



Chapter News Letter


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EDITORIAL . . .

Anshuman Ganeriwala

I am delighted to reconnect with you once more. While the new year brings new plans, goals, and a positivity, we also saw a new wave of Covid19. Even though the wave is receding, we should all follow safety precautions. While I'm here, I'd like to thank everyone on the ASM International Pune Chapter team for their hard work and contributions to the chapter's activities throughout the year.

Renewable energy is a buzzword these days, and each country is focusing on it in their own unique way. At the recently concluded COP26 summit, India declared its intention to achieve carbon neutrality by 2070, with hydrogen energy playing a key role. This topic has been discussed briefly in this newsletter.

We also kicked off the year with two very interesting technical talks on forgings and failure analysis. Both events received a massive turnout. A brief description of them can be found in the newsletter. In the future, we hope to hold more events like this. Our website would be updated with information about them.

Finally, I encourage all of our readers to participate in our chapter activities to the best of their abilities. You can contact us using the contact information provided on our website.

Wishing all of you a successful and safe 2022!

Editor
Anshuman Ganeriwala
From Chairman's Desk:

Dear ASM Colleagues,

Greetings!

Wish you very Happy & Prosperous new year 2022. We will be soon overcoming Pandemic Situation and start a fresh.

Please join me in welcoming young dynamic women member of our ASM Pune Chapter Dr Krutika Apshankar-Kher taking over as a Chairman News Letter Committee. She has constituted News Letter Committee and will come out with her plan in upcoming newsletter. Let us wish her best luck in her new role.

ASM has migrated from Ring Central Platform to Zoom. We have received login credential and will be migrating to this new platform from itself. Our revamped and Form. We at formed various and they regularly since will help to working of our Although you faces in many are looking for volunteers. I you to be part committees.


Udayan Pathak, FASM

We are proud to announce that we have received approval and Charter for Second Materials Advantage Chapter under Pune Professional Chapter. It will be at Govt. Polytechnic Pune. We have initiated activities to start Third MA Chapter also.

Our strength Technical Lecture Series is consolidating further with lot of new Speakers and Topics. I am sure you will enjoy and found these topics very interesting, informative and meeting your needs.

I am heavily banking on your active support to take forward, many new initiatives while continuing oldones.

Udayan Pathak, FASM.



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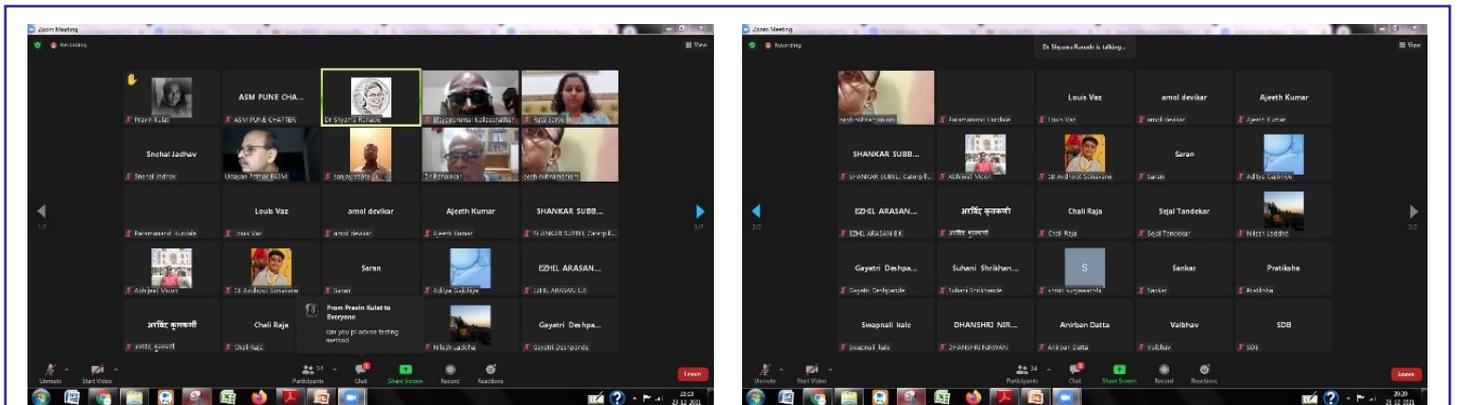
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'A Holistic Approach to Corrosion Bridging the gap between research and Industry'

Two lectures were conducted in December 2021 and January 2022 about corrosion and forgings. Both lectures were held in an online mode owing to the continuing pandemic situation.

