Cigar Workers (Conditions of Employment) Act, 1966
13. The Cine Workers and Cinema Theatre Workers Act, 1981.

For any Enquiries on Conducting of Training or Gap Analysis Study on the OSH&WC Code 2020 and Rules made thereunder you may kindly contact us.

Email: hvishvan@yahoo.com,
hvishvan@meenakshisafety.com
Mobile: +91 9082783567/+91 9869287053

The author presented a paper on OSH Code during Health Safety & Environment Conference on 3rd February 2026, held during Chemtech 2026, in Mumbai, during 3-6 February 2026.■

Hidden Hazards and Engineering Challenges in Offshore Wellhead Platforms

Offshore wellhead platform faces risks like fire, explosion, and blowout. Some of the most dangerous risks are hidden hazards that are hard to notice early. These include radiation sources, chemical performance loss at high temperature, asbestos in older assets, dropped objects, and security threats. Through this article, **Pratik G. Bhagat, Lead Process & Technical Safety Engineer** and **Karthik Sathanur, Technical Safety Engineer, NPCC Engineering Pvt. Ltd.**, describe the hazards and provide a practical solution to manage them early, during EPC design and execution.

India's offshore developments remain important for energy security. Making early identification of hidden hazards and strong safety integration in EPC design is essential for reliable operations. Offshore Wellhead Platform is a complex structure designed for the extraction and processing of petroleum and natural gas located in underwater rock formations. Offshore drilling is a complex operation, includes drilling wells, extracting oil and gas, and transporting these resources to shore. This industry is governed by strict regulations to prevent pollution, protect the marine ecosystem, enhance safety and reduce the ecological footprint of offshore drilling operations. This article highlights hidden hazards that may be missed early and suggests practical ways to address them during design and execution.

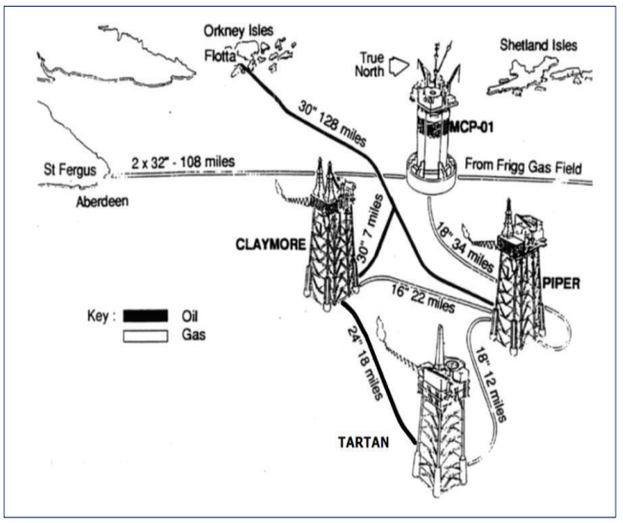
Offshore Platforms (representative image).

Source/Credit: Chad Teer, "Offshore platforms" (offshore Mexico), via Wikimedia Commons: https://commons.wikimedia.org/wiki/File:Offshore_platforms.jpg

Piper Alpha Disaster

The Piper Alpha disaster (1988, Scotland) was one of the deadliest offshore oil and gas accidents in history, resulting in death of 167 lives and significant financial damage. It involved a major hydrocarbon release that ignited and escalated into multiple explosions and fire.

Disaster investigation identified several key failures including inadequate maintenance and safety procedures, permit-to-work and handover weaknesses, and gaps in management of change. The lessons learned from this tragedy influenced safety practices and led to major changes in offshore safety regulations today.



Piper Alpha – interconnections to other platforms and to shore (schematic).

Source/Credit: F.K. Crawley, "Piper Alpha interconnections to other platforms and to shore", via Wikimedia Commons: https://commons.wikimedia.org/wiki/File:Piper_connections.png

Hazards on Offshore Wellhead Platforms

The oil and gas industry is fraught with dangers ranging from sudden fires to catastrophic blowouts. Known hazards are typically short term with high visibility, whereas Hidden Hazards may not be apparent at first glance. Identifying both early is essential for safer design and operations.

Hidden Hazards

Through various engineering lessons learnt and safety studies, the below hazards are shortlisted as they often lead to incidents if not properly identified:

Radiation: MPFM (Multi-phase Flow Meter), a flow measurement device installed on offshore platform, may contains a radioactive element. Other common examples are well-logging devices, radiography cameras and portable moisture gauges. Long-term exposure can lead to radiation-related health impacts.

