IICHE-MRC E-NEWSLETTER

(COVID SPECIAL ISSUE)
MUMBAI REGIONAL CENTER

FROM CHAIRMAN'S DESK

Dr. U. Kamachi Mudali
Chairman IIChE-MRC

Novel Corona virus attack has resulted in the outbreak of a respiratory illness n-Covid19 creating pandemic situation all over the world, and all eyes are now on the remedial vaccine coming soon. The pandemic continue to challenge individuals, families, doctors, organisations and governments. Both at work and home, employees experienced rising levels of anxiety and emotional exhaustion, for adequate health care systems, adequate support systems, and well-being of co-workers and friends who were already diagnosed with Covid-19 disease.

Mother Nature apparently has pressed the "heal" button, but economies around the world have taken a severe shock in the process. The way we work, shop, eat, travel, or learn is changing dramatically with new norms. Confined in the so called comfort and convenience of our homes, smart phone became our only friend for interacting with people, product and services outside home. Businesses around the world have adjusted to the new normal correcting to their general as well industry specific issues. Organisations were on digital transformation curve earlier in a slow manner, but n-Covid19 has now completely accelerated it. We human are resilient and have a great sense of patience and coherence that makes the world as something which is manageable, understandable, and meaningful. Therefore I have no doubt that collectively we will all quickly conquer the crisis and will create rather a new and better world.

Indian Institute of Chemical Engineers (IIChE) is the premier professional organization which provides a platform for interacting with all the disciplines of science and engineering. IIChE remain the most appropriate congregation to interact with fellow professionals, which is an important prerequisite for professional growth. IIChE-MRC continues to conduct and support many events throughout by online means despite the pandemic situation. I wish this issue of e-Newsletter too proves beneficial to the scientific fraternity and member community to encourage them to collaborate and pursue for Atmanirbhar Bharat.

Dr. U. Kamachi Mudali

IIChE-MRC Executive Committee

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Dr Anita Kumari	Hon. Vice Chairperson
Dr. Bibhash Chakravorty	Member
Mr. Mahendra Patel	Hon. Treasurer
Mr. Shreedhar M. Chitanvis	Member
Mr. Dhawal Saxena,	Jt. Secretary (Secretary In-charge)
Dr. Alpana Mahapatra	Member
Mr. Rajesh Jain	Member
Mr. Ravindra Joshi	Member
Dr. T.L. Prasad	Member
Mr. V.Y. Sane	Member
Mr. Joy Shah	Member
Dr. Aparna M. Tamaskar	Member
Mr. Jagdish Nageshri,	Editor IIChE-MRC e-Newsletter

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Editor's Corner

Dear Readers,

The coronavirus lockdown restrictions are slowly easing in India and across the world. We are perhaps wishing to meet friends, visit relatives, travel, or throw a party. But with the current trends and no vaccine yet to treat the infection, there's still a long way to go before life returns to normal. So it's best not to err on the side of caution, at least for some more time, even if the lockdown ends. As of now the lockdown will not be lifted in the true sense, the virus is here to stay and we all must be careful. Covid-19 is a respiratory disease, but when the lungs are not working in full steam, the heart has to work more to circulate blood. That is why it poses greater risk to patients with coronary artery disease, hypertension, diabetes and previous stroke. So, prevention is the best medicine.

The lockdown affects different people in different ways. Some are just trying to get through it, others are noticing that the lockdown provides opportunities for personal growth. Time has slowed down, in so far as many aren't expected to travel or run off to work and meetings. A lot of people are telling that this is giving them a chance to think more deeply about their lives. While we are locked down, we must set time aside each day to think about some of the deeper issues, including the sources of our happiness. Sit in meditation and prayer each day, read more sacred and philosophical texts, and set a goal to understand life better when we emerge from this period. Think of this lockdown as a short Vanaprastha-Ashram.

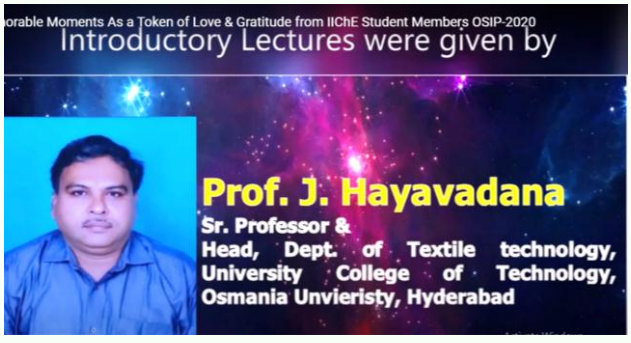
I would like to thank readers for the encouraging feedback on previous issue of E-Newsletter (April 2020), at the same time I wish greater contribution for the e-Newsletter. This issue has mainly covered glimpses of recent online events, AGM, and quite a few webinars. I wish we soon will accustomed to the new normal and come back with new schedules, of course with exceptional learnings. I am happy to present quite a few exceptional articles on Covid – 19 by our student members. The Institute desires active support of industry, academe and R&D organisations, and, indeed, the individual members for its active and meaningful sustenance. Happy reading. Take Care, Stay safe.

Jagdish Nageshri
Editor, IICHE-MRC e-Newsletter

First National level
Online Summer Internship Programme (OSIP-2020)

IIChE-HQ organised OSIP-2020 during **23rd May – 30th July** in which around 2000 students participated from approximately 150 colleges across the country.

- Dr. T L Prasad co-ordinated for Process Safety Management (PSM).
- Shri Dhawal Saxena Co-ordinated lean 6-sigma training Program.
- Shri Joy Shah, Shri Praveen Saxena, Shri V.K. Srivastava Shri Jagdish Nageshri and several IIChE-MRC members participated in several talks & sessions at OSIP.
- Some of the memorable moments are depicted in the Video.
  https://youtu.be/-Jxx8JqcKHM



Brief Report on Inaugural Program of Lean Six Sigma Yellow Belt

IIChE HQ conducted Lean Six Sigma Yellow Belt Certification Course in which around 175 students participated.

Shri Dhawal Saxena coordinated lean six sigma training program. The program was inaugurated on **9th June 2020** wherein our esteemed Guest of Honor Shri Thomas Mathew, Sr. President Reliance Industries Limited, enriched us with his words of wisdom and the insights of the subject matter. He appreciated IIChE's efforts in organizing such a novel venture for the students. Shri Sanjeev Katti, Director General, ONGCEC gave the mantra "Accept the Change, Adapt to the Change and Thrive" for a better post - COVID India.