The first lecture 'A Holistic Approach to Corrosion Bridging the gap between research and Industry' was given by Dr Shyama Ranade who is the owner of CORROSPECTIVE – the first website completely dedicated to courses on corrosion. She is a consultant and instructor for corrosion, coatings, cathodic protection and chemical treatment. Around 49 participants were present for this lecture, which aimed at understanding and integrating the different approaches industry and academician have towards corrosion. Dr. Shyama Ranade explained the concept of corrosion, components of a corrosion cell, material selection for different applications, lightweighting and the current top 10 trends in the materials industry.



'Forgings all that you need to Know'

The second lecture on 'Forgings all that you need to Know' was held on the 20th of January by Mr. Abhay Chauthai. Mr Chauthai is a metallurgist from COEP Pune. He has over 38 years of experience in the field of metallurgy at Bharat Forge, Bajaj Auto and S.K.F. Mr. Chauthai explained forging and its types (open die and closed die) in detail. The advantages of forging and the way it affects the microstructure was also elaborated. He highlighted the effects of alloying elements, the parameters of steel tested and various classes of heat treatment. Around 136 participants attended the lecture and many of them were actively asking doubts.

Green Hydrogen: Opportunities and Challenges for India



India has the potential to bring down the cost of green hydrogen by using low-cost renewable generating plants and cost-curtailement experience gained through solar and wind reverse auctions.

Over the past few years, green hydrogen has emerged as a 'game-changer' (at least theoretically) and become the latest buzzword in the area among net-zero energy experts. (Representative image)

By Manoj Kumar Upadhyay & Pratik Joshi,

India is witnessing an unprecedented rise in fuel prices since June 2021. This has brought the matter of energy security back on the discussion table. The discussion's central theme has been ever-increasing fuel demand and dependency on imported crude oil for domestic needs. India's annual energy import cost is in excess of USD 123 billion in 2019. More than 82% of this cost is consumed in importing crude oil and natural gas. Solar PV and wind have revolutionized India's green energy story in the past decade. Once struggling to meet the peak electricity demand, the country now has a surplus power scenario. Indian Energy Exchange reported that the availability of sell-bids for the day-ahead market in its system is twice that of demand.

Diversification of electricity sources by integrating renewable energy in its grid is helping India in achieving the Paris agreement targets. The country has pledged to achieve 40% installed capacity from renewable energy sources by 2030 and reduce emissions intensity by 33-35% below 2005 levels in its nationally determined commitments to the 2015 Paris agreement.

While renewable energy is undoubtedly a better option than present fossil fuel-based energy, it is not a one-stop solution for all our energy problems. Renewable technology is recommended but not a sufficient measure to achieve goals as envisaged in the Paris Agreement. Moreover, electricity comprises only around 16.5% of the final energy consumption at the national level. Additional efforts are required to reduce greenhouse gasses (GHG) emitted by the remaining 83.5% energy sector.

The goal post of environment-friendly development has changed from merely reducing GHG emissions to achieving net-zero emissions. Net-zero energy systems are emerging as a sustainable solution to topical energy problems. At least 12 countries have already legislated net-zero emission targets, and 41 more countries are in the process of doing the same. Over the past few years, green hydrogen has emerged as a 'game-changer' (at least theoretically) and become the latest buzzword in the area among net-zero energy experts.

Hydrogen: Sunrise Sector

Hydrogen is seen as a sunrise technology for achieving net-zero emission targets as it does not emit GHG upon combustion. Its inherent chemical characteristics, multiple end-uses, and harmony with other fuel and energy carriers make it a strong contender of the clean energy transition apart from electrification, battery storage systems, carbon, capture, utilization, and storage (CCUS), bioenergy, etc.

At present, hydrogen is being primarily produced with the help of fossil fuels for use in the chemical, steel, and refinery industry. Today, it is possible to produce hydrogen with the help of renewable energy-based electricity. The 'net-zerosness' of hydrogen depends on the method of production. Steam Methane Reforming (SMR) incurs a measurable amount of emissions when used for producing hydrogen (Hydrogen produced with such process is called gray hydrogen). Green hydrogen (made from water and green electricity using electrolyzer) is considered the next big movement toward sustainable development. It has found relevance in today's energy policy narrative, given its ability to decarbonize 'hard-to-abate' industries. Hard-to-abate sectors (like the steel industry) require a significant investment of green technology than existing carbon-based technologies.

Countries with net-zero emission targets have been exploring ways to augment the usage of green hydrogen in their economy for decades due to the absence of technological dominance by single or group of countries and broader geographical availability of primary resources such as renewable energy, water contrary to the fossil fuels are concentrated in the specific geographic area.

The reduction in the cost of renewable electricity has fueled the 'green hydrogen hope.' Interestingly, this is not the first time hydrogen is being projected to solve contemporary energy issues. Historically, hydrogen was first included as a part of energy policy in the 1970s after the oil embargo, but new discoveries of oil reserves damped out the efforts in subsequent decades. Although it was perceived as a solution to climate change on two separate occasions; once in the 1990s and again in the 2000s, the low oil prices, economic and financial crisis, and popularity of alternative renewable technologies like solar PV and wind affected the concrete financial support required for its development. Today, high technology costs, lack of adequate international supply chain, and lack of

awareness impact the commercialization, infrastructure development, and demand creation of hydrogen-based technology.