Chemical Degradation / Loss of Efficacy: Corrosion Inhibitors, Biocides, Hydrate Inhibitors are commonly injected into well fluid for corrosion protection, prevent microbial growth and hydrate inhibition etc. However, chemical degradation may be accelerated by elevated well-fluid temperatures, reducing potency and effectiveness.

Asbestos Exposure: Asbestos was used in offshore installations for fireproofing and insulation due to its Offshore conditions. Although its use has been discontinued for decades, older installations may still contain asbestos, which poses challenges during modifications and decommissioning.

Falling Objects: In rigs, vibrations produced by drilling and rotating equipment can contribute to dropped-object incidents. Workers must remain vigilant and dropped-object prevention practices must be maintained.

Pirate Attacks: The possibility of Pirate attacks/ sabotage/ terrorism are unforeseen events, which pose a challenge to human lives and property.

Other hidden hazards include:

- **Improperly maintained PPE kits:** These must be regularly inspected and replaced, when necessary, to ensure its effectiveness.
- **Electrocution accidents:** Workers must be trained in proper electrical safety practices. Additionally, all electrical equipment should be inspected regularly, and any damaged components must be replaced immediately.

Fire and Explosion	Blowout	Chemical Exposure	Helicopter Accidents
Any hydrocarbon spillage catches fire when exposed to ignition source and air.	A pressurized well fluid escaping from the well and resulting in a giant fireball that can engulf the entire rig.	Many chemicals are used in the oil extraction process. Exposure occurs when workers come in contact with them or inhale them.	These are mainly due to mechanical failure (e.g., gearbox), pilot error, extreme weather conditions etc.
Preventive Measures			
▪ Firewalls ▪ Regular inspection & maintenance of potential ignition and leak sources. ▪ Fire detectors and alarms ▪ Strategically placed Fire extinguishers	▪ Blowout Preventers (BOPs) ▪ Proper installation, operation and regular maintenance of BOPs	PPE including: ▪ Air-purifying respirators ▪ Chemical-resistant clothing ▪ Chemical-resistant goggles etc.	▪ BOSIET (Basic Offshore Safety Induction & Emergency Training) certification

Table 1: Known Hazards

Radiation	Pirate Attacks	
▪ Provide adequate Radiation Safety warning Signs to alert personnel at a safe distance around MPFM. ▪ Develop Restricted access and maintenance procedure. ▪ Mandate wearing PPE while handling radioactive elements like respiratory protection, goggles, coverall and gloves should be provided.	▪ Identify risk during HAZID. PHA methods need to be encouraged with experienced personnel. ▪ Install gates & CCTV monitoring to restrict access. ▪ Protect the plant shutdown keys from the vulnerable actions such as activation of push button by fisher man / pirates. ▪ Offshore Defense Advisory Group and Vessel Air Traffic Monitoring System should be developed.	
Asbestos Exposure	**Falling Objects**	**Chemical degradation / Loss of Efficacy**
▪ Ensure adequate Company policies for Asbestos disposal and handling, ▪ Awareness of personnel and use of PPE can be mandated during PHA. ▪ Asbestos survey to be undertaken during demolition activities.	▪ Maximum allowable weight of dropped object to be defined in Dropped Object Study. ▪ Ensure NO GO for crane operations in riser approach area with cranes to have limit switches. ▪ Ensure lifting gears are certified for specified loads.	▪ Ensure selection of chemicals whose thermal degradation temperatures are well above the wellhead flowing temperatures. ▪ Selected chemicals shall undergo testing against extreme well fluid conditions.

Table 2: Preventive measures for hidden hazards

- **Ship Collision:** Collision avoidance and protection measures shall be adopted.

Engineering Challenges

Offshore wellhead platform design and execution face numerous interconnected engineering challenges. The key challenges include:

- Harsh Marine Environment
- Complex Sub-Surface conditions
- Safety & Regulatory Requirements
- Scope Management & Design changes
- Cost & Quality Controls
- Procurement Delays (long-lead items)
- Market Volatility
- Geopolitical Risks etc.

In many EPC projects, schedules are accelerated, and engineering timelines are compressed. This can challenge the timely conduct of safety studies and the incorporation of their recommendations into engineering design deliverables. Early planning, strong interface management, and disciplined design reviews help reduce the risk of late changes and rework.