The session was followed by an Introduction to Lean Six Sigma and its Importance.

Brief Report on First National level Webinar: New Trends and Career Path for Aspiring Chemical Engineers

IIChE-MRC organized the first National Level Webinar for students across the country on **1st July 2020** during this COVID-19 Lockdown with Prof. G.D. Yadav as Chief Guest, in auspicious presence of Dr. U. Kamachi Mudali, Chairman & Chief Executive, Heavy Water Board and Chairman IIChE-MRC. Dr. Vinayak Marathe, Sr. Vice President, RIL enriched participants with his Keynote speech on the topic "New Trends and Career Path for Aspiring Chemical Engineers under COVID 19 Crisis".

The session was followed by panel discussion for industry institute interaction by prominent panelists like Shri Praveen Kumar Saxena, Prof. M V Rao, Dr. Ankur Chaturvedi, Shri Dhawal Saxena, Shri S I Thakar, Shri Dinesh Butala, Shri Somdev Ghosh, Smt. Rucha Sharma and others.

Six Sigma Trainings & Certifications by IIChE

26 August 2020 to 25 September 2020

IIChE-HQ organised "Lean Six Sigma Trainings & Certifications" program under OSIP-2020. Shri Dhawal Saxena coordinated for the Orientation Program on 26th August 2020. Shri Vinayak Marathe explained the importance of common sense in solving engineering problems with optimum use of resources. Prof. A.B. Pandit enlightened the evolution of solution from common sense to mathematical expression (quantification) as an ultimate form of logic. He also advised to be thoughtful while using statistical correlations.

IIChE is pleased to offer Lean Six Sigma trainings and certification and has the following objectives:

- To have a better understanding of Lean Six Sigma Methodology and Processes
- To understand the techniques used by Lean and Six Sigma
- To apply the knowledge and techniques used by Lean and Six Sigma
- To be able to track data, analyse errors and conduct root cause analysis
- To understand the benefits of statistical tools to improve analytical ability
- To be able to solve problems in the organization's processes
- To drive a higher level of service on key deliverables for customers

Identified participants would be given the trainings in Lean Six Sigma Yellow Belt training for 1day, Green Belt training for 2 days. The Green Belts would be given 4 more days of training in Black Belt topics. The Minitab software training is conducted using organization's data. By the end of training participants would be able to…

Lean Six Sigma Yellow Belt

- Comprehend fundamental methodologies utilized for Six Sigma.
- For BE/ B.Tech/ M.Tech Chemical Engineering students

Lean Six Sigma Green Belt

- Apply different tools to solve problems in the organization's processes
- For Quality Managers, Production Engineers, Operations Managers, Team Leads, Business Managers

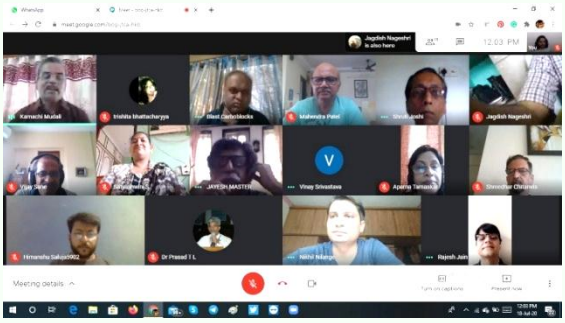
Lean Six Sigma Black Belt

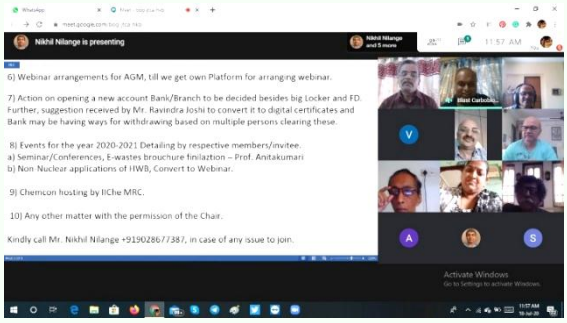
- To drive a quantifiably higher level of service on key deliverables for customers
- For Vice Presidents / Directors / General Managers, Team Leads , Executives, Quality Analysts,

IIChE-MRC: Executive Committee Meeting

Conducted online for first time on 18 July 2020

IIChE-MRC Executive Committee meeting conducted its first online meeting on 18th July 2020 due to COVID lockdown and social distancing norms. Shri Dhawal Saxena was elected as Honorary Secretary of IIChE-MRC in the web-meeting organised on Google meet platform.



