

March 2022

SPT
SCHOOL OF
PETROLEUM
TECHNOLOGY



WAR AND GEOPOLITICS

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SPT MIRROR

THE OFFICIAL MAGAZINE OF SPT PDEU

EDITOR'S DESK



Dr. Paul Naveen



Mr. Gaurav Hazarika

Pursuant to recessive NCov-19 epidemic predicaments and resumption of various activities, the geopolitical turbulence of Ukraine infringement by the Russian forces has resulted in record highs in oil and gas prices. The slacks in oil productivity, which is mostly paltry to Gulf nations viz. Saudi Arabia, UAE, and Iraq is over and above usually low that would not be ample to impede the sharp rise in oil prices and constraints on Russian oil and gas exports. In addition, the upstream underinvestment emanating from the previous both downscals i.e. of 2015 and 2020 have heavily affected the production capacities and record low reserve discoveries. Soaring energy prices are evoking the global inflation therefore to the economic deceleration (stagflation).

Against these backdrops, School of Petroleum Technology had a instrumental start with semester exchange of BTech sem-III and V students, faculty involutions at Vibrant Gujarat event, geological trips, MoU with MIT Pune, Expert talks/visits, consultancy projects. Fore and aft, the efforts of professional student associations: SPE, IADC, FIPI, SEG-SPG-EAGE in effectuating these programs were exceptional, with an enthusiastic involvement of student volunteers.

GATE 2022 results were another magnificiant intaglios of SPT students it has redo the previous year's traverse by obtaining first place by Srinath Jani (MTech SPT) and followed various other significant ranks within top 100. In addition, students have promulgated their concepts and published the articles on breathtaking topics including decarbonisation. Faculty publications are other addons with the record high number of 100 of which 71 publications are solely indexed in Scopus.

This SPT mirror subsumes various signatures of unprecedented level of expert talks, field visits, industrial outreach, GATE results, student exchanges, MoUs, consultancy projects, and publications. All embracing, it was very impressive jaunt and wish get go for the upcoming activities and events.

DIRECTOR'S DESK

SPT Mirror is the reflection of the School of Petroleum Technology and an excellent means to instigate freshers about the magnificent achievements and triumphant events conducted by the SPT. It incorporates variety of topics related to various activities, events, fests, cultural programs etc. SPT Mirror is for the students and by the students, so we will be grateful for your assist by sending us shots/pictures of your industrial training work etc. And we might just use it in the future issue of the SPT Mirror.

I also would like to cordially congratulate the team of SPT Mirror. We hope you are enlightened and enjoy reading this issue as well.

Regards

Dr. R. K. Vij

Director

School of Petroleum Technology



Dr. R.K. Vij
DIRECTOR
SCHOOL OF PETROLEUM
TECHNOLOGY

EDITORIAL



HIT PATEL



JAIMIN KANPARIYA



UMIT MANIYA



YASHVARDHAN CHAUHAN



RAIWANT MODH



HARMIT PARIKH



URVIL PATEL



ANKIT ILAVYA

AL TEAM



ANUGRUH SINGLA



SHUBHAM PATEL



MANAV PATEL



AARZOO JOBANPUTRA



HARSH PATNI



AASTHA MAURYA



ANANYA BAJORIA



RIYA NAIDU

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SPT NEWS & EVENTS

October Updates:

- NBA accreditation for Petroleum Engineering received for 3 years.
- DirectorSPT along with Dr Hari Sreenivasan visited IOGPT and IEOT, ONGC Panvel on 02nd Oct. 2021 for possible collaborations for offshore engineering, Robotics and sub-sea template.
- (f) Dr Shashi Guntur, CEO – Petrabyte along with Mr Durga Prasad from M/s Kognosdata visited PDEU on 08th Oct. 2021 for signing MoU and various collaborative efforts including Edge computing, Digital Twin, training on Data analytics
- A guest lecture on Drilling Engineering was organized by IADC by external expert Mr Ajay Gupta, which was highly appreciated by the students.

November Updates:

- Hydrogen expert of SPT attended World Hydrogen Conference organized by “World Hydrogen energy Summit” on a virtual platform on 16th Nov. 21. Undersigned chaired a session on Fuel cell where international experts from Israel, Greece, France and US participated.
- 21 students of B.Tech along with 3 faculties and undersigned visited MIT Pune as a part of IADC workshop on “Sustainability and Safety” from 25th – 27th Nov. 21. Undersigned delivered a lecture on Sustainability and Safety to participating students and attended a panel discussion of top industrial expert on Sustainability and safety issue. Mr O P Singh (Director- T&FS) ONGC graced the occasion as Chief Guest and appreciated the efforts of IADC student Chapters of MIT Pune and PDEU.
- SPE Fest have been organized for four days from 11th to 14th Nov. 2021. Large number of student’s across the countries and international participated industry professionals including academician participated physically at PDEU. Mr O P Sinha (EX Director & Head IRS) was the Chief Guest and has appreciated the quality education provided by SPT PDEU.
- Mr Sanjay Raval, a renowned motivational speaker given a session in PDEU at IADC platform, more than 500 students participated and benefitted by his talk.
- Prof. Kartic Khilar Memorial Lecture was organized on 22nd November 2021. Lecture was delivered by Mr Vasudevan Kannan, IIT Professor and EX ED-ONGC. Large number of faculties, staff and guest participated. Mrs Khilar and his son Mr Kunal participated in the talk hosted by PDEU.
- A keynote lecture was delivered on 23rd Nov. 2021 by DirectorSPT in virtual mode in International conference organized by Oil & Gas and Petrochemistry at Dubai.
- M/s SNF, a collateral of SPT donated Rs 9 lakhs furniture and fixtures for Chemistry lab. Work have already been completed.
- MoU was signed with MIT-WPU Pune for Student and Faculty Exchange and collaborative research on Sub Sea facility being installed in MIT Pune.

December Updates:

- Hydrogen expert of SPT attended World Hydrogen Conference organized by “World Hydrogen energy Summit” on a virtual platform on 16th Nov. 21. Undersigned chaired a session on Fuel cell where international experts from Israel, Greece, France and US participated.
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Polymer sample characterization project undertaken as a special ORSP project for a private E&P industry.

First ever around 100 petroleum engineers have been trained in one day fire training program (theoretical & demonstrational) at ONGC Main Fire Station, Saij, Kalol on 14th & 15th December 2021 with the help of ONGC management. Around 4 faculties and 100 students have been sent and were hosted by ONGC. The training was highly appreciated by stakeholders including the parents of the students and faculties. This initiative needs to be pursued every year for future if PDEU management supports the cost.

“Lifetime Achievement Award” was conferred on the undersigned for dedicated services to “Indian Oil & Gas Industry” in the last 4 decades by Afro Asian Association of Petroleum Geochemist (AAPG) in 11th international conference on AAPG inaugurated by Petroleum Minister Mr Hardeep Singh Puri on 23rd December 2021 in virtual mode.

Undersigned along with a student research group and 2 faculties visited Jagatiya, a site of gas exposure near Gir-Somnath for extended exploration to find out the potential, State government authorities including DC Gir-Somnath was contacted and permission sought. A letter has been written to ONGC for further help in evaluating the potential. It is proposed to carry out a gravity survey around the gas source in January 2022 by deploying PDEU faculty and students utilizing PDEU equipment’s.

Mr Pallav Pancholi, MD & CEO of CI Water Industries LLC approached undersigned through Prof. Dolly Gandhi,

a chemical engineering faculty from Vishwakarma Engineering College, Gujarat for possible collaboration in developing mud additives for drilling operations in oil and gas field. The team visited on 31st December and had deliberation M/s CI Water ready to finance research scholar in SPT for specific research objectives DEU.

- Mr Sanjay Raval, a renowned motivational speaker given a session in PDEU at IADC platform, more than 500 students participated and benefitted by his talk.
- Prof. Kartik Khilar Memorial Lecture was organized on 22nd November 2021. Lecture was delivered by Mr Vasudevan Kannan, IIT Professor and EX ED-ONGC. Large number of faculties, staff and guest participated. Mrs Khilar and his son Mr Kunal participated in the talk hosted by PDEU.
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January Update:

- Four students of B.Tech (3rd & 5th Semester) left for Semester Exchange Program in the University of Oklahoma in Petroleum engineering.
- 3 SPT faculties (BGD, Rohitsir & Gaurav) and DirectorSPT represented PDEU on Gujarat government organized international conference of Academic Institutions- A Vibrant Gujarat Event for two days' in Science City.
- A geological field trip for faculties and research scholars were organized from 07th – 09th Jan. in Kutch for enhancing the geological knowledge and better understanding through exposure to outcrops.
- Syllabus was revisited on 27th Jan. 2022 for finalizing second year B.Tech Petrochemical course as well as minor modifications in B.Tech and M.Tech course curriculum.
- Proposal for Semester exchange program with MIT Pune is being worked on as per MoU. Course mapping being undertaken by group of faculty of PDEU and MIT Pune.
- The success achieved in one of the research project by students being pursued by SPT in the form of further identifying the potential of gas resource in Jagatiya village of Kodinar taluka in Gir-Somnath district. Meeting was held with ONGC geoscientist and ONGC assured helped in exploration accordingly. A team of faculties, research scholars visited the field on 29th Jan. 2022 to carry out the gravity survey in and around the gas source by making 16 grid area, data collected and being reviewed. Three gas samples were collected in high pressure gas sampling equipment for onward transmission for KDMIPE – ONGC Dehradun for carbon isotope studies as suggested by ONGC expert. ONGC agreed to carry out the studies without any cost. The data will be shared with ONGC experts for firming up the future exploration program in the areas for overall development of gas resources of Gujarat.

February Updates:

- Dr. Pushpendra Kumar, India's topmost expert of Gas hydrate visited SPT and delivered a special lecture on 22nd Feb. 2022 to faculties and students and guided Dr Pawan Gupta for his research project on gas hydrate.
- Mr. Neeraj Gupta, CEO of I-Energy, New Delhi visited SPT on 25th Feb. 2022 for discussion on teaching a digital twin technology course to our students as a capsule course for around 20 hours.
- The sucker rod installed near SPT-PDEU is being made operational to test the digital twin technology as well as augmented reality experiment.
- Mr. Vijay Gokhale, ED and Asset Manager, Ankleshwar ONGC visited SPT on 28th Feb. 2022 and interacted with large no. of students to motivate them for oil industry and acquaint them the status of technologies prevailing in E&P sector. Mr Gokhale also interacted with faculties after having a detailed presentation of PDEU and SPT. During the visit to DCS laboratory, he appreciated the efforts of PEDU in making industry ready energy soldiers for the country.
- Mr. Arun Karle visited PDEU on 14th Feb. 22 and discussed the participation of SPT student in National Safety Programme of ONGC at New Delhi. Mr. Nisarg Patel of 2018-22 batch went to ONGC New Delhi for Safety week celebration and participation and sharing his project work on Safety.
- DirectorSPT delivered keynote address in plenary session in 12th World Petrocoal Congress 2022 on topic "Digital Transformation in E&P Sector" along with other speakers like Director-Exploration ONGC, ADGD-DGH and ADGE-DGH. Delegates from 15 countries participated in the congress.
- Mr Durgaprasad from M/s. Kognosdata, an affiliate of Petrabyte Corporation LLC. visited SPT along with his team to discuss and deliberate further collaboration with M/s. Petrabyte Houston.
- A new consultancy of Rs. 4.72 lakhs was awarded to SPT for analysis of water compatibility for water injection in petroleum reservoir of a leading private company in Gujarat

March Updates:

- Shrinath Jani, one of our M.Tech petroleum engineering student declared as All India Rank 1 (Topper) in National Gate Examination. Mr Jani is a B.Tech Petroleum engineering from SPT also. It is worth mentioning that last year also one of our student secured AIR 1.
- Dr. Kameshwar Singh, Guest faculty from Norway initiated the course on CMG software for selected group of students on 03rd March 2022 for improving digital skills and employability.
- Around 400 students of B.Tech 4,6 & 8 semester welcomed by Director-SPT in a grand function in Auditorium on 14th March 2022 wherein students also expressed their experience of pandemic specific to their family problems and personal losses by few of them. Director Academic Affairs, Prof T P Singh and Registrar, Prof Tarun Shah also addressed the students and assured full support and help to all the students joining offline after 2 years.
- Interviewed for next semester deputation of students

to OU, USA for Semester exchange program were held and 3 students were selected based on their academic results and personal interview. Further processing being done by OIR.