Strategies for Mitigation of Hazards & Challenges

To ensure inherently safe design and to avoid late discoveries of Hazards and Engineering Challenges, we recommend below step-by-step approach based on engineering Lessons Learnt (LLs) and Engineering Best Practices (EBPs):

Project Kick-off: Organize interdisciplinary review of LLs and EBPs before you kick start the project. This preventive measure creates awareness at the beginning of the project.

Hazards Identification: Ensure active participation in HAZID and Layout Safety Review workshops especially from Process and Piping Teams.

Risk Management: Project Team to conduct Risk Assessment and periodically monitor Risk levels. Safety Team to provide timely inputs to Quantitative Risk Assessment (QRA) & Fault Tree Analysis (FTA), as applicable.

Mitigative action: HAZOP studies proactively identify hazards and help in forming risk mitigation measures early during the planning and design stage. Ensure active participation from all stakeholders.

Process Safety in Design:

- Operability and Constructability review integrates safety concepts at early stage of project to enhance operational excellence.
- Encourage multidisciplinary participation. Third party Safety Audits shall be conducted to verify if all "Issued for Construction (IFC)" Safety Layouts comply to Safety Standards.
- Likewise, "As built" P&IDs and Construction drawings shall be reviewed (preferably by third party) for the compliance of Safety Study recommendations.
- Collaboration between Process & Safety Engineers, is essential. By jointly assessing process hazards before startup, incorporating safety features into system design and advising on process changes, the overall risk can be reduced, and safer operations can be achieved.

Takeaway

Hidden hazards are risks that are not immediately visible, often leading to accidents or injuries if not properly identified and managed. Every EPC project has different set of Engineering Challenges. Most common is "Accelerated EPC schedule", which hinder the timely incorporation of Safety Study recommendations into design. By identifying hidden hazards and engineering challenges early especially during the design stage and applying a structured mitigation approach (Lessons Learnt, HAZID/HAZOP, Risk Management, and Design Assurance), individuals and organizations can significantly reduce risk and create a safer working environment. ■

References

- Lessons Learnt and Engineering Best Practices from the past executed Offshore Projects.
- Marc Reid, The Piper Alpha Disaster: A Personal Perspective with Transferrable Lessons on the Long-Term Moral Impact of Safety Failures, ACS Chem. Health Saf. 2020, 27, 88−95.

Acknowledgments

We are thankful to Mr. Sukumar Nath Roy, General Manager – Process, National Petroleum Construction Company (NPCC) Engineering Pvt. Ltd. Mumbai, for the constant encouragement and indispensable support.

Authors

Mr. Pratik G Bhagat
Lead Process &
Technical Safety Engineer
NPCC Engineering Pvt. Ltd., Mumbai

Mr. Karthik Sathanur
Technical Safety Engineer
NPCC Engineering Pvt. Ltd., Mumbai

CASE STUDY

Adventure Above the North Sea: Service Technician from Busch on an Offshore Mission

Service technician **Anders Kandborg** from Busch Denmark shares his experience of maintaining the Busch vacuum system on an offshore oil platform in the North Sea.

Service technician Anders Kandborg from Busch Denmark on his way back from an offshore oil platform.
Source: Busch Vacuum Solutions.

The rhythmic whir of helicopter blades cuts through the cold North Sea air as Anders Kandborg, a service technician from Busch Denmark, prepares to land on a massive oil platform. Two hundred kilometers off the Danish coast, surrounded only by wind and waves, he begins a demanding service mission. His task: to ensure the reliable operation of a vacuum system from Busch Vacuum Solutions that is critical for the oil platform's production process.

A Workplace Above the Waves

As soon as the helicopter touches down, Anders is immersed in a world of steel, pressure, and precision. Equipped with tools and diagnostic instruments, he makes his way to the heart of the operation: the vacuum system room. For the next days, the service technician from Busch inspects, maintains, and optimizes the DOLPHIN liquid ring vacuum pumps that form the backbone of the platform's vacuum degassing system.

Each pump must run flawlessly to ensure stable production. He also trains workers in handling and maintaining the vacuum pumps. "You feel the power of the sea and the machinery all around you," says Anders. "It is a challenging but deeply rewarding job – there is no room for mistakes out here."