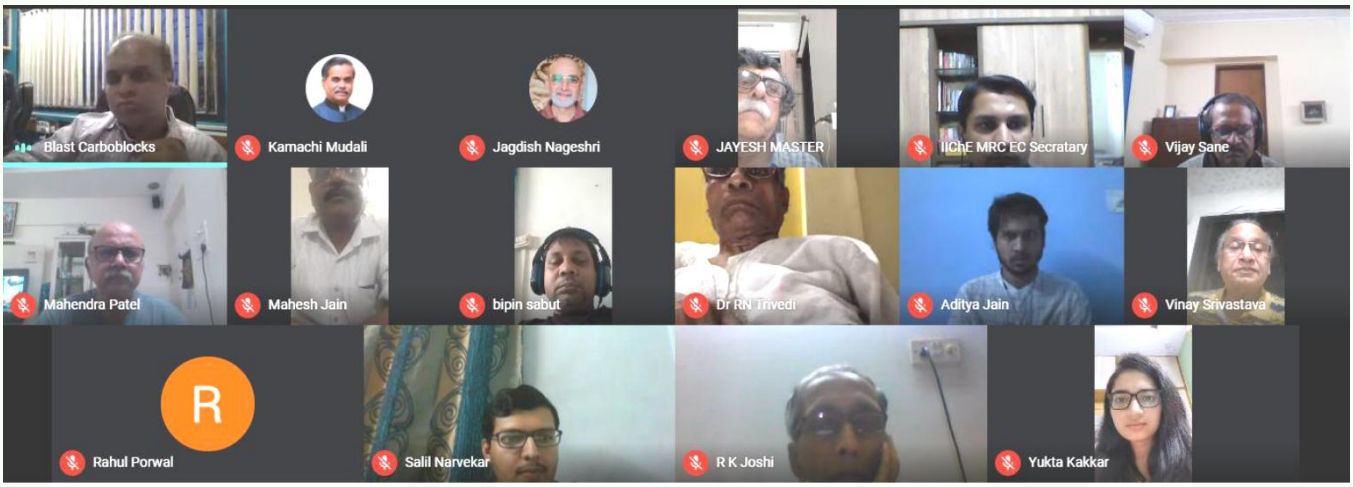


60th Annual General Meeting (AGM) of IIChE-MRC

Conducted online for first time on 06 August 2020

The 60th Annual General Meeting (AGM) of IIChE-MRC conducted online on 06 August 2020 on Gsuite meet platform due to COVID-19 Lockdown and social distancing norms as per guidelines from IIChE-HQ. Honourable Chairman **Dr. U. Kamachi Mudali** welcomed all the attendees of 60th AGM and new MRC Members joined during the Year 2019-20 on the behalf of MRC Executive Committee. Hon. Secretary Shri Dhawal Saxena presented Minutes of Meeting of 59th AGM held at IITB on 15th June 2019. Same was approved without any corrections by present attendees. He presented Secretary's Report for the year July 2019 - June 2020 including activities of IIChE MRC and was accepted. Hon. Treasurer Shri Mahendra Patel presented detailed Annual Audited Accounts for the year ending March 2020. All the queries were well taken and audited annual accounts were approved by AGM. Hon. Treasurer also explained for the continuity of the Auditor for next financial year and was accepted by all the attendees.

Hon. Secretary informed that election for Executive Committee for the period of 2020-21 is cancelled due to COVID-19 and existing Committee will continue for 2020-2021. Shri Praveen Kumar Saxena and Shri Vinay Kumar Srivastava shared information on important issues & developments at Head Quarter in light of Covid-19 and also suggested quite a few interventions for improving MRC activities. Hon. Chairman Dr. U. Kamachi Mudali appreciated the efforts of Shri Rajesh Jain and Shri Sane for collecting the contact details of the IIChE-MRC members. All attendees observed one minute silence for the sad demise of Shri R.K. Mehra. Members appreciated the efforts of IIChE-MRC for successful Launch and circulation of IIChE-MRC E-Newsletter. Honorary Chairman and Honorary Secretary thanked invited guests, IIChE Students Members, the young brigade, for their support in conducting online AGM and also making IIChE-MRC more vibrant. AGM was followed by a small singing Session by IIChE-MRC members.



PANDEMICS & LOCKDOWN : CHALLENGES AND OPPORTUNITIES - I

Salil Narvekar, Final Year Chemical Engineering, Institute of Chemical Technology, Mumbai

The COVID-19 is undoubtedly one of the most difficult challenges faced by humanity in recent times. Much has been said and written about the adverse effects of COVID-19.

But, is there a silver lining in this bleak situation?

Crises are often a catalyst for innovation and establishment of newer business models, industrial structures and cost levels. Due to this pandemic, the speed of innovation in chemical and biotechnology sectors has increased dramatically. The work done towards development of a vaccine will make us future pandemic ready. The speed with which various industries transformed their product line will be an example of how to pivot your business quickly and successfully, in future.

Many leading chemical companies pivoted their product line in the face of the pandemic-

- Dow, Huntsman and INEOS are increasing their sanitizer production
- Honeywell plans to start manufacturing protective masks
- Solvay and Boeing are together producing face shields
- Various companies are now using alcohol primarily as an antiseptic

Also, many new companies came up in the health and hygiene sector. They are engaged in making sanitizers, personal protection equipment, vegetable wash, disinfectants, antiseptics, protective packaging, etc.

Also, we must realize that the disruptions in supply chain and decline in revenue are not here to stay. Additionally, given the negative perception of China currently, many multinational companies want to shift their operation in China elsewhere. This is in fact an opportunity for India.

That said, market capitalization of most companies has dropped drastically due to the pandemic causing large revenue losses.

But, in case of pharma, speciality chemicals and agrochemical companies; the stock prices were marginally impacted due to their essential nature. Also, in case of the other chemical companies, manufacturing operations resumed shortly after the initial lockdown and the shares of the companies experience a turn-about after the initial dip.

This turn-about was also due to crude oil prices crashing globally due to low demand but abundant supply. It is said that oil price drop of 50% can typically result in 10%-50% reduction in cost for raw material of chemical companies depending on their place in the chemicals' supply chain. Due to this, profit margins of some of the chemical companies became tenable again.

The unorganised sector will definitely be largely affected as they will find it difficult to adhere to strict guidelines given by the government to prevent the spread of the virus. They are also likely to face more logistics problems, understaffing problems and shortages of protective equipment. So, it is likely that they will lose business to large companies having strong balance sheets.

Manufacturing plants in chemical industry are often worker dense as many activities are difficult to be controlled remotely. But now, due to social distancing guidelines workers will have to come in staggered shifts. So, production will have to be largely automated. It's time for chemical companies to go to the next level by applying concepts of data science, process and data integration and robotic process automation to achieve no-touch production and distribution. Also, in this period of reduced sales they should focus on user experience design and improving their marketing capability.

Chemical industries are definitely going to face great challenges in the coming future. But, as global supply chains are being tweaked and governments are coming up with economic stimulus packages, there is a possibility that chemical industries may emerge leaner but stronger. Only time can tell. Let's hope for the best!

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PANDEMICS & LOCKDOWN : CHALLENGES AND OPPORTUNITIES - II

Akash U. Gadekar, UG Chemical Engineering Student at MGM's CoET, Kamothe, Navi Mumbai.

Managing the future instead of Covid-19 crisis needs identification of challenges and a lot of brainstorming to find their solutions and an excellent planning to convert them into opportunities. India imports 37% organic, 13% inorganic, 36% medicinal and pharma chemicals and 28% dye intermediates also approx. 40% of total raw materials from china.

The rest are imported from Asian and European countries e.g. crude oil, solid fuels (coal), palm oil, petroleum gases etc. As china being the epicentre of pandemic caused lockdowns in Chinese production facilities which caused an adverse effect on Indian chemical industries.

Deficits and dependency on imports of raw materials is major challenge at present apart from that reduced empowerment in organisations for decision making, increased prices of dye-intermediates and raw materials (vinyl sulphone and H-acid shot up from ₹170 to ₹470 and ₹360 to ₹480 per kg respectively), reduction in chemical exports of India, suffering of organizations having slow procedures, complex bureaucracies and rigid hierarchies making organizational life less than pleasant. These are some challenges which Indian chemical industry is facing right now.