- Activity based Personality Development program was organized for SPT students by Dr. Mary Hepzibah on 23rd March 2022. Dr. Milind Vora, Head Anand grace the occasion and delivered, the program was big success. (i) Dr. R V Marathe visited PDEU and reviewed the performance of SPT research along with other consultancy projects on 25th March 2022.
- Mr Hrushikesh Karnik, AEE- Drilling form ONGC Meh-sana delivered a lecture on Digitization in drilling and share his experience which was highly interactive and students were benefitted a lot on 24th March 2022.
- Three days extravaganza program were organized and inaugurated by Director-SPT. The program was technical in nature. Large number of students from various universities participated in the program. Guest lectures were also organized on various topics. Students could develop their skills in addition to enhancing academic knowledge and industry interact.
- A MoU was signed with Mr Pallav Pancholi, CEO of M/s. C1 Water for possible collaboration for joint research project at SPT-PDEU for developing innovative oil field chemicals being supplied to E&P industries.
- Five students, executive of FIPI along with one faculty visited Dibrugarh University to attend Annual Convention of FIPI and presented a theme paper on Digitization on E&P Sector. The PDEU student chapter was adjudged as National Runner Ups for their outstanding achievement during the year.
- All the student chapters of SPT organized "Intern Talk" on 22nd March 2022 to share the internship experience among them.

MOU's Kognosdata, C1 Water, MIT Pune

C1 Water Industries LLC:

- C1 Water Industries LLC is a leading manufacturer of specialty chemicals used in drilling fluids, distributing mud additives to oil and gas industries worldwide. The Company's product and Services covers a range of drilling fluids for Oil and Gas Wells, Mud Chemicals, Work over and Completion Fluids, Production Chemicals, Well Stimulation Chemicals and General Utility Chemicals.
- This MoU will help SPT-PDEU in Formal training programs, work association and supply of samples



MIT-WPU Pune:

- MIT's School of Petroleum Engineering is one of the pioneering schools in the domains of energy. It has earned numerous laurels in last four decades. It is the second oldest school engaged in Petroleum Engineering education in India. With excellent technical infrastructure, faculty, and academic ambiance in the School, the students of PE excel in their studies as well as in co-curricular and extra-curricular activities.
- The School of Petroleum Engineering has been instrumental in a state-of-the-art Subsea engineering laboratory development project at MIT. This facility is a corporate social responsibility project by Aker Solutions. This joint initiative of Aker Solutions and MIT, Pune has been named the Dr. Vishwanath Karad Centre for Subsea Engineering Research. The laboratory is under commissioning.
- Formal training programs, Work Association and Student Exchange programmes.

Kognosdata:

- Kognosdata is a business affiliate in India providing services to Petrabytes Corporation and serving clients and institutions in India on behalf of Petrabytes Corp., Kognosdata offers a wide range of services in the areas of innovative and cost-effective engineering and scientific solutions, onsite and offshore consultancy services for engineering & scientific softwares, handholding in software development, highly secured online e-commerce solutions for clients, software development for all kinds of communication projects, technical training to the clients and a 24x7 technical support to its customers.
- Formal training programs, Collaborative research work and Recruitment.



IEnergy Innovations Private Limited:

- IENERGY is founded by oil & energy industry professionals, with several decades of experience and focused on driving digital transformation in the industry through the power of Cloud, IOT and data analytics.
- IENERGY has built an industry learning platform called Petrocoder.com to drive the learning transformation of oil & gas and energy community on digital technologies like big data, data analytics, cloud, IOT and others. IENERGY has also developed a portfolio of its own SAAS solutions (e.g., ICEBERG - for E&P information management; AURORA - for IOT solutions in oil & gas; NETZERO - sustainability and HSE Management; VISVA - Cloud Platform for Oil & Gas) to deliver digital transformation the in oil & gas and energy industry in India and globally.
- Formal training programs and Collaborative research work.

CAMPUS RESUMPTION



Rahul: I was super excited for this moment since college is the place where we enter to make our careers and memories. But due to the pandemic, I was not able to attend the very first day of my college which certainly disheartened me. For the last two years, we have all been stuck in our homes, and life seemed to be slow down. I could barely feel that I have entered the college due to the fact that we were instructed to follow the online academia.

Yash: How did you spend your time during COVID?

Rahul: Initially I spent some quality time with my family. Later on, as the circumstances started worsening, every-



HARSH : What is your thought on campus resumption?

YASH: Well, I was very excited to see the collage campus. I was attending the olinline classes since my admission, so it was very good experiece to attend the class in physical mode. I personally found that it is a good opportunity to perform practicals in laboratories because in online mode there was no any facility to actually understand the practicals and their importance.

HARSH: How did you spend your time during COVID?

YASH: During covid, the situation was becoming worse day by day and there was negativity all around, so I was unable to focus on my studies and also got distracted easily. Daily I used to pray to the god to make the situation normal. I was waiting for the day to come to the campus.

HARSH: How did you feel, meeting your college friends after 2 long years?

YASH: As I said, my batch was online batch so I never met my collage friends physically. We used to have meetings but in virtual mode. So, I was thrilled to meet all my friends for the first time physically.

HARSH: How difficult is it, transitioning from online teaching mode to offline? (Talk about concentration level, easy hard)

YASH: It was a bit difficult because I was quite distracted and unable to focus totally on study. Also I was bit worried about offline examinations because after three and half year I was going to give my first offline exam. Switching from digital screens to board and to sit continuously in the class were the factor being quite difficult but again good for the self development. I also met faculties physically and I found everyone to be very supportive.

Yash: What is your thought on campus resumption?

thing became lame. I started blogging which helped me to improve my writing skills. It also helped me to broaden my mindset as I spent a handful of time exploring and know myself in a much deeper manner.

Yash: How did you feel, meeting your college friends after 2 long years?

Rahul: The feeling was ecstatic, new faces, new people from different backgrounds, diversified approach, I absolutely loved that. Looking forward to make profound connections with them.

Yash: How difficult is it, transitioning from online teaching mode to offline? (Talk about concentration level, easy hard)

Rahul: Quite difficult, not from the student perspective but also if we consider the teachers too, it was difficult for them too, to impart the knowledge in an efficient manner. I also faced a lack of concentration when the circumstances felt like never ending, irritability and frustration become the natural behaviour changes that I observed in me during the lockdown.

Now since we are back to the campus, I am trying to adjust my routine through various experiments.

GATE 2022 PE

SHRINATH JANI

AIR 1
(2009 - 2013)



SHIVAM PATEL

AIR 37
(2018 - 2022)



CHAUHAN NITIRAJ

AIR 86
(2019 - 2023)



NEHAL KHETANI

AIR 123
(2018 - 2022)



TIRTH SHAH

AIR 174
(2019 - 2023)



MIHIR PANCHAL

AIR 227
(2018 - 2022)

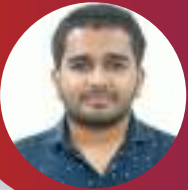


PERFORMANCE



JASH PATEL

AIR 227
(2018 - 2022)



GOGADANI KAUSHIK

AIR 240
(2019 - 2023)



UTSAV HARKHANI

AIR 247
(2018 - 2022)



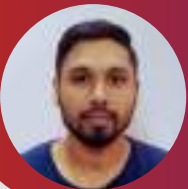
MANIYA DIGJAY

AIR 263
(2019 - 2023)



HALARI DARSHAN

AIR 294



BHASKAR PAUL

AIR 749

GUEST LECTURE ON ASPECT OF DRILLING PROBLEMS : CAUSES AND REMEDIES

SPE PDEU Student Chapter organized a guest lecture by Mr. Ratnabh Sinha, Executive Engineer (Drilling), ONGC, on the topic, "Aspects of Drilling Problems: Causes and Remedies" on 8th October 2021. Mr. Sinha shared his experience regarding the various on-field difficulties that emerge during drilling operations. He also threw light economic and practical solutions we can use to combat these complications.



PDEU SPE FEST'21

The seventh edition of the grand PDEU SPE Fest 2021 commenced with a warm welcome to the dignitaries, oil and gas professionals, faculties members and participants from the several universities all across the globe.

The Inaugural Ceremony witnessed prominent dignitaries



Empowering Excellence

11-12-13-14 November

from various disciplines of the industry

On the initial day of the largest Oil and Gas Festival PSF21, dated 11th November 2021, SPE PDEU Student Chapter organized the mesmerizing and stimulating Panel Discussion on the topic, "Are government policies aligned with India's Energy Security".

SPE PDEU Student Chapter organized 'Catechize: The International Quiz Competition' as part of the PDEU SPE

Fest 2021 launched under the banner for 'Empowering Excellence' on the 13th of November 2021. The quiz-based competition saw the immense participation of students all across the globe testing their knowledge of the Oil and Gas Sector.

GUEST LECTURE ON "PRODUCTION OPTIMIZATION USING FIELD MEASUREMENTS IN A.L. WELLS."

SPE PDEU Student Chapter organized a guest lecture by Mrs. Vibhuti Bhargava, Petroleum Engineer, SIAM Services India Pvt Ltd., on the topic, "Production Optimization using Field Measurements in AL Wells" on 12th November 2021. Mrs. Bhargava, who has over a decade of experience in the Oil and Gas industry, enlightened the partakers on various techniques that can be utilized to enhance the productivity of mature oil fields.



GUEST LECTURE ON "TRANSPORTATION OF HYDROCARBONS THROUGH PIPELINES."

SPE PDEU Student Chapter has perennially aspired to bridge the interlude between industry and academia, and we have always strived to accomplish our objective to the fullest. In its pursuit, SPE PDEU Student Chapter had organized an



enlightening guest lecture on the topic "Transportation of Hydrocarbons through the pipeline" by Mr. Sanjay Kumar Mazumder as a part of its 4-day oil and gas voyage; PDEU SPE Fest 2021, on 12th November 2021.

EXEGESIS: WELL LOG INTERPRETATION COMPETITION.

SPE PDEU Student Chapter organized "Exegesis- Well Log Interpretation Competition" on 12th November 2021 as a part of PDEU SPE Fest 2021. The competition was judged by Mr. V.L.N. Avadhani, Group General Manager, Geophysics, Head of Institute at CEWEL, ONGC. Participants used their analytical skills and problem-solving abilities to interpret the given well-log data and predict its implications on the petrophysical properties of the reservoir.



SHOWCASE: PAPER AND POSTER PRESENTATION COMPETITION.

As a part of the PDEU SPE Fest 2021, SPE PDEU Student Chapter commenced the third day of the Oil and Gas Petrovaganza, with the flagship event, "Showcase: Paper and Poster Presentation Competition," on 13th November 2021. The event's objective was to improve the skillset of partakers and provide a platform to demonstrate their creativity and meritorious proposal in the form of research and presentation.

EXAMEN: CASE STUDY SOLVING COMPETITION.

As a part of PDEU SPE Fest 2021, SPE PDEU Student Chapter organized Examen: Case Study Solving Competition. It was an intriguing case study solving competition held on the third day of the biggest oil and gas festival, during which the students were provided with a case study based on practical problems faced by the Oil and Gas Industry in day to day lives.