Before his first mission on the oil platform, he participated in BOSIET (Basic Offshore Safety Induction and Emergency Training) – a three-day survival course that includes helicopter evacuation, firefighting, first aid, and sea survival exercises. "It is like being in a completely different world," he explains. "You learn to handle any situation – even jumping into the sea from a helicopter if you have to." This course has to be renewed every four years.

A DOLPHIN liquid ring vacuum pump from Busch Vacuum Solutions. Source: Busch Vacuum Solutions.

Pushing Oil from Rock to Surface

The vacuum system from Busch on the platform consists of two DOLPHIN liquid ring vacuum pumps, each with two ejectors. It plays a crucial role in seawater injection – a process that keeps oil production efficient. Maintaining stable pressure inside an underground oil field is essential because it helps push the oil toward the production wells. As oil is extracted, this pressure drops. If it becomes too low, the flow of oil slows down drastically or may even stop. By maintaining pressure via seawater injection, oil recovery stays efficient as more oil can be extracted from the same reservoir. During this process, high-pressure injection pumps force the seawater down specially drilled injection wells. These wells reach into the same rock formations that hold the oil. The injected water fills the empty spaces left by the extracted oil, pushing remaining oil toward production wells and restoring reservoir pressure – a process known as injection drilling.

Role of Vacuum Degassing in Offshore Production

Before injection, gases like oxygen and carbon dioxide must be removed from the water because they promote corrosion and cause leaks in production facilities. By removing these gases through vacuum degassing, the lifetime of the pipeline is extended, and maintenance costs are reduced. It also lowers the risk of gas-related accidents and equipment failure.

In this degassing process, known as seawater deoxygenation, the seawater from the surrounding ocean is pumped into a big tower called deaerator. This tower is kept under vacuum. When water is placed under vacuum, dissolved gases become less soluble and escape from the liquid – much like opening a soda bottle, the change in pressure releases the trapped gas. After the gas is removed from the top of the tower with the help of the vacuum system, the degassed seawater collects at the bottom of the deaerator tower. From there, it is withdrawn through outlet pipes. The oxygen-depleted seawater is then sent either to high-pressure injection pumps for reservoir injection or to cooling systems on the platform. It is used to cool compressors and turbines driving oil and gas processing equipment.

Passion for Precision

After a few days of demanding work under harsh offshore conditions, Anders completes his maintenance tasks and final checks. The vacuum system is running smoothly, ensuring the platform's production continues without interruption. As he boards the helicopter for the flight back to shore, he takes one last look at the vast expanse of sea and steel beneath him. "It's a tough job," he says with a smile, "but also something special. Not everyone gets to work in a place like this." Back on solid ground, he feels grateful – for the experience, the teamwork, and the knowledge that his efforts help keep such a complex operation running safely and efficiently. ■

CASE STUDY

Lubrication Intelligence: How Whole-Site Condition Screening Reduced Oil Changes and Delivered Seven-Figure Savings

Refineries rely on thousands of lubricated assets, yet most sites only analyse oil from a small proportion of them, typically the most critical systems or those capable of providing large sample volumes. The remainder often operate on fixed-interval oil changes, leading to unnecessary maintenance, wasted lubricant and increased operational risk during intrusive activities. This article explores how a large North American refinery challenged this model by implementing a whole-site, minimal-volume oil condition assessment programme. Using handheld infrared spectroscopy, the site gained visibility into lubricant health across most of the rotating equipment. The result was a rapid return on investment, elimination of hundreds of unnecessary oil changes, improved maintenance planning and a step change toward condition-based lubrication. **Daniel C. Shorten, CRL MLE, SME Asset Condition Management, John Crane Service Solutions,** through this article outlines the technical approach, implementation lessons, operator feedback and the pathway to extending condition-based lubrication across all rotating assets.

Calendar-based oil change intervals remain standard practice across the industry, particularly in large refining environments. They are familiar, predictable and easy to plan, but they are not always optimal. Decisions based solely on time rather than actual lubricant condition can lead to unnecessary maintenance activity and can limit the reliability potential of bearings, seals and other critical rotating equipment components.

In many cases, lubricants are replaced long before their useful life has ended. In others, oils remain in service beyond acceptable limits, without any knowledge of degradation, increasing the risk of component deterioration or failure and machinery breakdown. The underlying issue is simple: without real data on oil condition, maintenance teams are forced to rely on time-based assumptions.

A large refinery operation sought to move away from this model by making oil change decisions based on lubricant health rather than calendar dates, across the entire site, not just the most critical assets.