The India Story

India's endeavor in hydrogen technologies dates back to 1976, when the Department of Science and Technology sponsored hydrogen projects in universities and technical institutes. At present, India produces around 6.7 Mt of hydrogen annually. A report published by The Energy and Resources Institute anticipates the demand to reach 23 Mt in 2050. The current price of hydrogen in the country ranges from INR 340 to 400 per kg. (USD 4.5 to 5.3 per kg). The cost parity is expected to be achieved when green hydrogen is produced at INR 150 per kg (USD 2 per kg). Refineries, fertilizer, and the steel industry are major consumers of hydrogen in the country. Apart from industries, active research, development, and demonstration is being carried out in the area of electricity production, hydrogen storage, and mobility (fuel cell powered cars, rail, truck, bus, ships).

High technology cost, risk of undesirable sunk cost, absence of dedicated government policy, and lack of public awareness have been significant barriers in front of India's hydrogen economy. However, the recent policy developments portray India's serious intentions in transitioning towards green hydrogen in the long term.

India's government has proposed spending INR 800 Cr by 2024 in its Union budget for FY 2021-22. It mentions pilot projects, infrastructure and supply chain, research and development, and regulations and public outreach as core focus areas. Ministry of New and Renewable Energy (MNRE) is planning to launch a policy document for the national hydrogen energy mission, which will act as a primer for the development of the hydrogen ecosystem in the country, and the rationale of the government to be aggressive in green hydrogen development seems to be prudent.

Opportunities and Challenges

It is quite challenging to integrate renewables in the electric grid beyond a point without technological intervention. Higher penetration might result in the duck curve phenomenon, first observed in California, USA. In the duck curve phenomenon, renewable electricity production and peak demand are displaced by hours on a daily load curve. Green hydrogen, in conjunction with grid-scale battery storage, can act as a solution to this problem. Such a solution will reduce renewable energy curtailment, allow maximum utilization of renewable energy sources, entrust and protect RE investments against loss of revenue due to curtailment, provide power system operation flexibility, and allow additional capacity for more renewable plants in the electric grid.

India has discovered one of the lowest solar PV generation costs globally through a reverse auction mechanism. While the country's lowest cost of solar PV generation stands at INR 1.99 per kWh, most of the projects are being installed in the range of INR 2.5 to 4 per kWh.

According to International Renewable Energy Agency's report, reducing the cost of renewable-based electricity by half can halve the Levelized cost of green hydrogen if other cost components (capital cost, annual load factor of electrolyzer) remain unchanged.

India has the potential to bring down the cost of green hydrogen by using low-cost renewable generating plants and cost-curtailment experience gained through solar and wind reverse auctions. Huge market potential, owing to the young demography and thriving economy, will be a long-term benefit for the government while pushing the application of hydrogen-based technologies.

Hydrogen needs to be considered as complementary to its alternatives rather than contemplating it as an ultimate and stand-alone solution as it comes with its own constraints. The present storage and transportation technologies are expected to be mature and cost-effective by 2030. Hence, the production and near-real-time utilization of hydrogen at the same location can be promoted to safeguard investments against undesirable sunk costs.

Production of green hydrogen requires water and green electricity as input to the electrolyzer. Each kg of hydrogen uses around 8.92 liters of demineralized water. The availability of sufficient water streams is critical as it is a



valuable and limited resource having multiple application areas. Desalination plants can be set up to process wastewater or seawater for electrolysis to avoid possible water usage conflicts. Freshwater from such desalination plants can also be provided to the local population if the plants are set up in water scarce regions. Green hydrogen as an energy sector can become a reality in India if the large availability of renewable and water resources are used optimally.

The Way Forward

Renewables have been torchbearers of the green initiative since the beginning of the 21st century. Hydrogen can play the same role by the mid-century as the goalpost of going green shifts from merely reducing GHG emissions to achieving net-zero emissions. The success of government initiatives lies in administering the right mix of intra and inter-sectoral policies. It is undoubtedly clear that policymakers' decisions today will have a long-lasting impact on the country's energy story. The wish and will by the government, in conjunction with stable and sustained policies instead of stop-go policies, ensure an expedited as well as smooth transition towards the green hydrogen ecosystem. India's immediate policy announcements will set the context for the role of hydrogen in its energy transition amid ongoing hype and hope around it.

This article was published in Financial times on 30th September 2021

KNOW OUR MEMBER

Mr. Vinod M Borse is a Metallurgical Engineer. He has completed his Diploma in Metallurgy from Government Polytechnic Pune in 1993.