SPECTROCODE: THE CODING COMPETITION.

SPE PDEU Student has always aimed to provide enthusiast knowledge, and platform in every direction and dimension with the same objective, SPE PDEU Student Chapter organized "Spectrocode-The Coding Competition" in association with our event partner Petroleum from scratch on the 13th of November 2021 as a part of the PDEU SPE Fest 2021.

FEUD A NATION: THE DISPUTE SOLVING COMPETITION.

The final day of the grand PDEU SPE Fest 2021 saw its commencement with the most glorifying event, Feud A Nation: The dispute solving competition. Partakers engaged in meaningful discourse, showcasing their debating skills and understanding of the Oil and Gas Industry on the topic,



BID YOUR BLOCK

"How will energy crisis impact the trajectory for Low Carbon Pathway"

Among the numerous technical events that PDEU SPE Fest 2021 boasted off, Bid your Block: Virtual Block Bidding competition was organized on 14th November 2021, the initial day of the technical extravaganza.



Amidst the spectrum of numerous technical events which succored the partakers in strengthening their intellect, SPE PDEU Student Chapter also encompassed some technical events in PDEU SPE Fest 2021 arsenal, which encouraged the participants to showcase their marketing skills and bring out something unconventional.

CLOSING CEREMONY

PDEU SPE Fest 2021, The Grand Oil and Gas Extravaganza of India, finished off in flair with a mesmerizing and grandiose Closing Ceremony on the final day of the fest, 14th November 2021. The session graced with the solemn presence of Dr. R.K. Vij, Director, School of Petroleum Technology, PDEU, Dr. Bhawanisingh Desai, Associate Professor at SPT PDEU, Dr. Amit Verma, Faculty Advisor at SPT PDEU. The prominent Oil and Gas Festival was also honored by the presence of Ms. Yogini Lakhani, President 2020-21, SPE PDEU Student Chapter, Mr. Shivam Paliwal, President 2019-20, SPE PDEU Student Chapter and Mr. Dhruvin Kaneria, Secretary 2018-19, SPE PDEU Student Chapter.

TREASURE HUNT

SPE PDEU Student Chapter conducted an engrossing event, Treasure Hunt on 26th November 2021 to wholeheartedly welcome and acquaint the freshers with Oil and Gas Industry in a perspicacious and illuminating way. The event fostered the partakers to resuscitate their logical reasoning and problem-solving skills to unlock the amusing puzzles. The event was held virtually on MS teams and was invigilated by the core committee members of SPE PDEU



Student Chapter.

SPE PDEU Student Chapter hosted, 'Conflict Confronts- A Debate Competition', to wholeheartedly welcome and acquaint the freshers with oil and gas industry in a perceptive and illuminating way. Partakers engaged in a meaningful discourse, demonstrating their debating skills and understanding of the oil and gas industry on the topic, Should India levy Carbon Tax to combat the effects of climate change?

SPECIAL DAY OUT.

SPE PDEU Student Chapter organized, 'SPEcial Day Out- A donation drive', where we wholeheartedly welcome and acquaint the freshers in a do-good and enjoyable way. The event was held on 28th November 2021 wherein the students as well as committee members of SPE PDEU engaged in an event for the benefit of society.

GUEST LECTURE ON CEMENT SLURRY DESIGN AND ITS APPLICATION.

SPE PDEU Student Chapter conducted a distinguished guest lecture on the topic, "Cement Slurry Design and its Application" on 9th January 2022. This guest lecture was delivered by Mr. Nishant Kumar Singh, Field Operational Professional, Halliburton.



OIL-O-QRIOUS: A TECHNICAL QUIZ COMPETITION.

SPE PDEU Student Chapter organized Oil-O-Qrious: A Technical Quiz Competition in collaboration with IPE GATE, which is an initiative taken by the alumni of IIT Madras for providing quality and conceptual learning platform for Petroleum GATE examination. IPE offers the fundamental knowledge to students to perceive all concepts and apply them in a better way. The main objective of the competition was to aid all the participants to scrutinize their GATE Exam preparedness.

GUEST LECTURE ON "OPTIMIZING WATER-FLOOD MANAGEMENT TO IMPROVE OIL PRODUCTION IN CARBONATE RESERVOIR VIA STREAMLINE STUDY"

SPE PDEU Student chapter organized the guest lecture on 'Optimizing Water Flood Management to Improve Oil Production in Carbonate Reservoirs' as part of its mission to educate the budding petroleum engineers with key insights of the Oil and Gas Industry. The lecture was delivered by Mr. Soumyabrata Biswas, an Executive Engineer (Reservoir), Institute of Reservoir Studies (IRS), ONGC.

PTER ACTIVITIES



Pandit Deendayal Energy University
SPE Student Chapter

5MT

SPE PDEU Student Chapter organized '5MT', the presentation competition as part of the SPE Week 19.0. The event was on a virtual platform wherein participants were assigned a random topic to prepare a PowerPoint presentation. The participants competed in teams of 2 to prepare the ppt in time span of 5 minutes. The event significantly enhanced the participants' critical thinking, logical reasoning, and time management skills.



PERSPECTIVE

SPE PDEU Student Chapter organized "PerSPeCtive: A live Interaction session" as a part of SPE Week 19.0. The podcast on 'The Role of Natural Gas in Energy Transition', was conducted on the final day of the SPE Week 19.0 and provided a unique opportunity to understand the current role of natural gas and the future of petroleum engineering as a whole.

The speaker for the session Mr. Zachary Evans is a Reservoir Storage Manager at WSP, and SPE Regional Director of North America. The session established itself with the meaning and need for Energy Transition. Sir emphasized upon 'Energiewende', a case study on transition to shift to low carbon energy.



SPECTATION

SPE PDEU Student Chapter organized 'SPEctation: The case study solving competition as a part of SPE Week 19.0. The alluring competition, held on 3rd day of SPE Week 19.0 provided students with an excellent opportunity to improve their technical and logical reasoning abilities. Participants came up with their innovative ideas to tackle the case study problem of, 'Economics of Infill Drilling Programs in Oil and

Gas Reservoir,' and presented them to Mr. Peyush Nene, the judge for the event. Mr. Nene judged the participants, understanding their views and ideas while also considering their presentation and communication skills. The event saw humongous participation of students from universities all across the country.



GUEST LECTURE ON "RESERVOIR ENGINEERING DIAGNOSTICS IN UNCONVENTIONALS."

The SPE PDEU Student Chapter organized a 'Guest Lecture' under the banner of SPE week 19.0. The topic of the lecture was "Reservoir Engineering Diagnostics in Unconventional". The session highlighted the discussion of production analysis and forecast in unconventional reservoirs. The event was held virtually on MS teams.



APPLICATION OF MACHINE LEARNING IN E&P

PDEU PANDIT DEENDAYAL ENERGY UNIVERSITY
FIPI FIPI PDEU STUDENT CHAPTER

2 Week Workshop
--- on ---
APPLICATION OF MACHINE LEARNING IN E&P

SHRI R.V. MARATHE
Former Executive Director and Head, Institute of Reservoir Studies, ONGC

3 PM Onwards
16th to 20th Aug'21
30th Aug to 3rd Sep'21

Contacts:
Komal: +91-9624324887 | Harsh: +91-9737411987

f /fiippdeu | @fiip_pdeu | in /fiip_pdeu | @fiip_pdeu | fiip_pdeu

Machine learning is now widely recognized as a way to collect vast amounts of data in real-time and turn them into meaningful insights and it can help to save time, cut costs, and improve safety in the oil and gas industry. The FIPI PDEU Student Chapter organized a two-week workshop on the Application of Machine Learning in E&P to empower final-year students with knowledge and domain skills. The workshop was delivered by Dr. R.V Marathe (Former executive director and head at IRS, ONGC). The workshop was exclusively organized for final year students, where the selection of the students was done through a preliminary quiz.

Various topics such as Big Data in E&P, basics of Python, Introduction to Machine Learning and Tools of Machine Learning, Electro Facies Classification and determination, Data Analysis for reservoir characterization, Time series model, Introduction to Ann and Ann's problem solving using Keras, and others that are useful in the Oil and Gas industry were covered throughout this workshop. Upon completion of the workshop, the students were provided with a certificate of participation..

INTERNATIONAL WEBINAR SERIES FOR THE BRANCH OF RUSSIAN STATE UNIVERSITY OF OIL AND GAS NAMED AFTER I.M. GUBKIN IN TASHKENT, REPUBLIC OF UZBEKISTAN

DAY 1 :

In accordance with the signed memorandum of understanding between PDEU and the Russian State University of Oil and Gas, SPT, in conjunction with FIPI PDEU and OIR PDEU organized a 5-day International Webinar Series on the oil and gas sector for the branch of the Russian State University of Oil and Gas named after I.M Gubkin in the city of Tashkent, during 20th -24th September 2021. The event began with introducing the esteemed faculties of Pandit Deendayal Energy University, followed by an ardent interaction with the faculties and students of the Russian State University. Dr. R.K. Vij began his lecture at 11 UZT Time and addressed how oil companies are building more prominent supercomputer centers to analyze seismic and drilling data quickly. Then, at 1:00 UZT time, Dr. Shanker Krishna began by elucidating the Role of Geo-Mechanics in the Oil and Gas Industry. At 3:00 UZT time, Dr. Shanker Krishna and Dr. R.K. Vij concluded the session, leading to a great end to day 1 of the webinar.

PDEU PANDIT DEENDAYAL ENERGY UNIVERSITY
FIPI FIPI PDEU STUDENT CHAPTER

INTERNATIONAL WEBINAR SERIES
for the branch of
Russian State University of Oil and Gas named after I.M. Gubkin in Tashkent, Republic of Uzbekistan

20th-24th September, 2021

OIR **SPT** **FIPI**
"International Webinar"

DAY 2 :

On 21st September 2021, Mr. SSP Singh delivered the first webinar on industrial oil & gas field production operation. He started his lecture with a brief introduction to the petroleum asset value chain and the life cycle of petroleum engineering. Throughout the session, he covered many topics like well connection configuration, well manifold, wellhead and well fluids, simplified well head fitting and piping, Christmas tree components, etc. Mr. Santosh Rampilla delivered the second webinar on Advanced logging techniques for reservoir characterization. The plenary began with an introduction about the use of Advanced well logging tools and approaches toward Improved reservoir characterization and their value to reservoir engineering. He covered different topics like NMR imaging, its principle, image logs, advanced sonic application, wireline open-hole log testing, pulse neutron logging, etc. Mr. Gaurav Hazarika delivered the last webinar on the Matrix Acidization, he discussed the field procedure for matrix acidization and the Injectivity test, and three case studies that he practically encountered during his career. With this session, the second day of the International Webinar series concluded.

DAY 3 :

On the Third Day, Mr. B.B. Ray started the session with a brief description of Geological aspects of oil and gas field development. He explained how petroleum geology is concerned with the structural configuration of the crust of the earth and briefed how such structural deformation may form features capable of trapping migrating petroleum along with the procedure of field development and what FDP should include. He concluded the session by briefing about Proven Reserves and how Stochastic Model works. The last webinar of the third day of the International Webinar series was on Offshore Operations & Technology which was delivered by Dr. Hari S., who firstly discussed how the development of welding design philosophies for deepwater offshore structures took place over time. He further threw light on the evolution of the Offshore platforms and discussed environmental loads acting on an Offshore platform, Floating production storage and offloading, Mooring systems, and different types of Marine risers.