The Challenge: Thousands of Systems, Limited Visibility

The site operated thousands of lubricated systems across pumps, compressors and other rotating equipment. Historically, only around 15 - 25% of these assets were included in routine laboratory oil analysis programmes.

While these systems benefited from detailed insights into fluid health, contamination, wear debris and causation, the remaining majority were serviced solely through scheduled oil changes. This resulted in a high volume of predetermined oil changes each year, many of which were unnecessary.

The cost impact was significant, not only in lubricant consumption, labour and downtime, but also in the added risk associated with opening equipment and the potential for maintenance-induced failures.

A New Direction: Whole-Site Oil Condition Assessment

To challenge the traditional approach, the maintenance team asked a fundamental question:

What if we knew the condition of the oil in every lubricated system?

Conventional laboratory testing could not deliver this at scale. Cost, logistics and sample volume requirements made full-site coverage impractical.

Any alternative solution needed to:

- Require only a minimal oil sample
- Provide fast, reliable on-site screening
- Correlate well with established ASTM methods
- Deliver a clear “suitable / not suitable” assessment

The team adopted a rugged, handheld infrared spectrometer capable of identifying key degradation indicators, such as oxidation, acidity, water ingress, and antioxi dant depletion, using only a few millilitres of oil per test.

This made whole-site lubricant screening feasible for the first time.

Implementation: Practical Lessons Learned

Several important insights emerged during implementation:

- **Sampling access matters**

  Many systems lacked appropriate sampling points. Retrofitting valves and improving access became a clear opportunity for future reliability improvements.

- **Consistency is critical**

  Sampling location within a sump significantly affects results. Repeatable sampling methods and dedicated tools will improve data quality over time.

- **Testing environment affects results**

  Although in-field testing was possible, conducting analysis in a controlled indoor environment produced more consistent data and improved workflow efficiency.

- **Software usability influences adoption**

  While functional, the initial software interface limited efficiency. More intuitive mini-lab platforms are being evaluated for future upgrades.

Results: Quantifiable Savings and Better Decisions

The baseline cost for scheduled oil changes across the site exceeded USD 1.5 million per year.

Within the first year:

- Approximately 90% of systems tested were deemed suitable for extended service
- Oil changes were avoided on more than 1,200 systems
- Cost savings, calculated based upon reduced oil consumption, logistics and downtime, approached close to USD 1.25 million in the first year, excluding contractor labour
- The capital investment in hardware and software was recovered early in Year 1

Looking ahead, the site expects to permanently eliminate at least 50% of previously scheduled oil changes through condition-based decision-making. All whilst maintaining a safe sampling environment and with recorded data to verify and provide assurance that oil change driven by oil condition was performed with appropriate risk management.

Operator Experience: Key Takeaways

Reliability and maintenance teams identified several practical considerations:

- In-field testing at the asset offers immediate feedback but exposes equipment and personnel to harsher conditions
- On-site but centrally located testing improves consistency but requires disciplined sample handling
- Sample identification errors are reduced in controlled environments
- Mapping any non-sampled systems creates a clear roadmap for sampling improvements
- Initial pipette sampling worked but lacks repeatability; dedicated sampling values tools are preferred especially where samples can be taken during machinery operation.

Looking Ahead: Expanding Condition-Based Lubrication

Future phases of the program include:

- Refining alarm and condemning limits
- Incorporating asset criticality to drive testing frequency
- Expanding coverage to hydraulic and gear systems
- Evaluating onsite mini-laboratory solutions for more detailed oil condition monitoring
- Extending to include ultrasonic condition-based greasing
- Installing retrofit sampling valves for non-intrusive, live sampling

Conclusion

Whole-site lubrication intelligence is achievable. By combining ultra-low-volume on-site oil screening with a data-driven maintenance strategy, large industrial sites can significantly reduce unnecessary oil changes while improving reliability, safety and asset visibility.

Beyond oil cost and maintenance optimisation, improved control of lubricant condition also supports the health of bearings and mechanical seals, helping to extend component life and improve overall rotating equipment uptime. Together, these outcomes reinforce the wider value of condition-based lubrication practices as a foundation for effective asset reliability management.