These challenges and barriers need to overcome and for that we need concrete action plan. First step will be centralisation of control for organisations to move faster with greater clarity and in some cases, more reassurance and discipline. Secondly, to avail enough resources, tools and the right processes for remote work.

Then we can move onto detailed clarification of decision rights like 'What things will belong more exclusively to the centre and what things you absolutely need approval for?'. Due to remote working, leaders need to update themselves on a continuous basis and employees need to preface their resource request.

Manufacturing of basic raw materials, APIs (Active Pharmaceutical Ingredients) and pigments in India itself can help to overcome shortage of raw materials and also, delocalization of resources of key raw materials can be done to reduce dependence on Chinese import. Because of remote working environment the INDUSTRY 4.0 revolution gained speed in terms of innovations and application of technology for cloud operating. Also, Industrial Internet of Things is now trending.

Moreover, Indian chemical sector has some huge opportunities in this situation. In dye industry 20-30% import is Chinese raw materials while rest of raw materials are India based. Also, India has its own dye-intermediates manufacturing facilities e.g. Bodal Chemicals, Shree Pushkar, Bhageria Industries, Kiri Industries, Aksharchem, etc. So, the net effect would be increased export prices (approx. chemical and dye export is ₹60,000 crore annually before pandemic). Increased production of export commodities whose raw materials are manufactured or can be made available in India like fine and speciality chemicals, finished petroleum products, agrochemicals and fertilizers will generate more revenue.

Rubber chemicals, graphite electrodes, carbon black, dyes manufacturers are likely beneficiaries, because China and other Asian as well as European countries are adapting Electric Arc Furnace (EAF) route to increase steel production which was halted due to pandemic and lockdown, this scenario is positive for graphite electrode makers in India e.g. HEG and Graphite India.

In this pandemic increased compliance norms had led to closure of dyes and pigments manufacturing facilities in China, which will benefit Indian dye manufacturers. Nearly a year ago, Chinese suppliers had increased the prices of raw materials. Despite the fact, Indian units continued buying raw materials as there was no alternate. Hence, this is the right time to convert adversity into opportunity.

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PANDEMICS & LOCKDOWN : CHALLENGES AND OPPORTUNITIES - III

Meenal Rathi, Final Year Chemical Engineering, Institute of Chemical Technology, Mumbai

'Every coin has two sides, so does the pandemic and lockdown!' Everyone is aware how the Covid19 pandemic has tremendously affected our complete lifestyle. An instant announcement of lockdown, gave no chance for contemplation to act. Humans are intensely social creatures, wanting a company for interaction. Staying at home with near ones for a longer period of time turned out frustrating for many. Some had to stay away from their family, in this dreary period due to *lack of means of transportation* in the lockdown. Instead of grumbling, people discovered distinct ways to live with these unprecedented times.

Overall the pandemic resulted in a drastic transition in the mindset of the people, their *behavioural attitudes*; brought *public health awareness* (which was minimal in some states of our country). *Education system* underwent a big learning curve. For example, person-to-person meetings turned into virtual; students could attend the lectures at their comfortability from home. Downside is a concern if they are really gaining the virtually imparted knowledge which reinforces the importance of in-person learning over other methods. Familiarising with the online applications and tools pose a challenge for some; unavailability of virtual platforms arose a kind of disparity for the few.

'Life is full of lessons and the lockdown really provided a chance to put things into perspective, to embrace a lifestyle that is kinder to people and the planet! Lockdown indeed turned out to be a great teacher!'

Running a race in our life has made us forget about our inner self! The slower pace succoured us to reflect on the effects of our busy lives; facilitated us to make some constructive changes in our well-being. Those who were lucky to stay with their family, were able to deepen the otherwise weakened bond. Everyone received a **priceless gift of time** by the lockdown which was used as a golden opportunity to up-skill and develop some hobbies or practise those which were left untouched for a long time.

A preeminent impact of the lockdown was the **increase in unemployment rates**. Many (especially daily-wage workers) became jobless and some (including decent working employees) had their salaries halved. Nevertheless, employment in the health sector has improved. Jobs like teachers, architects, insurance, and marketing underwent a special transformation. Opportunity lies in the IT services, with rising **Work From Home** demand.

From an engineering perspective, engineers across the globe are inventing ways to produce essential medical emergency supplies, like *PPE*(Personal Protective Equipment) *kits, ventilators* at a cheaper rate and faster pace. Common people got acknowledged with new medical instruments like oximeters and thermal detectors. The biggest challenge, in a developing country like India, is the production of APIs (Active Pharmaceutical Ingredients), many of which were imported, especially from China but now with the **Make-In-India** and **Self-Reliant India initiative**, engineers have to face a big challenge of inventing and assemblance of these products. Our initiative has invited many foreign collaborations which would serve as a support for capital infrastructure. Decarbonisation and Digitalisation are the controlling parameters in the post-pandemic world.

Lastly, in these tough times, opportunities lie with all those who are ready to *adapt to a process, innovate* and *integrate* to make it *inclusive (i.e. self-reliant)*. Here is where skilled labour/engineers come as a challenge which after an effective implementation of the **National Education Policy(2020)** can experience an exponential rise.

'Opportunities come with Challenges! The one who masters the process turns a challenge into an opportunity…' .

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PANDEMICS & LOCKDOWN : CHALLENGES AND OPPORTUNITIES - IV

Kashish Dungar, Third Year Chemical Engineering, Thadomal Shahani Engineering College, Mumbai

"'The Lockdown".

These two words brought a smile on almost every student since most of their colleges and schools had shut down because of the Covid-19 breakout. An abundance of free time is the fantasy of every student. Yet, most of us got bored of "being bored" and thus decided to do something with all this free time we had. Despite the mundane and monotonous routine of online classes, we wanted to test and explore new ideas.

Many Indian educationists are worried over a digital movement in education, that threatens to cut off a sizable number of children. Only about a 1/3rd of students will have access to any online content. It would be difficult for rural parents and marginalised communities to understand that content. When will schools reopen? What will be the future of sports? These are some of the burning questions. Basic internet access to children is the biggest hurdle. With the continuing decline in the economy and salary of a middle class parent, such parents cannot afford recharges or WiFi connections.