DAY 4 :

On 23rd September 2021, the fourth day of the International Webinar Series commenced at 10:10 UZT Time with the webinar on Redevelopment of Offshore Oil

Field by Dr. R.K. Vij. He started the session by explaining how two-thirds of the world's daily oil production comes from mature fields including the history of the production of crude oil in India from 2006 to 2016, along with the field details and generalized stratigraphy. The session was concluded with a briefing on the Management field. The next Webinar was on Machine Learning for Petroleum Engineers which was delivered by Dr. R.V. Marathe. It was intended to make participants aware of the importance of Machine learning and big data in the oil and gas industry. In his session, he discussed deep learning, Linear and Non-Linear classification problems, Building Predictive Machine Learning Models, and the Application of Typical Data Categories models in Reservoir Engineering. With this session, the fourth day of the International Webinar series concluded.

DAY 5 :

On 24th September 2021, the Fifth Day of the International Webinar Series commenced at 10:10 UZT Time with the webinar on Gas Hydrate Technology by Dr. Pawan Gupta. He started the session by explaining how accurate, consistent and timely energy data are fundamental to developing effective and efficient national energy policies. The session also included how the peak of the Gas Hydrates Resource Pyramid is represented by gas hydrates that exist at high saturations within quality reservoirs rocks under existing Arctic infrastructure. The session was concluded with the topic of methane recovery from hydrate reservoirs. The next Webinar was on Coal Bed Methane Recovery, which was delivered by Dr. Paul Naveen. The session commenced with a statistical review of world energy and projected a clear understanding of the importance of unconventional energy resources technology in the context of world energy demand and why Coal Bed Methane (CBM) gas has gained prominence at the commercial scale in different countries To maintain the enthusiasm of the webinar series and check the knowledge gained by the students, a quiz was conducted on the last day based on the topics discussed in the lectures. After the quiz ended, a valedictory ceremony was organized to celebrate the accomplishment of the 5 Day International Webinar Series and bid a final goodbye to the students and faculty members of the partnered university. The occasion was graced by the presence of our guests of honour, Professor S. Sundaram, Director General, PDEU, and Professor Abdulla Magrupov, Deputy Director-executive director, Russian Stage University. The ceremony ended with a vote of thanks by Mr. Gaurav Hazarika.

C2C WEEK

Highlighting the importance of HR and Technical skills for employability, FIPI PDEU conducted C2C: Campus to Company Week, from 4th to 10th October 2021. It consisted of 4 Competitive Rounds and 2 Guest Lectures. On the first two days, Ms. Nancy Shah (Public Speaking Trainer and founder of Speaker's Circle) and Mr. Nizom Baruah (Speaking and Marketing Enthusiast) delivered the lectures on 'How to face HR questions in an Interview' and 'CV building' respectively. The Competitive rounds began, after the lectures, with the Aptitude and Technical quiz followed by the Excel Round where participants solved the given problem statement using Excel. Round 3 was a Guesstimate Round, conducted by Hrushikesh Vora (Production Engineer, ONGC) and Jenish Lalcheta (Executive Engineer, Sanmarg projects). Round-4 and the final round was the Mock Interview round conducted by Mr. Anshul Gupta (Directional Driller, Baker Hughes), Mr. Sachin Nambiar (Assistant Executive Engineer, ONGC), and Career Moderator. The C2C week provided the participants with a simulation of the job interview in a safe environment.



A FIELD ASPECTS OF MWD-LWD DRILLING SERVICES

FIPI PDEU Student Chapter organized a webinar on "A field aspects of MWD-LWD drilling services" in collaboration with Educative Oil and Gas Industry Training. The overall purpose of this webinar was to give a basic overview and practical aspects of running MWD/LWD tools. The webinar was delivered by Mr. Khalid Karajagi, who has over 13 years of experience in onshore, offshore, and deep-water wells. He started the session by outlining the several drilling services and the roles of the personnel in each. Then, he went over the various data that MWD tools provide, such as wellbore positioning, pressure, and temperature. He concluded his discussion by explaining LWD systems which provide superior formation evaluation data, and gamma-ray sensors that identify the lithology changes. It was followed by a question-and-answer session. Overall,

the webinar was a success, and the purpose of imparting knowledge through the webinar was accomplished.

PROF. KARTIC KHILAR MEMORIAL LECTURE ON "FUTURE OF SUSTAINABLE FOSSIL FUEL IN NET ZERO ECONOMY AN INDIAN PERSPECTIVE"



Every year, PDEU organizes a memorial lecture in honour of our former Director-General, late Professor Kartic Khilar. The FIPI PDEU STUDENT CHAPTER was given the privilege of hosting the 11th memorial lecture this time. Mr. Vasudevan Kannan, Ex-ED Basin Manager Bombay offshore, Capital ONGC, and visiting professor at IIT Bombay, was our Chief Guest at this event. Mrs. Jayashree Khilar, Kartic Khilar Sir's wife, and Mr. Kunal Khilar, Kartic Khilar Sir's son, honoured

the event. The intriguing lecture was based on the topic “Future of sustainable fossil fuel in the net-zero economy: An Indian perspective.” The session came to a close after the chief guest imparted his knowledge, with all guests having the opportunity to address the chief guest any questions they had.

COALESCE 4.0

FIPI PDEU announced the 4th Generation of this event series that goes by the name of “COALESCE 4.0” under the theme of ‘Digitalization in Petroleum Industry’. To highlight the upcoming digital trends in Oil and Gas Industries and to prepare the future petrobuds for more such transitions, Coalesce 4.0 hosted a set of 5 events, namely; Ecoscribe 3.0, Prospect, Webinar, Friendly Cricket Match, and Social Initiative. The very first event of this series was “Ecoscribe-An Online Blogging Competition” which revolved around the theme of ‘Impact of Offshore Oil Extraction on Marine Ecosystem’ and portrayed the environmental concerns of the Oil & Gas Industry that needs attention. The 2nd event of this series was the “Petrospect-Technical Quiz Competition” wherein the technical knowledge of the participants about how well they know to oil and gas industry was examined. Next in the sequence was a webinar on



“Demystifying Digitalization: Careers in Oil and Gas by Mr. Nikhil Kulkarni” which illustrated the upcoming digital transformations of the Oil & Gas Industry and strategies to overcome them. The most generous event of Coalesce 4.0 was indeed a cricket tournament between 3 student chapters of PDEU and was conducted to cherish unity and team spirit between these student chapters. Coalesce 4.0 concluded with a social initiative that aimed towards spreading awareness regarding sanitation and hygiene at the time periods among the girls and women at a street school located in the slums of Vadodara. Thus, Coalesce 4.0 ensured a 360-degree development of participants by computing their technical knowledge at one end as well as giving a social message at the other end.

As part of our Social Initiative, the representatives of the FIPI PDEU student chapter got a chance to visit a street school at Zadeshwar Nagar Vadodara for the sanitation and hygiene drive for girls and women who stay, work and learn at the school. They tried to explain and spread awareness about the importance of maintaining hygiene during periods and what is the correct use and proper disposal of sanitary napkins. Amidst the increasing cases of Coronavirus in

SANITATION AND HYGIENE DRIVE



the country, people at NGOs ensured that all the COVID protocols are strictly followed. Even the children of 7-8 years of age knew that it was important to put on masks and maintain social distancing. They were overwhelmed by the response of the girls and the women at the school. Our vision behind the drive was to create a world where every girl and woman manages her menstrual hygiene without an iota of shame.

2-DAYS WORKSHOP ON T-NAVIGATOR SOFTWARE

From the reservoir to surface networks, tNavigator is a high-performance tool for integrated static and dynamic modelling. Mr. Shantnu Brajesh [Business Development Manager, Reservoir Manager, Rock Flow Dynamics] gave a two-day session on the tNavigator software. The workshop provided a thorough understanding of the overview and fundamentals of reservoir stimulation, as well as a solid foundation of knowledge. After the workshop, there was a quiz, and certificates were given out.

IADC ANNUAL GENERAL MEETING



On 28th September, IADC PDEU Student Chapter marked one glorious and amazing year since its establishment in Pandit Deendayal Energy University.

To look back and commemorate the achievements in the past year, IADC PDEU SC held the celebration of the 1st anniversary at the campus. The day's chief guest was Mr. Ved Prakash Mahawar, Ex-Director (Onshore), ONGC who has an experience of 34 years in managing drilling and operational functions.

The celebration started with a video showcasing the journey of IADC PDEU SC where the training mentors, Mr. Anwar Momin (QHSE Manager, Shelf Drilling), Mr. Joachim Meulen (Secretary, DROPS Asia), and Mr. Randeep Gandhi (Former GM, Shell), shared their experiences with IADC PDEU SC and sent best wishes for the team.

Prof. S. Sundar Manoharan, DG-PDEU, shared his encouraging words and talked about the genesis and growth of IADC PDEU SC in front of his eyes in the past year. After that, Mr. Virag Poshiya, Chairman of IADC PDEU SC, thanked everyone who played a part in the journey of IADC PDEU SC.

With great enthusiasm, Mr. V. P. Mahawar shared his journey in the oil & gas industry. After a short tea break, Mr. N. K. Jain (Ex – ED, ONGC) talked about rig equipment and their terminology related to animals and birds.

Mr. Vishnu Rawal (Head of Drilling Services, ONGC-Mehsana)

shared his journey that motivated the students. Then, Mr. A. K. Gupta (Drilling Supervisor, Kuwait Oil Company) shared essential tips to keep in mind for a successful career as a drilling engineer. Dr. Amit Verma (Assistant Professor-School of Petroleum Technology) gave a presentation on the overview of the drilling industry and how PDEU plays an essential role in preparing the next generation of energy soldiers.

Dr. Hari S (Faculty Mentor IADC PDEU Student Chapter) took the opportunity to share the news about the latest patents registered by the university. Mr. Arun Karle, in his virtual address, advised the students to think out of the box and never forget the importance of safety even in daily life. Mr. Mike Dubose (Vice President – IADC), who joined the celebration from Houston, wished IADC PDEU SC for the milestone and talked about the role of student chapters in spreading the practical knowledge required in the industry. Towards the end, Mr. Gaurav Hazarika (Assistant Professor-School of Petroleum Technology) delivered his closing remarks and a vote of thanks to everyone for being present on the occasion of the 1st anniversary of IADC PDEU SC.

WEBINAR ON DRILLING OPERATIONS: LOST CIRCULATION & CONTROL





IADC PDEU Student Chapter organised a webinar on 'Drilling Operations: Lost Circulation & Control'. The session conducted by Mr. Ajay Gupta who was working as Drilling Supervisor at Kuwait Oil Company (KOC) and had more than 35 years of experience in oilfield operations as drilling engineer and drilling supervisor. Mr. Ajay Gupta started the session from the basic of the lost circulation problem. After He covered about mud losses & consequences. Later He explained How to use the best remedial action through their experience. Also said that how this type of losses or damages happen in well by heavily fractured cavernous formations and normally pressured, deeper formations. The session was concluded with an interactive Q&A session and a special vote of thank by Mr. Dipesh Patel.

HSE CONFERENCE & SUSTAINABILITY

IADC PDEU Student Chapter organised a webinar on 'Drilling Operations: Lost Circulation & Control'. The session conducted by Mr. Ajay Gupta who was working as Drilling Supervisor at Kuwait Oil Company (KOC) and had more than 35 years of experience in oilfield operations as drilling engineer and drilling supervisor. Mr. Ajay Gupta started the session from the basic of the lost circulation problem. After He covered about mud losses & consequences. Later He explained How to use the best remedial action through their experience. Also said that how this type of losses or damages happen in well by heavily fractured cavernous formations and normally pressured, deeper formations. The session was concluded with an interactive Q&A session and a special vote of thank by Mr. Dipesh Patel.