This approach represents a practical and scalable pathway toward fully condition-based lubrication, turning oil analysis from a selective activity into a site-wide decision-making tool. ■

Author

Daniel C. Shorten
CRL MLE, SME Asset Condition Management
John Crane Service Solutions

Solar Manufacturing

Government Extends ALMM Framework to Solar Ingots and Wafers; To Come into Effect from 1 June 2028

Ministry of New and Renewable Energy (MNRE) has expanded the Approved List of Models and Manufacturers (ALMM) Order to introduce ALMM List-III for Ingots and Wafers, which will take effect from 1 June 2028.

The move is being considered as a major step towards building a stronger, self-reliant solar manufacturing eco-system. It will deepen domestic domestic value addition across the solar supply chain, reduce reliance on imports, and reinforce India's ambition to become a global solar manufacturing hub.

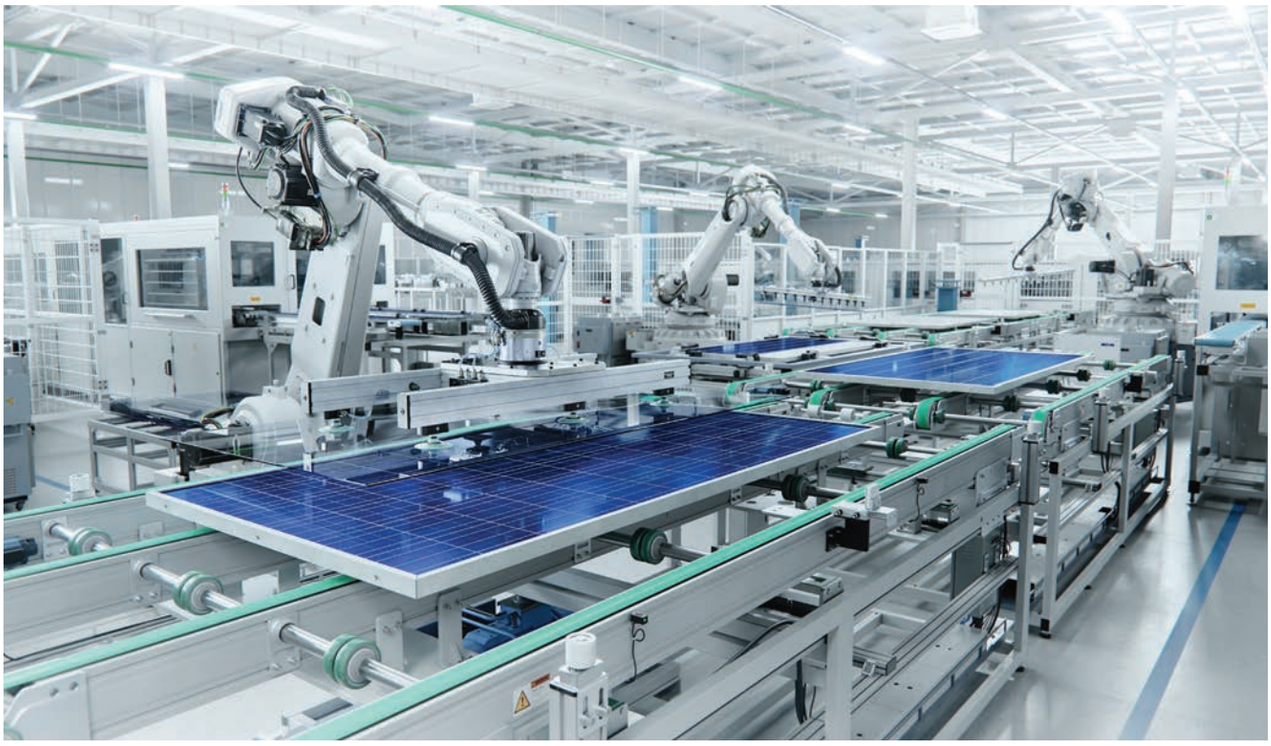
Suitable grandfathering provisions have been built in to protect projects already in the pipeline. The current order of MNRE, extends mandatory sourcing requirements from ALMM lists, already in place for modules and cells, one step further up the solar supply chain to include the ingots and wafers, which currently remains heavily import-dependent.

Union Minister for New and Renewable Energy, Shri Pralhad Joshi, said that it is a decisive step towards strengthening India's solar manufacturing ecosystem. The Minister said that the move will boost domestic production, enhance supply chain resilience, reduce import dependence, and ensure higher quality standards across the solar value chain.