A carefully analysed decision pertaining to their attributes, can drastically improve their chances at a more rewarding career. Therefore, students and employees can apply for further decision programs, by evaluating their personal characteristics to gain more insight into the directions they have considered, by using a simple acronym "S.E.A.T", which is as follows:

Skill: These are the acquired skills of an individual. They may be hard or soft, since it's an individual's ability to accept challenges and carry them out responsibly.

Enjoyment: The inclination towards comprehending something with exciting engagement.

Advantage: Things that are beneficial in the long term, to add as accolades for the student. Motivation, balance and leadership qualities are a few vital values to acquire, that help in all fields of life.

Temperament: An individual's response to a stimuli in the given environment. Their reaction determines their perspective, which then determines their attributes.

Utilizing the right avenues and developing career specific-skills, is a personal competitive benefit. Networking, using social networking tools like LinkedIn, to exhibit your personal philosophy and brand, can also make sure that your foot is right inside the occupational circle.

The Indian government has also introduced courses like SWAYAM, ICT, iGOT etc.. The online courses are extremely affordable, which cost a few dollars for the certificate, whereas the learning material is absolutely free of cost. Well thought lesson plans, with assignments and resources, make sure the theory is taught with a practical application, which enhances the learning experience, and makes it more invigorating. They are available in English, as well as regional languages, which make it extremely user friendly. There are many life altering courses which an individual can use for their personal life, while still having a positive impact on their professional life. It takes a lot of trial and error to get into the right field of your choice, and many online platforms and courses, help in segregating your likes and dislikes.

With a bloom in such great learning opportunities even during such extraordinary circumstances, many have an added edge of values in their professional and personal lives. The use of technology during the pandemic has been extremely crucial. The lockdown has not put a standstill on growth and education, which makes it pivotal for students to make an impact and accelerate the speed of innovation. Confronting the crises, through effective use of our time and resources, can empower a better and sustainable future.

"Defeating a challenge gives rise to the extraordinary, from mediocrity"

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PANDEMICS & LOCKDOWN : CHALLENGES AND OPPORTUNITIES - V

Surada Kavya, 4th year Chemical Engineering, Indian Institute of Petroleum and Energy

The lockdown is affecting different people in different ways. Some are mentally disturbed, financially worried, some are just trying to get through it, other are noticing that the lockdown, while not what we had hoped for, provides opportunities for personal growth. Time has slowed down. We got an opportunity as we aren't expected to travel or run off to work and meetings (at least not in person) to spend time with our loved ones. People are telling that this is giving them a chance to think more deeply about their lives, about their passion. It is important not to let this opportunity pass. Spend some time for physical exercises as well as for mental exercises such as meditation and prayer each day. Try to know more about yourself.

Challenges:

Lockdown has created a huge range of challenges for business of all sizes. Those that do not qualify as essential businesses may have been forced to close their premises, and others that can stay open face a completely changed economic landscape which they are trying to survive in. Including the metros, start-ups and larger enterprises are now faced with a tough decision of whether to reopen their offices and asking employees to return to work. The lockdown has proved, beyond doubt that productivity has not been hit by working from home. With the availability of technology tools like Slack or Zoom, virtual collaboration has become convenient and easier.

1. The Covid-19 pandemic has thrown up monumental challenges for India's real estate industry. A slump in sales, halt in construction at ongoing projects, and derailment of new project plans.
2. While potential homebuyers, staring at possible job loss and pay cuts are likely to stay away from the market.
3. The industry was impacted further due to restriction in the movement of people and raw material.
4. People died from diseases other than Covid-19 due to lack of medical facilities.

Opportunities:

Having said that, every challenge comes with some opportunities and the current crisis is no different. Here we take a look at some of the unusual opportunities that lockdown has actually created for businesses. They may be an ideal way for any company to survive and thrive in these uncertain times. Here are the silver linings to the dark clouds surrounding Indian realty:

Builders and owners might have to reduce prices to sell inventory, which could be a great opportunity for investors to grab good deals.

The government is trying to do things to create further opportunities. This has led to a number of laws being lifted or relaxed to make it easier for businesses to survive.

Now, it is the ideal time to carry out a little work on the interior and exterior of the places like add a coat of paint, install new lighting, or completely redecorate.

Lockdown has forced many people to work from home when they may not have experienced it before. Now could be the perfect time to invest in selling online.
This is a great time to really examine the market and establish what your business can offer to the community that could help during this time. And as times goes on, other possibilities will arise too.

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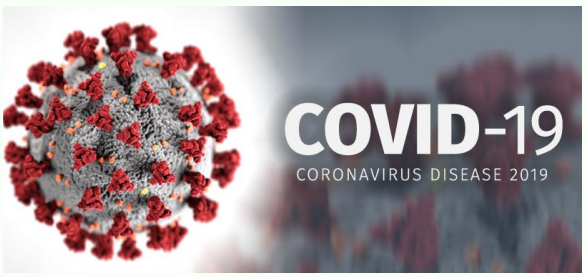

PANDEMICS & LOCKDOWN : CHALLENGES AND OPPORTUNITIES - VI

Hema Chandra Gokavarapu , Student at RVR&JC COLLEGE OF ENGINEERING, Guntur
E-mail - gokavarapuhemachandra@gmail.com

The COVID pandemic has put the world in an unprecedented situation and the whole world is suffering major losses in terms of human life as well as economy and people around the world are in a state of unrest and uncertainty and they are terrified seeing people dying all around them.

In this article I would like to share my opinion on the challenges and opportunities that arise due to this pandemic

When we consider the current situation around ourselves we will find the challenges one needs to overcome and the opportunities one can make use of, as of now there is no vaccine available for use in market and many people are losing their jobs and the country's economy has been hit hard and knowing all these things can make any person feel overwhelmed but that doesn't change the situation instead one needs to overcome the following challenges and make use of the opportunities to successfully make it out of this situation.

Challenges during the COVID pandemic:

The following are the challenges one needs to overcome and that stands in the way of your well being and your all round development

1. The biggest challenge of this pandemic is staying healthy and this is due to the work stress and other personal factors that impact the body functionality and it also affects immunity which makes you more vulnerable to the virus.

2. Maintaining mental health this is also due to lockdown which made people isolated from others and which is leading to different types of conditions like insomnia, phobia, insecurity feeling and for few people sometimes leads to worse like committing suicide. These can be avoided by spending time with friends and family via technology.

3. The other challenge is work from home, It is because no one thought work from home would become a reality and for this reason most of the people could not adopt to the culture which is affecting their work and for some it is costing job.