He has also completed Part Time BE Mechanical. He is ASNT Certified level 2 in UT, RT, MPI & LPT.

*He is having 21 years of industrial experience from

- A) Kalyani Carpenter Steel Ltd - Senior Engineer (SMS) -8 yrs
- B) Premier Automobile Ltd - Executive Metallurgist - 5 Yrs
- C) Premium Energy Transmission Ltd - Deputy Manager - 8 yrs.

*He was also Director (Metallurgist) of Partnership 2013 to 2017)

- A) Om Multitherm Engineers Pvt Ltd - German client's Critical parts in finished grinding condition.
- B) Bofco Engineers Pvt Ltd - In this ltd approved Stress Relieving frame part specially for controlled (SR f/c size 4 mtr Ht by 4 mtr Wth

* In 2017 he was selected for Istanbul, 07 National & International Inhouse Heat Treatment plant + MIM lab. He has developed Oil field parts & house Heat Treatment furnaces as per



Vinod Borse

his own Heat Treatment Plants (In

In this HT plant he developed one of his Pit type case Hardening Process to

HT plant M/s Siemens Ltd & M/s Alstom Furnace for their metro railway bogie heating and controlled cooling process by 8 mtr in length)

Turkey as a Metallurgical Head out of Metallurgists. He has set up their plant + Sintering plant + Metallurgical Construction Equipment parts from international customer requirements.

He is also looking after Supplier development for Raw steel bars, Raw forgings, Raw aluminium Extrusions & Spring wire, etc. For Supplier Development and for Metallurgical Inspections purposes he visited Korea, China, Taiwan, Singapore, Greece, Bulgaria & Gulf countries.

As hobby he likes to make friends and socialize with people.

Mr. Vinod Borse can be contacted on Email - vmbmet@vmil.com. Mobile +91 9822300500



Upcoming Technical programs

S.No.	Month	Topic	Speaker	Venue	Invitees	Date	Status
1	Feb'22	Heat Treatment & Metallography of MS, Stainless Steel & Duplex Steel	Prof Abhinandan Admuthe	Zoom	ASM Member	17-02-2022	Planned
2	Mar'22	Heat treatment of Aluminium, Copper & Magnesium	Mr Khalap	Zoom	ASM Member	24-03-2022	Proposed
3	Apr'22	Latest Development in Dew point Analyser	Naval Patel	Zoom	ASM Member	21-04-2022	Proposed
4	May'22	Heat treatment fixture - vacuum molding & investment casting		Zoom	ASM Member	-	Proposed
5	June'22	Shot peening - from design perspective	Amit Aradhya	Zoom	ASM Member	-	Proposed
6	Jan / Feb 2022	Health related program by Aloha Clinic - related to Heart diseases	Aloha Clinic	Zoom	ASM Member	-	Proposed
7	July'22	Super alloys - Pinaka & Brahmos	Sunflag Steel	Zoom	ASM Member	-	Proposed

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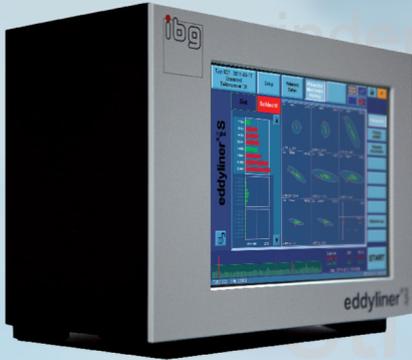
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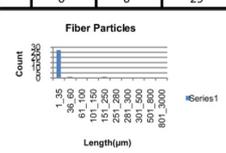
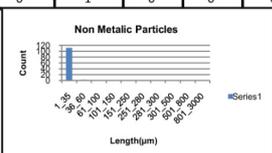
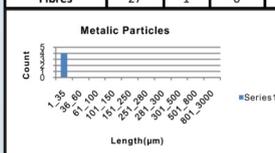
PARTICLE TEST REPORT.

Customer	ABC		
Part No:	A124N	Recd Date:	04-Jun-18
Report No.:	1672	Department :	QA Lab
Sample ID:	ABC	Test Date:	05-Jun-18
Analysis:	Particle	Standard Specification:	As per ISO 16232
Magnification	100X	Filter paper Size:	47 mm
No. of Fields :	5	Scanning Area	30 mm



Particle Size Analysis

Size ranges(µm)	1_35	36_60	61_100	101_150	151_250	251_280	281_300	301_500	501_800	801_3000	Total Count
Metallic	4	0	0	0	0	0	0	0	0	0	4
Non Metallic	111	3	0	0	1	0	0	0	0	0	115
Fibres	27	1	0	0	1	0	0	0	0	0	29



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