Key Provisions

- **Effective Date:** 1st June 2028 - the date from which ALL projects must use ALMM-listed wafers including Net metering/ open access projects.
- **Cut-Off Date:** 7 days after the initial list of ALMM List-III for wafers, is published. Bids submitted under Sec 63 route, after this date must mandatorily specify use of ALMM List III compliant wafers.
- **Threshold for issuing the initial list:** At least 3 independent manufacturing units (not under common ownership or control) with a combined capacity of 15 GW, ensuring the list is issued only when this minimum domestic supply is available.
- **Mandatory ingot capacity:** Manufacturers seeking enlistment in ALMM List-III for wafers, must also have equivalent ingot manufacturing capacity, promoting upstream integration for ingots.
- **Module list integrity:** Effective date onwards, ALMM List-I (Solar PV modules) will include only such modules which are manufactured using ALMM-listed cells and wafers. Separate lists

Wafers are the critical intermediate stage between polysilicon and solar cells. India currently has limited domestic wafer manufacturing capacity and relies substantially on imports. The expansion of Approved List of Models and Manufacturers (ALMM) represents an important step towards *Atmanirbhar Bharat* and the country's commitment to achieving 500 GW of non-fossil fuel capacity by 2030.



will be maintained for grandfathered projects to avoid disruption.

- **DCR provisions:** This Order does not dilute or override any Domestic Content Requirement (DCR) provisions under the existing MNRE schemes.

Expected Benefits

Wafers are the critical intermediate stage between polysilicon and solar cells. India currently has limited domestic wafer manufacturing capacity and relies substantially on imports.

The introduction of ALMM List-III is expected to:

- Drive investment into ingot and wafer manufacturing facilities in India;
- Improve supply chain security and reduce vulnerability to import disruptions;
- Ensure quality and traceability of solar components all the way from wafer to module;
- Create skilled employment in upstream solar manufacturing;
- This expansion of ALMM represents an important step towards Atmanirbhar Bharat and the country's commitment to achieving 500 GW of non-fossil fuel capacity by 2030.

Background

India's Approved List of Models and Manufacturers (ALMM) Order, 2019 is a quality-and-reliability framework that ensures solar equipment used in the country's solar projects meet the domestic manufacturing standards. It applies for projects awarded through competitive bidding under Sec 63, Electricity Act, 2003 and for net-metering or open-access projects.

Since ALMM was introduced, domestic solar manufacturing has expanded significantly. ALMM List-I (solar PV modules) has grown from 8.2 GW in 2021 to around 172 GW currently. ALMM List-II (solar PV cells), introduced more recently, has already reached 27 GW within seven months, demonstrating the framework's effectiveness in stimulating domestic investment. ■

Oil Gas & Power

Quarterly Magazine for Comprehensive Information @ Emerging Energy Ecosystems

UPCOMING ISSUES

June 2026
Digitalization

September 2026
Nuclear & Thermal Energy

December 2026
Exploration & Production

March 2027
Oil Gas & Power World Expo 2027
Special Issue

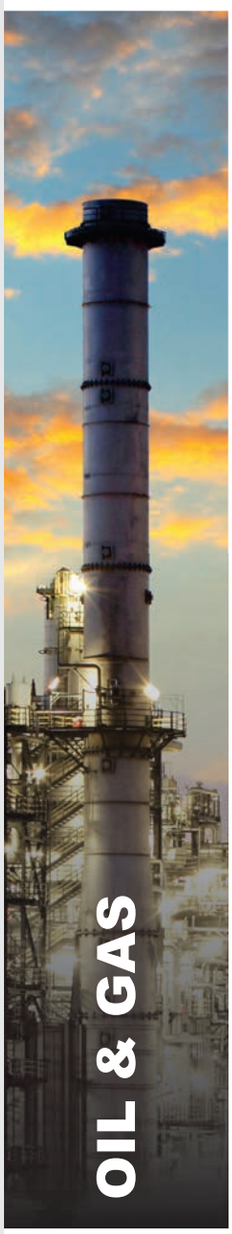
Jasubhai Media Pvt Ltd
Taj Building, 3rd Floor, 210, Dr. D N Road, Fort, Mumbai – 400 001, INDIA.
Tel: +91-22-4037 3636, **Email:** sales@jasubhai.com