4.Staying productive has been a hassle for quite a lot of people as they cannot focus on their work when working from home, these people easily tend to distract from work and they are not as productive as they used to be in their regular work environment.

Opportunities during the COVID pandemic:

1. The biggest opportunity given by the pandemic is the digital transformation and digitalisation of various sectors all over the country.

2. Online presence to continue their business for small business owners to continue their business during the pandemic without compromising the safety of customer.

3. The most important of opportunities is for the students as they have been given the chance to be a part of different knowledge sharing programs offered by different institutions and professional organisations like IIChE .

4. Students have got the chance to learn new skills from MOOCS and even do internships or research right from the comfort of their home and by ensuring their safety.

5. The biggest opportunity any person can learn from this pandemic is there is always room for improvement and nothing in this universe is perfect and it never stays perfect and one always needs to be ready for the future no matter the challenges are.

6. This pandemic is an eye opener for almost all the governments in the world as it showed the true colours of their rule and the consequences they need to go through for example, when a country is focussed entirely on military and neglect other things this showed everything needs to be given it's own importance and the consequence one need to face in the future.

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PANDEMICS & LOCKDOWN : A BOON OR A BANE ?

Narayanan Madathil, Third Year Chemical Engineering, Thadomal Shahani Engineering College, Mumbai

The more I think about this, the more confusing it gets. Is this lockdown good? Or is it bad? Am I having fun sitting in front of the laptop for 9 to 12 hours straight? Or is it just that my wish of working from home has come true?

Work from Home is something that we all have wanted from a long time. All work can be done, right from our comfort zone. But now that we have it, we realise that this is not what we expected when we meant "Work from Home". The grass is always greener on the other side.

Well, let's just agree to disagree. It has its own merits and demerits. As a budding chemical engineer, this is how I feel about the lockdown, which has been caused by the Coronavirus pandemic.

I remember the day when the lockdown was announced. The initial reaction was happiness (for me personally), since my college periodic tests were round the corner. But my parents' reaction troubled me a little. They hurried to the market to buy the basic supplies, groceries and medicines for the coming week. Here, I would like to enumerate certain challenges which we faced (or are still facing), which I converted into growing opportunities.

Though the above-mentioned challenges have contributed to my inner well-being and personal development, I have started to envisage my contribution to the development of the society. I have started thinking as to how I can help the society, the downtrodden, and the needy. I dream of a poverty-free India where food and shelter are available to all. I dream of my India with education for all.

In this pandemic/lockdown, I have realised the importance of the quality "Gratitude". I am grateful for everything that I have. We are all grateful to the innumerable doctors, paramedical staff, policemen, cleaning workers, delivery boys, milkmen, and other people who selflessly work for the service of the society, and who have made our lives comfortable and hassle-free.

We, the chemical engineers, are the torch bearers for the society. With an increasing hunger for technology, and a plethora of opportunities, I feel that the right amalgamation of Chemical engineering with technology will take humanity leaps and bounds ahead of its time.

Wishing for a healthy, peaceful, and loving earth.....

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Challenges ——————————————————> Which I converted into opportunities	
Sitting in front of the laptop for online lectures	Now using it for personal and professional development, like online certification courses, competitions, and webinars, along with my college studies
Less physical movement due to lockdown	Realised the importance/necessity of exercise, and started exercising regularly
Busy schedules of the family members never allowed us enough quality time	Now since everyone confined to the four walls of the house, more quality time spent together, and more involvement in household chores
Couldn't spend time with friends in and around the college	Now using that time for reading books, passion project, doing our daily prayers, and deciding our future prospects, also keeping in touch with friends via social media
Never realised the value of the things that we have	Understood the difficulties faced by maids/drivers/labourers, thereby developing a helping mentality in me and a feeling of compassion towards my fellow beings

Covid-19 : A Lesson in 2020

Covid-19 virus is not a great disaster, it is a great corrector. There is a spiritual purpose behind everything that happens, whether that is what we perceive as good or bad.

Covid 19 is reminding us that we are all equal, regardless of our culture, religion, occupation, financial situation. It treats us all equally.

Covid 19 reminding us that we are all connected and something that affects one person has an effect on another.

Covid 19 reminding us that the false borders that we have put up have little value as this virus does not need a passport.

Covid 19 reminding us of how precious our health is and how we have moved to neglect it through eating nutrient-poor food and drinking water that is contaminated with chemicals.

Covid 19 reminding us of how materialistic our society has become and how, when in times of difficulty, we remember that it's the essentials that we need (food, water, medicine) as opposed to the luxuries that we sometimes unnecessarily give value to.

Covid 19 reminding us of how important our family and home life is and how much we have neglected this.

Covid 19 forcing us back into our houses so we can rebuild them into our home and to strengthen our family unit.

Covid 19 reminding us that our true work is not our job, that is what we do, not what we were created to do. Our true work is to look after each other, to protect each other and to be of benefit to one another.

Covid 19 reminding us to keep our egos in check as no matter how great we think we are or how great others think we are, a virus can bring our world to a standstill.

Covid 19 reminding us that the power of freewill is in our hands. We can choose to cooperate and help each other, to share, to give, to help and to support each other or we can choose to be selfish, to hoard, and to look after only our self. Indeed, it is difficulties that bring out our true colors.

Covid 19 reminding us of the shortness of life and of what is most important for us to do, which is to help each other, especially those who are old or sick.

Covid 19 reminding us that we can be patient, or we can panic. We can either understand that this type of situation has happened many times before in history and will pass, or we can panic and see it as the end of the world and, consequently, cause ourselves more harm.

Covid 19 reminding us that this Earth is sick. It is reminding us that we need to look at the rate of deforestation urgently. We are sick because our home is sick.

Covid 19 reminding us that after every difficulty, there is always ease. Life is cyclical, and this is just a phase in this great cycle. We do not need to panic; this too shall pass.

Covid 19 reminding us that this can either be an end or a new beginning. This can be a time of reflection and understanding, where we learn from our mistakes, or it can be the start of a cycle which will continue until we finally learn the lesson we are meant to.