MOTIVATIONAL TALK ON PERSONALITY DEVELOPMENT AND FEARLESS LIVING

IADC PDEU SC successfully organized a much-awaited event "Motivational talk on personality development & Fearless Living" on 18th November, 2021. The guest speaker of this event was Shri Sanjay Raval who is an author, film producer



and one of the most prolific and dynamic motivational speakers with thousands of precious webinars under his grace and millions of glimpses on social media. The event began with the welcome addressed by Dr. R. K. Vij, Director of school of petroleum technology. He discussed how to grow as a glorious personality and live your life with fearless attitude along with excellent out of the box perception to be a unique competitor for withstanding in today's highly competition world. Dr. R. k. Vij and other faculty members respected Sanjay sir with gorgeous memento and thanked him for giving his valuable time and heart touching life lessons to our students.

REPORT ON 3-DAYS WEBINAR ON INDUSTRIAL SAFETY IN PETROCHEMICAL INDUSTRY

Mr. Sagar Patel - a technical services engineer at Evonic Catalyst, India was a guest lecture for this webinar series. The session began with the brief discussion on how petrochemical industry was developed followed by discussion on various factors associated with safety to made participants understood the importance of safety and also gave information regarding different types of safety. The future engineers made familiar with functioning and use of different safety devices i.e. Assembly point, escape root, fire extinguisher, manual call point, safety shower, hazardous area, etc. and the exposure limits of various hazardous chemical. In the second day of training the participants were given the knowledge of different permit systems based on different operations.

Participants were made aware of the action that should be performed if the fire occurs. The last session was all about a discussion on common industrial tragedies such as Bhopal Gas, Charnobyl, Piper Alpha, Texas city. The training was concluded by conducting a quiz. The participants were provided the training completion certificates.



LATEST TRENDS IN DRILLING TECHNOLOGY



IADC PDEU SC organised a Guest lecture on 'Latest Trends in Drilling Technology' on 24th March, 2022. Mr. Hrushikesh Karnik, an expert in the Drilling domain currently serving as Assistant Executive Engineer (Drilling) at Oil and Natural Gas Corporation Ltd. (ONGC) was invited as a guest speaker. Mr. Hrushikesh Karnik started the talk with great energy and enthusiasm and explained top drive system, Bottom drive system and Kelly drive system.

TECHNICAL WEBINARS

Webinar Title	Speaker	Date	Time
Offshore and Onshore Rig Safety Engineering and Management	Mr. Harshit Aneja, HSE Advisor at Shelf Drilling	November 22, 2021	11:00 AM (GMT+5:30)
Evolution of Regulatory Framework with Focus on Offshore Safety	Mr. E. Sander, Executive Director - HSE at ONGC Ltd.	November 22, 2021	11:00 AM (GMT+5:30)
Risk Assessment in Drilling Operation	Mr. Parthiv Herb, Head of HSE at Security of Shelf Drilling & Evaluation Ltd.	November 22, 2021	11:00 AM (GMT+5:30)
Risk Assessment in Aviation Industry for Oil and Gas	Mr. Rajaram, HSE, Wing Aviation Dept.	November 22, 2021	11:00 AM (GMT+5:30)

1. OFFSHORE AND ONSHORE RIG SAFETY ENGINEERING AND MANAGEMENT

This was the first webinar of this series and conducted by Mr. Harshit Aneja - Senior HSE Advisor at Shelf Drilling. He shared 4 agendas related to safety movements in industry. Major points of the session were related to how to prepare and travel to offshore and onshore locations. He discussed Onboard HSE Orientation and hazards in onshore and offshore locations with proper justification. The session was ended with Q&A round.



2. EVOLUTION OF REGULATORY FRAMEWORK WITH FOCUS ON OFFSHORE SAFETY

Mr. R. Sundar - Retired Executive Director at ONGC shared his thoughts and industrial experience and talked about Safety Regulatory Framework and Enforcement of various countries for global Industry prospective. Spotlight of this webinar was on Offshore Regulatory Developments and HSE.

3. RISK ASSESSMENT IN DRILLING OPERATIONS

Mr. Paritosh Nath - Head of QHES & Security at Jindal Drilling & Industries Ltd. was invited to deliver a session on this topic. Risk is managed in oil drilling at two levels: At Management level & At Working level. Major Hazard Categories identified for the Remote Exploration Environment includes: - Crude Oil under pressure, Hydrocarbons in Formation. Refined hydrocarbons such as Lube oils, Hydraulic oil, Diesel fuel, Aviation fuel, Grease. To prevent accidents and undesired events in drilling operations it is essential to identify, evaluate, assess and control the attendant risks. In this work, a structured methodology is proposed for risk assessment of drilling activities. A case study is performed to identify, analyze and assess the risks arising from human factors in one of the onshore drilling sites.

4. RISK ASSESSMENT IN AVIATION INDUSTRY FOR OIL AND GAS

Mr. Rajaram gave a very deep insight of how the risk assessment done in Aviation Industry for Oil and Gas. He is a retired Army Aviation Corp. and Currently Aviation Advisor BG Exploration and Production India Ltd. He gave practical examples of Oil Field Installation with outcome of his webinar session explained How the main purpose of this risk assessment is Human, environment, and material safety. SMS (Safety Management System) is core part of these processes. There are 4 pillars of SMS:

1. Safety Policy & Objectives
2. Safety Risk Management
3. Safety Assurance and
4. Safety Promotion.

Due to accident two types of costs we have to pay Direct & Indirect. Strategies for Risk control/ mitigation.

5. HSE MANAGEMENT SYSTEM (HAZID/HAZOP)

Mr. Nilesh Sakpal - founder and director of Techniche Engineering Private Ltd. was invited to speak on this topic. The webinar was mainly focused on the Process Safety. The concepts like HAZID and HAZOP were the main topics of discussion. HAZID stands for HAZard IDentification is a systematic assessment to identify hazards and problem areas associated with plant, system, operation, design and maintenance. HAZOP stands for HAZard and OPerability study which involves a structured and systematic examination of a complex planned or existing process or operation in order to identify and evaluate problems that may represent risks to personnel or equipment.

6. SAFETY MANAGEMENT SYSTEM

Mr. Wilmer Capote, HSE Manager, Schlumberger (India and Bangladesh), was invited to give a session on Safety Management Systems used by the oil multinationals. The session began with a brief discussion on the importance of safety in the industry and Schlumberger's concern towards company's oil needs. He then discussed Schlumberger's safety processes and the Risk Based Approach to manage the Safety issues.

7. WASTE MANAGEMENT SYSTEM AND PERSONAL SAFETY

Prof. Anwar Momin - QHES manager at shelf drilling was speaker for this topic. Mr. Anwar made future engineers aware of their duty regarding safety, their responsibilities as a worker doing different jobs i.e. rig floor tripping operations, working with crane, working in PPE exempted working area etc. He discussed the current scenario related to waste management and their salutary through a video. At the end Q&A session was conducted to clear the doubts of participants.

8. JOURNEY MANAGEMENT SYSTEM

Mr. Junaid Parkar, Project manager, JMC delivered this session on Different driving challenges i.e. road conditions, seasonal risks, security risks etc. The discussion was ended with explanation of journey management system and technology.

WEBINAR ON "RARE EARTH ELEMENTS & ITS APPLICATION IN GEOLOGICAL STUDIES: A CASE STUDY FROM AMBADUNDAR CARBONITE COMPLEX"

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SEG
SOCIETY OF GEOLOGICAL ENGINEERS

EAGE
EARTH AND ENVIRONMENTAL ENGINEERING SOCIETY

Dr. Bijay Kumar Das,
Senior Geologist

Prabhakar Lakra,
Suptdg. Geologist

A WEBINAR ON
Rare Earth Elements and its application in Geological Studies : A case study from Ambadundar Carbonatite Complex, Gujarat

Date : 25th March, 2021
Time : 11:30 A.M. Onwards
Platform : MS Teams

SEG – SPG – EAGE PDEU Student Chapters along with Geological Survey of India(GSI) had organized a webinar on RARE EARTH ELEMENTS AND ITS APPLICATION IN GEOLOGICAL STUDIES: A CASE STUDY FROM AMBADUNDAR CARBONITE COMPLEX. The webinar was delivered by Dr. BijayKumar Das and Mr. PrabhakarLakra. Also, the Director of SPT, PDEU Dr. RakeshKumarVij with assistant professors Dr. Bhawanisingh Desai and Dr. UttamBhui were present in the webinar. The event was attended by more than 75+ students on the online platform Microsoft Teams. The main topics covered by the lecturer were as follows; How RE are helpful in the petroleum industry, where does RE is obtained in India, The Survey of minerals at Ambadundar, Gujarat, Ambadundargeological timeline, Study at Ambadundar Land by Dr. Das and Mr. Prabhakar with Team of GSI. At last, there was a question and answer session in which almost all the doubts raised by the participants were cleared by the lecturer.

SPL – SPG Premier League

SPG Premier League
A Freshman's Challenge

Prizes Worth 2000 INR

Round 1:
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Time: 11 AM-12 AM
(For 1st Year Students Only)

A fascinating chain of quizzes created to offer you a competitive edge over others.

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SEG-SPG-EAGE PDEU Student chapters had organized "SPL - SPG Premier League", a technical quiz competition on 3rd April 2021 as a part of Petragon 2.0, (pre-fest event). It was specifically designed for the 1st year students. It was a 3 round quiz competition, wherein 1st round was conducted on the Google form. The Top 8 contestants from the 1st round competed in further rounds on MS Teams. The competition enabled freshmen to showcase knowledge of their geological attitude as well as the fundamentals of the petroleum industry. At the end of the Petragon 2.0, winners were declared in Award Ceremony and rewarded with prizes.

PETRAGON 2.0

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PETRAGON 2.0
Spectacle of Events
3rd-11th April 2021

- CASE-LINKED & CASE STUDY SOLVING COMPETITION
- SPG PREMIER LEAGUE - A FRESHMAN'S CHALLENGE
- WORD-9-MINGS & CONTENT WRITING COMPETITION
- MASTER-CLASS - ESTABLISHED BEST LECTURES
- PETRO-VISION & POSTER PRESENTATION CHALLENGE
- LOGGERS' QUEST - A WELL-COURSED CHALLENGE
- PETRO-LEAGUE - AN INTERNATIONAL GSC COMPETITION

Contact Us:
Workshop: +91 82942 88888 | Chatbot: +91 82942 99876

Petragon 2.0 was the first ever virtual edition technical fest due to pandemic situation across the globe. The Petragon 2.0 took place on 9th - 11th April 2021 with the theme of "Enigma of Curiosity". The main aim of the fest was to provide a platform for all the aspiring contestants to showcase their proficiency and innovative ideas for upgrading their technical as well as professional skills. The marvellous Oil & Gas Technical fest began with the Inaugural Ceremony. It was held on 9th April 2021 from 10 A.M. onwards at MS Teams Platform. The Inaugural Ceremony was gratified with the presence of Mr. Shivkumar Sharma - Executive Director - Chief Geophysical Services, ONGC & President at SPG - India, Mr. C B Yadava - GGM at GEOPIC, ONGC & Vice President at SPG - India, Mrs. PadmajaMattey - Group General Manager at IRS, ONGC, Mr. Onkar Singh - Chief General Manager at Geophysical Services, ONGC & Secretary at SPG - India, Dr. Rakesh Kumar Vij - Director SPT, PDEU, Dr. Uttam Kumar Bhui(Faculty mentor-SEG), respective faculties and participants. The events included in Petragon 2.0 were Word-O-Wings - Content Writing Competition, Master Class on "Recent Trends in Seismic Imaging, Loggers' Quest - A Well Logging Challenge, Petrovision - Poster Presentation Challenge, Petroleague - An International Quiz Competition and Case Locked - A Case Study Solving Competition. More than 250 contestants from the various prestigious Universities across the globe with their extraordinary skills and technical prowess attended the fest virtually. At the end the of all the events, The Award Ceremony was held on 11th April 2021 at 4:00 P.M IST. The Award ceremony was gratified with the presence of Dr. Rakesh Kumar Vij (Director- SPT) and Dr. Uttam Kumar Bhui (Faculty mentor-SEG). The Award ceremony graced with the beautiful words of Dr. Rakesh Kumar Vij and followed by the Committee Members sharing glimpses of various events of Petragon 2.0 as well as declaring the victors of each event. The winners were awarded with cash prizes and certificates. In the closing moments of the ceremony, Dr. Uttam Kumar Bhui also shared his views on the technical fest and congratulated the student chapter for hosting such a fascinating technical fest. The ceremony was witnessed by 100+ students from various colleges.