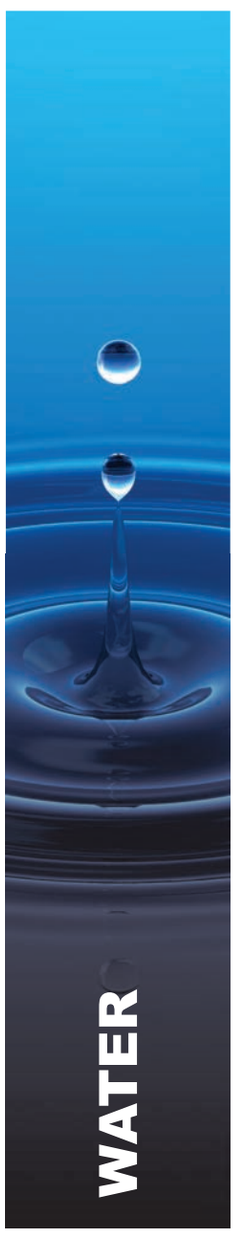
www.jasubhaimedia.com

GRE PIPING

CPP®

GRP PIPING





Conveying Fluids Efficiently!™

PIPES | FITTINGS | DUCTS | HEADERS | STACKS | LAUNDERS

Material : FRP/GRP Pre-insulated, FRP/GRP, PVC-FRP, CPVC-FRP, PP-FRP, PVDF-FRP, FEP-FRP

TUV NORD ISO 9001

TUV NORD ISO 14001 / ISO 45001

IS 12709:1994
CM/L-7980402

License No. 15LR-0129

CHEMICAL PROCESS PIPING PVT. LTD.

CPP House,Satyam Solaris, B.S.D. Marg,
Govandi, Mumbai 400088, INDIA
Phone : + 91 22 67230602
E-mail : sales@cppiping.com Website : http://www.cppiping.com

CHEMTECH FOUNDATION
1974-2024
Inspiring Intelligence...
..Igniting Innovation

International Integrated **ENERGY** Exhibition & Conferences

Oil Gas & Power

World Expo 2027

ANNOUNCING 2027

3-5, March 2027

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

Oil&GAS World Expo 2027 | POWER + COAL World Expo 2027 | Nuclear ENERGY World Expo 2027

GREEN ENERGY & HYDROGEN World Expo 2027 | GAS WORLDTECH Expo 2027 | Refining & Petro CHEMICALS 2027 | SMP Shipping, Marine & Ports WORLD EXPO 2027 | Surface Engineering Coating & Corrosion World Expo 2027

EXHIBITOR GROUPS

OIL & GAS
- Exploration & Production
- Oil Field Services
- Geographical and Seismic Surveys
- Drilling
- Sub Sea
- Transportation Storage & Infrastructure

NATURAL GAS & LNG
- Natural Gas Marketing
- City Gas Distribution
- Transportation & Storage Infrastructure

REFINING
- Oil Refining
- Marketing
- Petrochemicals Manufacturing
- Technology Licensors

POWER
- Power Generation
- Technology Licensors
- Power Transmission & Distribution
- Infrastructure

CLEAN ENERGY
- Renewables – Solar Wind & Hydro
- Hydrogen
- Biofuels
- Methanol
- Nuclear

ENGINEERING SERVICES
- EPC services
- Project Management Consultants
- Engineering Services
- Construction

SHIPPING MARINE & PORTS
- Shipping Services
- Ports
- Inland water ways
- Transportation Warehousing
- Supply Chain Management
- Material Handling & Supply Chain Management
- Logistics Services

CORROSION CONTROL
- Surface Engineering
- New metallurgies
- Industrial Coatings
- Corrosion Control Technologies & Services

PROCESS PLANTS & PLANT EQUIPMENT
- Distillation Columns
- Reactors
- Heat Exchangers, Cooling Towers & Boilers
- Storage Tanks
- Compressors , Pumps & Valves
- Plant instrumentation & automation
- IT Infrastructure & Digital Technologies

Jasubhai MEDIA

Organised by: **Jasubhai Media Pvt Ltd**

Taj Building, 3rd Floor, 210, Dr. D N Road, Fort, Mumbai – 400 001, INDIA.
Tel: +91-22-4037 3636, **Email:** sales@jasubhai.com

Ahmedabad - 09833104834 | Bangalore - 09892644177 | Chennai - 09176963737
Delhi - 09891469629 | Hyderabad / Pune - 09822209183 | Vadodara - 09820544904

sales@jasubhai.com **www.chemtech-online.com**