(Courtesy: Open Source)

Anaerobic production of Biogas from Domestic Waste

Mr. Anuj Shah, Ms. Radhika Bhadbhade, Dr. Sadhana J. Purohit
Thadomal Shahani Engineering College, University of Mumbai-India

Abstract:

Annually, India produces about 62 million tonnes of waste, which is nearly 1, 69,863 tonnes of waste daily. The volume of waste generated is increasing by 4% year on year. The issue of waste management needs to be addressed at the earliest due to the hazards it poses to the environment. Dry waste can easily be reused or recycled by a series of processing steps. However, wet waste needs to be treated before disposing it as it hosts a number of microorganisms which disturb the ecosystem. Another well organized and systematic usage of wet waste is to use it in harnessing energy which in turn reduces the burden on the overall waste disposal system. Biogas, rich in methane can be used a source of energy for a variety of purposes. It is produced by microbial decomposition of organic material under anaerobic conditions. The residue left behind is rich in nutrients and can be used as a fertilizing agent. This report focuses on the appropriate use of waste generated by eateries and canteens. Generation of biogas from food leftovers of college canteens shall prove to be an economical and eco-friendly technique of wet waste disposal. We aim at constructing a simple and minimalistic power generating plant which would suffice the layman's everyday power requirement. We look forward to consequently have a beneficial impact on the waste management system of the country.

Keywords:

Waste management, Eco-friendly, Anaerobic digestion, Minimalistic design.

Biography:

Ms. Radhika Bhadbhade and Mr. Anuj Shah are third year students of Bachelor of Chemical Engineering at Thadomal Shahani Engineering College affiliated to the prestigious University of Mumbai. They aim to generate power by anaerobic digestion of domestic waste. Dr. Sadhana J. Purohit is working as a professor in Chemical Engineering Department at Thadomal Shahani Engineering College, University of Mumbai, and her area of specialization is in Petrochemicals and Advanced Separation techniques.

ANAEROBIC PRODUCTION OF BIOGAS FROM DOMESTIC WASTE

Need For Finding Alternative Energy Sources:

With the growing concern of the depletion of the fossil fuel in the world finding substitute resources has lead to an increased interest in the idea of renewable energy sources. As the world slowly progresses towards this idea of renewable energy, many people are wondering which renewable energy source will last the longest. Though all renewable energy resources are way better and less harmful than the current depleting fossil fuels, the most promising and emerging technology is Biogas. The principle of supply and demand holds that as hydrocarbon supplies diminish, prices will rise.

Therefore, higher prices will lead to increased alternative, renewable energy supplies as previously uneconomic sources become sufficiently economical to exploit. Artificial gasolines and other renewable energy sources currently require more expensive production and processing technologies than conventional petroleum reserves, but may become economically viable in the near future. Different alternative sources of energy include nuclear, hydroelectric, solar, wind and geothermal. One of the more promising energy alternatives is the use of inedible feed stocks and biomass for carbon dioxide capture as well as biofuel. While these processes are not without problems, they are currently in practice around the world. Bio diesels are being produced by several companies and a source of great research at several universities.

BIOGAS:

Biogas is produced by bacteria through the bio-degradation of organic material under anaerobic conditions. Natural generation of biogas is an important part of bio-geochemical carbon cycle. It can be used both in rural and urban areas.

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Biogas is a type of biofuel that is naturally produced from the decomposition of organic waste. When organic matter, such as food scraps and animal waste, break down in an anaerobic environment (an environment absents of oxygen) they release a blend of gases, primarily methane and carbon dioxide. Because this decomposition happens in an anaerobic environment, the process of producing biogas is also known as anaerobic digestion. Anaerobic digestion is a natural form of waste-to-energy that uses the process of fermentation to breakdown organic matter. Animal manure, food scraps, wastewater, and sewage are all examples of organic matter that can produce biogas by anaerobic digestion. Due to the high content of methane in biogas (typically 50-75%) biogas is flammable, and therefore produces a deep blue flame, and can be used as an energy source.

Biogas is known as an environmentally-friendly energy source because it alleviates two major environmental problems simultaneously: The global waste epidemic that releases dangerous levels of methane gas every day. The reliance on fossil fuel energy to meet global energy demand by converting organic waste into energy, biogas is utilizing nature's elegant tendency to recycle substances into productive resources. Biogas generation recovers waste materials that would otherwise pollute landfills; prevents the use of toxic chemicals in sewage treatment plants, and saves money, energy, and material by treating waste on-site. Moreover, biogas usage does not require fossil fuel extraction to produce energy.

KITCHEN WASTE:

In various cities of India, the cumulative waste produced is about 1.43 In various cities of India, the cumulative waste produced is about 1.43 lakh metric tonnes out of which barely 35,600 metric tonnes are sent for processing. What happens to the remaining 1.1 lakh metric tonnes of garbage? Having no economical solution to treat this huge mass of waste, this waste is readily dumped in the open or in water bodies.

According to a recent report generated by a leading newspaper, out of the 29 states and 7 Union territories of the country only 8 states have been able to process nearly half of the waste generated by the respective state and none of the states have achieved an accuracy rate of 100 percent waste processing. Waste as whole cannot be disposed by a single method. Segregation of waste and then treatment of each waste sector proves to be an efficient technique.

Liquid waste, solid rubbish, organic waste, recyclable waste and hazardous waste have been categorized as various waste types. Knowing these types shall validate the suitability of disposal routines. Kitchen waste does not only comprise of food waste (food that is wasted, lost or eaten) but also includes plastics, glass, cardboard from packaging and liquid waste which can be disposed by recycling or expert removal. Although a large majority of waste that kitchens produce is food waste, not all of it can be disposed easily. There are many regulations surrounding food waste, due to the fact that raw meats, fish and eggs cannot be landfilled.

By recycling food waste and other kitchen waste that is recyclable one could improve the environmental image as well as have a positive impact on the economy. All food waste, garden waste, manure and rotten meat are classified as organic waste. Over time, organic waste is turned into manure by microorganisms. This does not imply that treatment of organic waste can be achieved without great effort. Dumping of organic waste in landfills is convenient as far as the economy is concerned however it emits methane and shouldn't be simply discarded. An effective method must be devised for processing of organic waste as it comprises of about 42 percent of the total garbage produced by the country as a whole. lakh metric tonnes out of which barely 35,600 metric tonnes are sent for processing. In various cities of India, the cumulative waste produced is about 1.43 lakh metric tonnes out of which barely 35,600 metric tonnes are sent for processing. What happens to the remaining 1.1 lakh metric tonnes of garbage?