Valedictory Ceremony



SEG-SPG-EAGE PDEU Student Chapters organized a Valedictory Ceremony on 10th June 2021 at 10:00 P.M IST. The ceremony started with greetings of the Director of SPT, faculties, mentors, and the students. The ceremony further proceeded with brief information on the chapter's objectives and achievements. The ceremony was graced with encouraging speech of SPT-Director Dr. R.K Vij Sir, Dr. Uttam Bhui, Dr. Pawan Gupta, and Dr. Mahesh Jallu to appreciate the enthusiasm of core committee members of 2020-2021 towards the growth of chapters. Afterwards, the core committee of the year 2021-22 was declared by the existing core committee members to all the deserving candidates on basis of their determination in serving the Student Chapters. In the closing moment of the ceremony, the newly made Core Committee members bid farewell to the Core Committee of the year 2020-21 by wishing them all the best for future endeavors.

Webinar on "Outlook & Opportunities in Various Sectors for Engineering Education Amidst & Post Covid -19"

SEG - SPG - EAGE PDEU Student Chapters, hosted a webinar on "OUTLOOK AND OPPORTUNITIES IN VARIOUS SECTORS FOR ENGINEERING EDUCATION AMIDST & POST COVID -19." Mr. Rajendra Singh Sisodia, one of India's most well-known personalities in the oil and gas sector, delivered the webinar. The webinar was held online on the Microsoft Teams platform.



The webinar was held with to inform future engineers about the prospects that exist in the current pandemic situation, as well as the skills that must be developed to establish career chances. A total of 65+ students from various universities and engineering branches participated in the webinar.

QUIZOHILIC 2.0-An Aptitude



SEG SPG EAGE PDEU Student Chapters, held an outstanding event called "QUIZOHILIC 2.0 - An Aptitude Test" on July 1, 2021, from 4:00 to 5:30 P.M, using the online platform ClassMarker. It was a fantastic opportunity to put your eligibility and aptitude skills to the test in preparation for job interviews and any other exam. Numerous talents were tested, including arithmetic reasoning, verbal reasoning, abstract reasoning, speed accuracy, and others. 250+ students from 14 different universities representing various engineering areas attended the event to display their abilities and talent. Finally, the winner received a monetary prize of Rs. 1,000 as well as a Certificate of Appreciation. All of the winners are congratulated by the Student Chapters.

Webinar on "Natural Gas Hydrates System & Its Prospects in India"



A webinar on "NATURAL GAS HYDRATES SYSTEM & ITS PROSPECTS IN INDIA" was hosted by SEG - SPG - EAGE PDEU Student Chapters. Dr. Pawan Gupta, an Assistant Professor at SPT, PDEU was the Webinar's speaker. The webinar was held via the Microsoft Teams platform in online mode. The following are the main points that were discussed during the webinar:

- Introduction to Gas Hydrates and its Implications & Applications
- Hydrate Structure.
- Experimental Set-up and Procedure for generating phase equilibrium curve.
- Methane Recovery from Hydrate Reservoir.
- Polymer flooding in hydrate reservoir for methane recovery.
- Future Recommendations

The webinar was held to educate future engineers on the importance of unconventional energy resources and Gas Hydrates in India. The webinar drew more than 50 students from various universities. Dr. Pawan Gupta's Webinar was very informative and enlightening, and the Student Chapter would like to thank him for it and hope to hear from him again in the future.

SEG WEEK 5.0

To survive in today's competitive world, one must be immaculate in every area in order to stay in the race. In light of this, the SEG-SPG-EAGE PDEU Student Chapters had organized the "SEG WEEK 5.0". It was organized from August 30 to September 3, 2021. The SEG WEEK 5.0 activities assist in the development of soft skills and the intensification of technical knowledge skills of entrants in a professional



manner, as well as the exploration of adroitness that will be useful in the near future. SEG Week 5.0 consisted of 5 events: WORDSCRIBE- A Report Writing Competition, TECHNICAZA 2.0- A Technical Quiz, TECHNOVATE - A Presentation Competition, Dialogue Session on PANEL DISCUSSION WITH INDUSTRY EXPERT and BID DEAL- bidding competition. The winners of each event were awarded with cash prizes.

Introductory Session of SEG-SPG-EAGE PDEU Students Chapters



SEG-SPG-EAGE PDEU Student Chapters had successfully organized an INTRODUCTORY SESSION for welcoming SPT-2021 batch on 26th October at 9.00 AM onwards on MS Team's platform. The session was aimed to provide basic knowledge of student chapters & also the important role that student chapters play in shaping one's life growth. The speakers Mr.Parag, a former adviser of SPG PDEU Student Chapter & Mr.Yashpal, a former president of SPG PDEU Student Chapter mentioned various activities of the student chapters to give a better idea of our student chapters. A quiz was arranged at the end of the session & exciting prizes were given to the winners. The session was overall quite informative & useful.

Webinar on "Artificial Lift and Practical Artificial Lift Operations"



SEG-SPG-EAGE PDEU Student Chapters organized a webinar on "Artificial Lift and Practical Artificial Lift Operations". The lecture was delivered by Mr. Pradeep Eapen Mathew. He is the Artificial Lift Specialist at ONGC Karaikal. The webinar was held online using the MS Teams platform on 17th January 2022 at 4:00 PM. The event was held to inform future engineers about Artificial Lift Operations and their practical aspects. So, that they can build up their concepts about Artificial Lift. The session was overall quite informative, interactive, and encouraging.

"Quiziva – Online Quiz Competition On Artificial Lift"



SEG-SPG-EAGE PDEU Student Chapters had conducted a quiz competition named "Quiziva – Online Quiz Competition On Artificial Lift" on 18th January 2022. It was an individual quiz competition held in online mode on My Swots. The question was designed such that it helped participants to enhance their basic understanding of Artificial Lift. Many enthusiastic petroleum engineering aspirant students took part in the quiz. The winners were awarded with cash prizes.

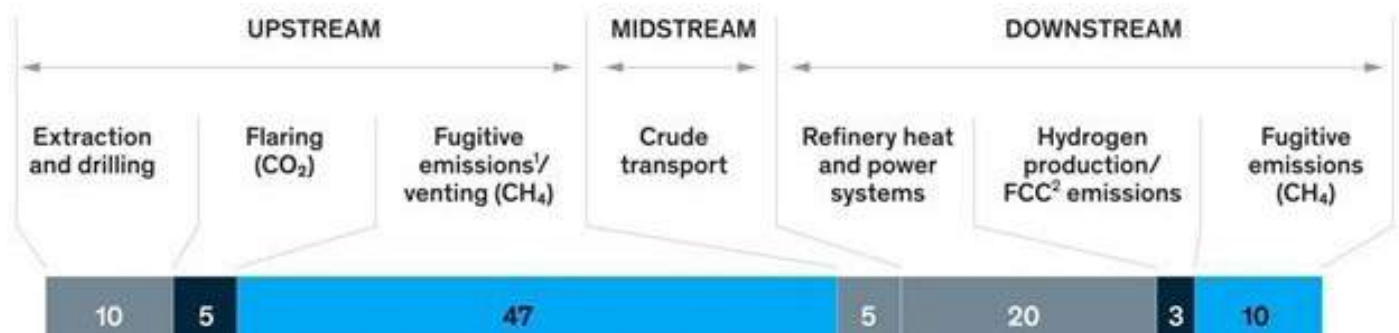
TECHNICAL ARTICLE

The Role of Disruptive Technologies for Long-Term Energy Sustainability: An Overview of the Indian Scenario

- Manav Patel, Shubam Patel, Tirth Shah

Emissions by source, share, and possible solutions, %

■ CO₂ (energy related) ■ CO₂ (not energy related) ■ Non-CO₂



INTRODUCTION

The oil and gas business is vital to the global economy and the economies of many countries, including those in developing and emerging markets. With a better understanding of environmental sustainability, it's become evident that the majority of our technical advancements are merely band-aid fixes to problems caused by activities that should never have been undertaken in the first place. Indeed, as a matter of business practice, many companies have committed significant resources and efforts to advancing sustainable development. They are not only furthering the Sustainable Development Goals (SDGs), but they are also establishing norms and practices that go well beyond legislative requirements in some circumstances.

By 2050, the oil and gas industry must reduce emissions by at least 3.4 GT of carbon dioxide equivalent (GtCO₂e) per year, compared to "business as usual" (already anticipated policies or technologies)—a 90% reduction in current emissions. It is undeniable that reducing oil and gas consumption will make achieving this aim simpler. Even if demand remains unchanged, the industry may reduce most of its emissions for less than \$50 per ton of carbon dioxide equivalent (GtCO₂e) by targeting the most cost-effective actions.

ACCOUNTING FOR METHANE EMISSIONS

Human activities such as natural gas system leaks and livestock production and natural sources such as wetlands generate large amounts of methane. Its role as a significant precursor to tropospheric ozone generation has a range of indirect consequences on the quality and productivity of vegetation, human health, and crop yields. Methane is a climate pollutant with an atmospheric lifespan of around 12 years. It has a far shorter lifetime in the atmosphere than carbon dioxide (CO₂), but it is significantly more effective at absorbing radiation. Over 20 years, methane has an 86-fold more significant impact on climate change than CO₂ per unit of mass and a 28-fold more substantial influence over 100 years. Methane accounts for 57 percent of all emissions from oil and gas activities, including vented and fugitive emissions.

Potential Solutions:

Methane monitoring, modeling, and alerting sensors based on spatial platforms.

By tracking Methane emissions and forecasting wind speeds, satellite data is becoming increasingly crucial in comprehending global energy and environmental systems. Satellite technology and data's

extensive geographic coverage are essential elements driving their adoption. The Landsat-8 Thermal Infrared Sensor-2 sensor, for example, can scan a 185-kilometer (115-mile) swath of ground, giving the earth's surface a 16-day coverage cycle.

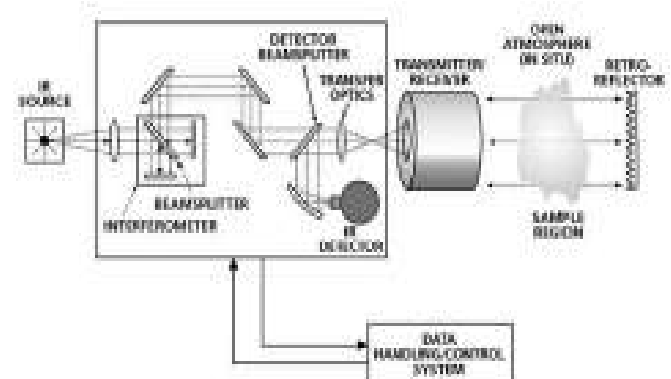
AI-based methane monitoring system

The gas cloud imager (GCI) is used to perform real-time gas imaging. The Gas Cloud Imaging (GCI) camera, which ranges up to 1,700m and uses snapshot hyper spectrum imaging for real-time detection, identification, and quantification of gas leaks, is ideal for big sites and extended areas. Real-time alerts produce actionable alarms and display live videos of the leak while sending notifications via email or text. Real-time alerts create actionable alarms and show live videos of the leak while sending information via email or text. Monitor, quantify, and display explosive, dangerous gas leaks as they occur.