Continue…

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PROCESS OF ANAEROBIC DIGESTION OF KITCHEN WASTE:

The process of anaerobic digestion involves a number of steps which finally leads to the production of methane which is later processed to be converted into biogas. The biodegradable matter present in kitchen waste such as vegetable peels, meat leftovers, egg shells and other wet waste is broken down by microorganisms in the absence of oxygen. This method is quite effective in handling waste in an economical manner. A very good example of anaerobic digestion is the fermentation used to produce food and drinks.

The digestion process involves the hydrolysis of organic matter by bacteria. The following complex materials are converted into their simpler forms in the initial steps of anaerobic digestion:

1. Carbohydrates → Soluble derivates by bacterial hydrolysis

2. Sugar+ Amino acids → Carbon dioxide+ hydrogen+ ammonia+ organic acids by acidogenesis

3. Organic acids→ Acetic acid+ additional ammonia, hydrogen and carbon dioxide by acetogenesis

4. Products → Methane+ carbon dioxide by methanogenesis

PROCESS DESCRIPTION:

The four key stages of anaerobic digestion, hydrolysis,acidogenesis, acetogenesis and met hanogenesis. The overall process can be described by the chemical reaction, where organic material such as glucose is biochemically digested into carbon dioxide (CO_2) and methane (CH_4) by the anaerobic microorganisms.

$C_6H_{12}O_6 \rightarrow 3CO_2 + 3CH_4$

Hydrolysis: In most cases, biomass is made up of large organic polymers. For the bacteria in anaerobic digesters to access the energy potential of the material, these chains must first be broken down into their smaller constituent parts. These constituent parts, or monomers, such as sugars, are readily available to other bacteria. The process of breaking these chains and dissolving the smaller molecules into solution is called hydrolysis. Therefore, hydrolysis of these high-molecular-weight polymeric components is the necessary first step in anaerobic digestion.

Through hydrolysis the complex organic molecules are broken down into simple sugars, amino acids, and fatty acids. Acetate and hydrogen produced in the first stages can be used directly by methanogens. Other molecules, such as volatile fatty acids (VFAs) with a chain length greater than that of acetate must first be catabolised into compounds that can be directly used by methanogens.

Acidogenesis:

The biological process of acidogenesis results in further breakdown of the remaining components by acidogenic (fermentative) bacteria. Here, VFAs are created, along with ammonia, carbon dioxide, and hydrogen sulphide, as well as other by-products. The process of acidogenesis is similar to the way milk sours.

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Acetogenesis:

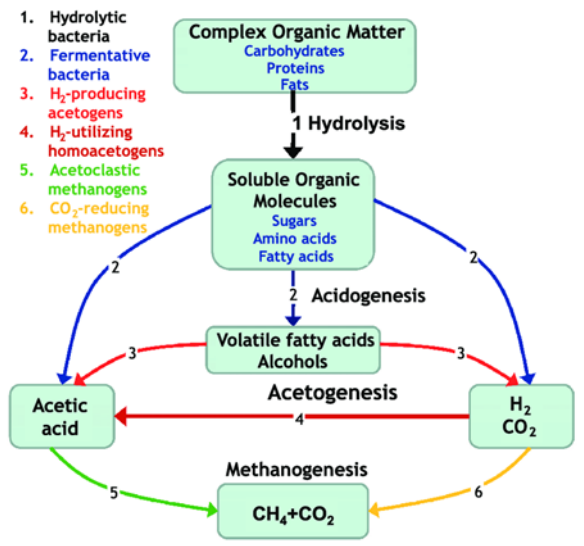
The third stage of anaerobic digestion is acetogenesis. Here, simple molecules created through the acidogenesis phase are further digested by acetogens to produce largely acetic acid, as well as carbon dioxide and hydrogen.

Methanogenesis:

The terminal stage of anaerobic digestion is the biological process of methanogenesis. Here, methanogens use the intermediate products of the preceding stages and convert them into methane, carbon dioxide, and water. These components make up the majority of the biogas emitted from the system. Methanogenesis is sensitive to both high and low pHs and occurs between pH 6.5 and pH 8. The remaining, indigestible material the microbes cannot use and any dead bacterial remains constitute the digestate.

In developing countries, simple home and farm-based anaerobic digestion systems offer the potential for low-cost energy for cooking and lighting. From 1975, China and India have both had large, government-backed schemes for adaptation of small biogas plants for use in the household for cooking and lighting. At present, projects for anaerobic digestion in the developing world can gain financial support through the United Nations Clean Development Mechanism if they are able to show they provide reduced carbon emissions.

Methane and power produced in anaerobic digestion facilities can be used to replace energy derived from fossil fuels, and hence reduce emissions of greenhouse gases, because the carbon in biodegradable material is part of a carbon cycle. The carbon released into the atmosphere from the combustion of biogas has been removed by plants for them to grow in the recent past, usually within the last decade, but more typically within the last growing season.



If the plants are regrown, taking the carbon out of the atmosphere once more, the system will be carbon neutral. In contrast, carbon in fossil fuels has been sequestered in the earth for many millions of years, the combustion of which increases the overall levels of carbon dioxide in the atmosphere.

CONCLUSION:

Anaerobic digestion can help replace fossil fuels, reduce the energy footprint of waste treatment plants and is an important component of the zero-waste initiative. In countries that collect household waste, the use of local anaerobic digestion facilities can help reduce the amount of waste that requires transportation to landfill sites and incineration facilities. This reduced burden on the transportation will collectively help to reduce carbon emissions. This will not only prove to be beneficial to mankind but shall be the aftermath of the massive waste management programmes of a country.

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IIChE Forthcoming Activities at a Glance

S-CHEMCON – 2020

October 9-10, 2020

The theme of the event is "Intensified Industrial Chemical Engineering-Operations, Practices and Techniques for Sustainable Development (IIChE-OPTSD)". Please visit www.iiche.org.in for more information related to online SCHEMCON-2020.

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(October 9-10, 2020)

Theme: *Intensified Industrial Chemical Engineering-Operations, Practices and Techniques for Sustainable Development (IIChE-OPTSD)*

Organized by

INDIAN INSTITUTE OF CHEMICAL ENGINEERS (IIChE)

Indian Institute of Chemical Engineers

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CHEMCON - 2020

Chemcon 2020 is likely to be postponed. Confirmation will be made later by HQ.

For Internal Private Circulation Only

Edited and published on behalf of
Indian Institute of Chemical Engineers Mumbai Regional Center
by Shri Jagdish Nageshri, Editor, IICHE-MRC E-Newsletter

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