Integrating Machine Learning principles and the Internet of

Things to monitor methane emissions

Differential Optical Absorption Spectroscopy ("DOAS"), Tunable Diode Lasers ("TDLAS"), and OP-FTIR are just a few examples of single-beam open-path technology. Because it can monitor almost all compounds of interest simultaneously, OP-FTIR is the most powerful and adaptable technology for E&P sites having long-term monitoring systems. Short-term intensive measurement campaigns can quantify short-term emissions and concentrations of selected target compounds or surrogates at complex area sources. They can provide a more accurate picture of the fence line when short-term measurement findings are combined with long-term fence line monitoring using Machine Learning and the Internet of Things.



ACCOUNTING FOR EMISSIONS FROM REFINERY HEAT AND POWER SYSTEMS

Refinery heat and power systems contribute 20% of total oil and gas production emissions. Oil refineries generate smog and air pollution. Oil refineries release around 100 chemicals every day. Metals like lead, for example, are toxic to youngsters and make learning harder. They also contain PM10 particles, which penetrate deep into our lungs and impede our breathing capacity. Finally, refineries produce nitrogen oxide (NO₂), Sulphur dioxide (SO₂), carbon dioxide, methane, carbon monoxide, dioxins, chlorine, hydrogen fluoride, benzene, and other gases. Disruptive technology and cost-effective techniques for decreasing emissions are good prospects for refineries

Potential Solutions:

Using digital twins to improve operational efficiency

In various businesses, digital twins are increasingly becoming a significant priority. According to Gartner, 13% of firms deploying IoT initiatives are already leveraging digital twins strategically, while 62% want to or are in the process of doing so.



Digital twins are becoming more prevalent in various industries, including the oil and gas sector. They offer significant benefits to refineries, particularly asset dependability for all sorts of essential equipment. Consider heat exchangers as an example. Because they impair uptime and processing over lengthy periods, unexpected failures can be costly. As a result, predicting an impending failure long before its occurrence is beneficial. The usage of a digital twin of the exchanger can offer information on the current state of the asset. Digital twins are becoming more prevalent in various industries, including the oil and gas sector. They provide significant benefits to refineries, particularly asset dependability for all sorts of essential equipment. Pumps, heat exchangers, pipelines and vessels, compressors, valves, and other vital assets can all fail, resulting in disastrous results.

FLARING OF NATURAL GAS

Flaring is a widely used but divisive way of removing unwanted gas. Because it emits a considerable amount of greenhouse gases, which add to the overall burden of global warming, gas flaring is a serious environmental challenge that the world faces today.

Potential Solutions

Zero routine flaring

A digital twin is a full 360° reproduction of a physical asset that allows for process and control modeling and monitoring, such as pipelines, heat exchangers, gathering systems, turbines, compressors, pumps, or entire plants. It creates the framework for a digital transformation that optimizes production, diagnoses equipment concerns before they cause problems, and identifies new process improvement opportunities while decreasing unplanned downtime. Just around 5% of the site's methane emission sources have been studied. To be more particular, pneumatics and compressor seals. LDAR comes around once or twice a year. 90% of actual emissions are overlooked. A reliable digital data system is necessary to track and analyze emissions. A digital twin of every on-site equipment, including projected flow rates and maintenance schedules, is being created to estimate emissions. The finding of field methane during airplane flyovers shows that flares and enclosed combustors are leaking considerable volumes of methane. Conduct an integrative study to assess the scope of the problem.

KG Basin (R Cluster)

R Cluster is an ultra-deepwater gas field located in block KG D6 off India's east coast, roughly 60 kilometers from the KG D6 Control & Riser Platform (CRP) off the coast of Kakinada. With more than 2000 meters, the block is Asia's deepest offshore gas field. One of the most challenging issues in ultra-deep-water production is the overall quantity of energy required. The power needs of offshore rigs are higher than those of onshore rigs. Traditionally, offshore rigs have depended on diesel generators to fulfill their power requirements. The objective is to develop a hybrid energy system that allows renewable and nonrenewable energy sources to coexist in a mutually beneficial relationship.

The R-Cluster field is a gas field where most of the gas leaking from oil and natural gas wells is methane. Methane is a potent greenhouse gas, with a warming tendency of 36 times that of carbon dioxide (CO₂), the dominant contributor to global warming over 100 years. As a result, we must consider a methane monitoring system as a preventative step. We will deploy OP-FTIR technology for this project since it is the most powerful and adaptable technology for long-term methane monitoring programs at E&P sites. Real-time gas imaging with a gas cloud imager (GCI) can also be used to improve performance. The Gas Cloud Imaging (GCI) camera ranges up to 1,700m and is intended for use at enormous locations and across long distances. It detects, identifies, and quantifies gas leaks in real-time using snapshot hyper-spectrum imaging.

Jamnagar Refinery

The manufacturing division at Jamnagar refinery is the largest refining center in the world. It has shifted India from a net importer to a net exporter of petroleum products, securing the country's energy security. The Jamnagar refinery is a trailblazer, with a crude processing capacity of 1.24 million Barrels Per Stream Day (BPSD). It has earned multiple honors, including the renowned 'International Refiner of The Year' award. It also houses some of the world's largest units, including the Coker, Alkylation, Fluidized Catalytic Cracker (FCC), Polypropylene, Paraxylene, Petcoke gasification, and Refinery Off gas (ROG) cracker.

Refineries benefited tremendously from digital twins, particularly asset dependability for all essential equipment types. Pumps, heat exchangers, pipelines and vessels, compressors, valves, and other vital assets might fail, and devastating results. The usage of a digital twin in an investment can offer information on the present status of the item. Using the multiple data points acquired by IoT devices, the digital twin may alert an operator when a component or system state begins to deteriorate. When connected to an asset management system, digital twins provide users access to the backlog of service orders, inspection images, the total maintenance and cost records, and insights into the reliability program and logs of all the potentially failed scenarios.

CONCLUSION

While the practices presented show the many opportunities that the industry is already pursuing to contribute to sustainable development, much more can and must be done. This is where disruptive technologies come into play to achieve long-term energy sustainability. Incorporating digital twin technology in the upstream, midstream, and downstream sectors helps in various ways, from detecting emissions to creating the entire refinery model. The use of disruptive technology to train, test, and validate renewable energy integration models for hydrocarbon extraction is critical to a sustainable future. However, reducing emissions is not the only way to achieve sustainability; Carbon Capture, Utilization, Storage, and low-carbon energy production will all contribute to cleaner operations.

According to the case study of India, it is the ideal candidate for incorporating such practices to reduce emissions and achieve the Sustainable Development Goals. According to recent IEA reports, India, which is currently the second-largest energy consumer, is on track to become the largest consumer by 2040. It is possible to conclude that disruptive technologies and the introduction of new technology hold the key to achieving long-term energy sustainability in the future.

NON-TECHNICAL ARTICLE

Russia-Ukraine war and its consequences on the world

-Megh Soni

24 February 2022, the Russian president announced special military operations in Ukraine, just after announcing Donetsk People's Republic and Luhansk People's Republic as two different nations in the eastern part of Ukraine. First, they entered these two regions as a peacekeeping force, and thereafter from many directions, the Russian army launched military operations and shocked the whole world. After understanding the invasion, the first thing that comes to our mind is why Russia invaded Ukraine?

Since Ukraine wants to be part of NATO (North Atlantic treaty organization) and if that happens, it will lead to the presence of western forces on the Russian border. That may lead to security issues for Russia. There are many reasons for invasion but stated by the Russian president is "to de-nazify and de-militarize Ukraine" and he also stated that "It is not our plan to occupy the Ukrainian territory. We do not intend to impose anything on anyone by force."

However, they went to Ukraine and launched a full-fledged attack. Russia has the second most powerful army with a global power index of 0.0639 and Ukraine has the 29th strongest army with a power index of 0.5082. Therefore, we can assume that without the external support of any third-party country it is almost next to impossible to stop Russian military operations in Ukraine.

War in any part of the globe affects almost every part of the globe. Moreover, Western forces are not ready to Directly support the Ukrainian army they are externally supporting and imposing heavy sanctions on Russia, they still fail to stop military operations. Russian invasion, heavy sanctions, lack of direct support to Ukraine, refugee crisis, and many other things are affecting the world negatively many essential things like fertilizer, wheat, crude oil prices are already increased.

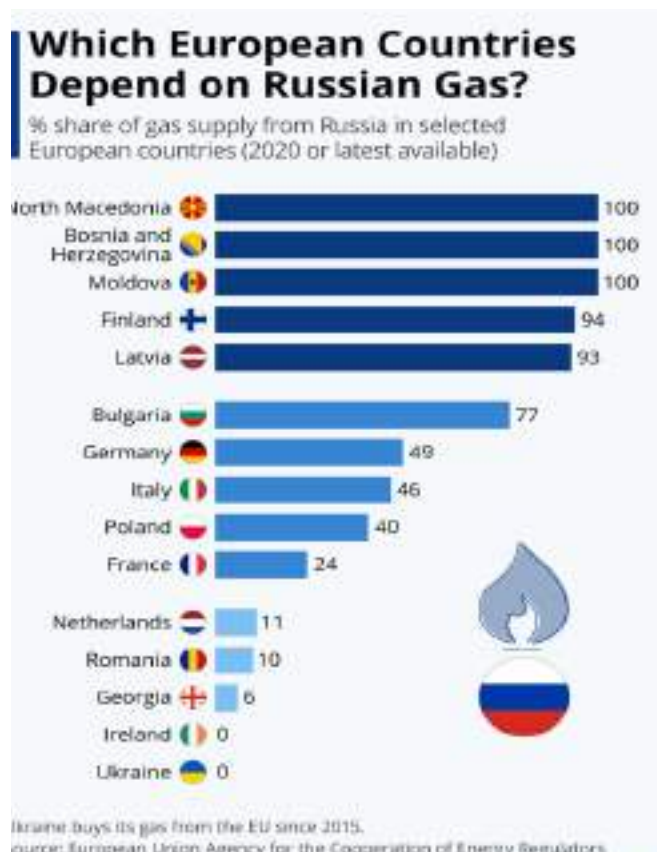
As crude oil prices are rising like anything and due to the increase in crude oil prices as Russia is one of the largest exporters of oil and gas, almost every commodity price is increasing. Ukraine is a very big exporter of wheat, some precious metals, etc. Ukraine is also known as the "breadbasket of the world" it will affect food supplies and we can see a spike in the price of metals (gold, iron, uranium, etc.). On one side where crude prices are increasing, on the other side, wheat prices are increasing. Practically, this war is acting as a double-edged sword for the world economy.

• Effect on Oil and gas prices

Russia is the third-largest exporter of crude oil just after the USA and Saudi Arabia. Russia has the highest gas reserve in the world. Russia has almost 24% of the total natural gas of the world, available in reserves. So, if a country has this much of resources entering into war will affect the global crude oil prices and already we are witnessing its effect.

Europe is highly dependent on Russian gas. That is, not easy even for the European countries to blindly sanction Russia or enter into war. In fact, according to some sources Europe is buying more natural gas from Russia after the invasion Russian gas pipelines, for example, Nord Stream, are passed through Ukraine and both countries entering war will affect the energy security, majorly gas in most parts of Europe.

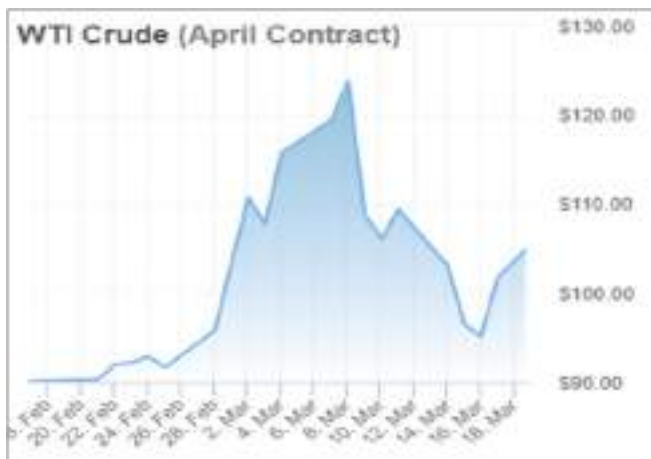
For reference purposes, Chart of the dependency of Europe for natural gas on Russia is attached.



Now we will understand the direct effect of war on crude prices globally. After the war has started, there is a sudden increase in crude prices. Many things are dependent on oil prices. Majorly the transport industry depends on crude prices it will affect every possible thing. Major geo-politics depend on crude prices. Many of the countries get devastated due to dirty politics related to crude oil. Crude oil is one of the major driving forces of politics in the world.

For reference, the chart of WTI crude oil price has been attached. As we know that Russian invasion started on 24 February 2022 from there the prices are increasing. During the peak period, the prices reached to record high of more than 120 dollars/barrel, and still after this many days, the prices are above 100 dollars/barrel. Increased crude prices will be in favor of the USA only as they are the biggest exporter of this and many oil exporter nations. As we all know that crude will increase prices rapidly but it will decrease at a very slow pace and this will affect the global economy. For Brent crude and natural gas, chart for this is attached for reference.

Increased crude prices are vile for developing nations and especially for those countries that are net importers of crude oil. As crude oil will impact every commodity and it will increase the prices of almost everything and it will affect the



economy of that country and will increase the inflation rate also. for developing nations, already lack of resources (due to covid), plus they don't have many funds or any specific mechanism to control inflation. This will lead to a negative effect on the economy. In today's time (post covid) where the middle class is looking to increase their saving, it will also affect them negatively.

- **Stand of NATO**

NATO was created in 1949 and its main purpose is to stop spreading communalism from Europe its headquarters is based in Belgium. NATO is one of the most powerful groups currently working in the world. It has many members like the US, UK, France, Germany, and many more powerful countries.

NATO is in talks due to its article 5 which says that if one of its members is under attack, every member will attack the opposite country. Which is its main feature, for which Ukraine wants to be a member of it. NATO is not ready to directly interfere in war but they are taking the side of Ukraine. Economically and by arms, they are supporting Ukraine. According to them if they directly become part of conflict (as many NATO member countries are having nuclear warheads) this may result in world war.

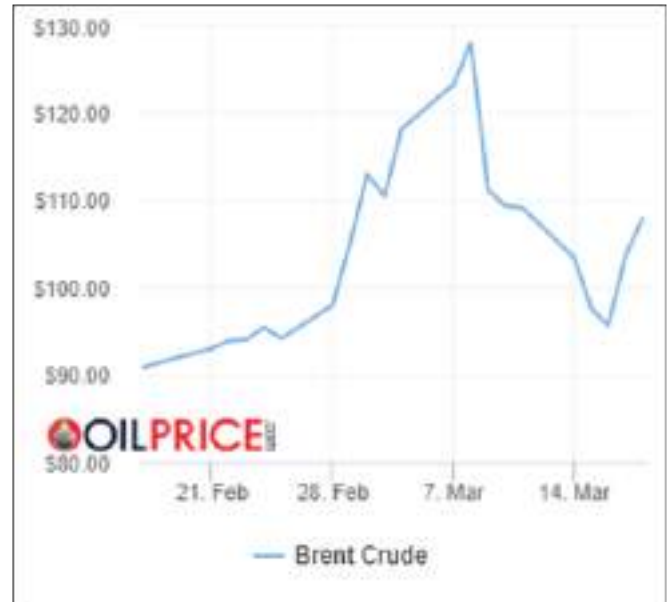
It has many member countries which share borders with Russia. The main thing which Russia wants from NATO is the expansion in Eastern Europe to stop and also NATO to stop the deployment of weapons in its Neighborhood. also, Ukraine shouldn't become a member of it.

NATO doesn't have the guts to include Ukraine as a member country. and at many times. Ukraine urged to become a member but they don't follow. Now, after the war started, no aid or other source can help Ukraine until they send their troops on the ground. Whatever the condition of Ukraine is there in the present time, NATO is also responsible for that.

NATO is pouring weapons into Ukraine to stop the invasion by Russia for example- France is sending rocket launchers for air defense. The Estonians are sending Javelin antitank missiles. Stinger which is a surface air missile is being sent by Poland and Latvia. The Czechs are sending machine guns, sniper rifles, pistols and ammunition, and many more

Also, more than 22000 troops are sent to member coun-

tries bordering Russia. Poland wants to send its troop to Ukraine as a peacekeeping force many of its members also announced humanitarian and financial aid to Ukraine and help the common people. Still no direct support to Ukraine has been given which Ukraine is needed in this hard time.



The EU is a union that is made up of 28 nations in Europe. The union was established in 1993. The capital of the EU in Belgium, Brussels. Officially, however, the EU does not have a headquarters in any of the member countries. EU is also taking the side of Ukraine in a war they are also not entering war but they are financially helping and providing humanitarian aid to Ukraine. To support Ukraine against Russia. EU has already announced 4 packages of sanctions on Russia. 4 sets of sanction packages are already imposed

on Russia but still many of their member nations are buying gas from Russia only.
EU aids Ukraine.

- Humanitarian support: 500 million pounds to counter tragic humanitarian consequences of the war, and 100 million pounds to €100 million worth of supplies through the Union Civil Protection Mechanism
- Protecting those fleeing the war: Helping and supporting people who want to flee from Ukraine giving them assistance
- Supporting border management: managing border help to reduce the arrival time and help people
- Cohesion policy action for refugees in Europe: help will be given to refugees on education, employment, housing, health and childcare services, or basic material assistance.

• Stand of USA

The USA is very aggressive in conflict due to the involvement of Russia. They are giving much-needed aid and weapons to Ukraine and are imposing heavy sanctions on Russia. It has the world's strongest army at present

Also, Russia is a historical rival, but still, they are not sending troops to support Ukraine as they know that if they involve in war, it will escalate the situation and they may push the world near to nuclear war. Fighting with Russia for a third-party country is not viable for the USA. It will be suicidal step so, they are providing humanitarian aid, weapons, also helping financially. The power that the USA holds is to apply sanctions on Russia. they are also targeting the Russian oil and gas industry with their sanctions. As we all know that sanctions applied by the USA are the most effective and a nightmare for the sanctioned country as we have seen in Iran and North Korea. Russia has already become the most sanctioned country on the globe at present.

Some key figures provided by the USA gov on 18 march 2022

- 18,500 Number of USAID/BHA provided high thermal blankets delivered to Ukraine
- 100,000 Number of people USAID/BHA-funded interagency emergency health kits can support
- \$4 Million In dedicated FY 2022 USAID/BHA support for

essential WASH programming

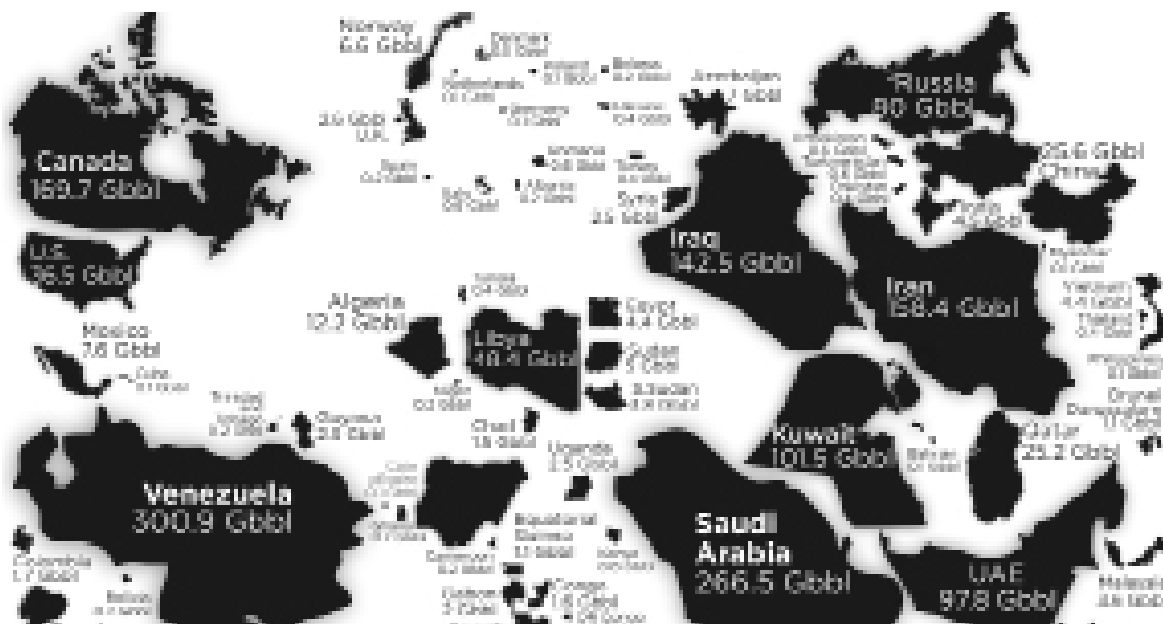
- \$50.3 Million In dedicated FY 2022 USAID/BHA funding for life-saving food assistance
- \$5.5 Million In dedicated FY 2022 USAID/BHA support for MPCA

• Effect on India

India is a net foreign buyer of crude oil. We import 80% of crude oil in our total requirement so an increase in crude oil prices will affect India negatively. There is a chance that inflation may increase. We import a heavy number of fertilizers from Russia and Belarus and due to sanctions, fertilizer prices may rise which will harm farmers as well as the food sector also, daily commodity prices may increase.

Since the war began, the Indian stock market has been negatively affected. India has been experiencing a huge amount of pressure from the west to take a position or side in the war in support of Ukraine. For India, it is not easy to take anyone's stand. If we support Russia, we will be facing heavy sanctions from the west and also a negative impact on our economy and many of the FTA may get canceled. we can't oppose Russia as many of our platforms or weapons are of Russian origin forex: Brahmos, mig-29, su-30mki, AK-203, and many more. So, opposing Russia will harm our defense side and we can't bear that, many times in the past Russia helped India unconditionally. So, in this war, we have to be neutral.

This situation of war may be helpful for Indian farmers as the wheat shortage will be there and their gap can be filled by Indian farmers. Vegetable oil prices are going higher and higher and this can help to get a good price for oilseeds. Also, India is procuring crude oil at a cheaper price amid sanctions and the rupee-ruble trade may help decrease the dependency on dollars for both countries. India is also buying more kinds of stuff from Russia by barter system. The Pharma industry may be affected as raw materials derived from petroleum products will be expensive. The Indian pharma industry also exports pharma products worth nearly 137.3 million dollars to Ukraine and 386 million dollars to Russia. This also will be negatively affected, but not much effect will be observed.



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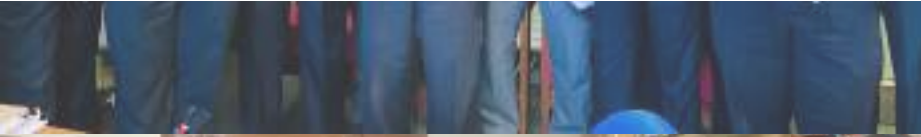
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SCHOOL OF PETROLEUM TECHNOLOGY

Pandit Deendayal Energy University
Raisan, Gandhinagar-382007
Gujarat, India

For any queries, mail us at
sptinfo@spt.pdpu.ac.in

Phone: +91 079 23275081 | Fax: +91 079 23275030