

YANTRA VIDYA

DEPARTMENT OF MECHANICAL ENGINEERING

Department Magazine

Issue: March 2022



Our Alumni of Batch2019-20

Mr. Shubham Kadam

Currently working at Mercedes Benz India

**VIDYA PRATISHTHAN'S KAMALNAYAN BAJAJ INSTITUTE OF
ENGINEERING AND TECHNOLOGY, BARAMATI**

Department of Mechanical Engineering

Department Vision

To inculcate Learning culture in Students and Faculties to meet the Current and Future Technological challenges of Industry and Society.

Department Mission

- ◆ To impart the students with fundamental knowledge of mechanical engineering.
- ◆ To provide practical exposure by promoting students for training and internship in related industries.
- ◆ Holistic development of the students by inculcating ethical and moral values towards the society and environment.
- ◆ To develop association with premier educational institutions, industries and alumni for enhancement of faculty skill.

Principal's Message



Dr. R. S. Bichkar
Principal,
VPKBIET, Baramati.

I am pleased to hear that, Department of Mechanical Engineering is publishing the March 2022 issue of Department magazine, 'Yantravidya'. The result of high intention, sincere efforts, and intelligent execution, always leads to excellence with choices not chances. The articles composed with these magazines will sow the seeds of ideas, germinate to the fullest extent possible, and this will lead to the success story. In the era of cut-through competition, the molding of tomorrow's technocrats happens to be all-round engineers, not only Mechanical Engineers. I am sure, the task force of Mechanical Engineering Department has taken lead, to one of the best examples of not only the land of ideas but the forest of excellent products.

Vice-Principal's Message



Dr. S. B. Lande

Vice-Principal,
VPKBIET, Baramati.

I am delighted to announce that the Department of Mechanical Engineering is bringing their Technical Magazine 'Yantravidya' Issue-March 2022. It is a tool for faculty and students to develop productive technical materials and support skills. The most important thing you can get out of this fantastic effort is that it brings out the various technical and analytical skills of novice engineers. I am happy to welcome all the teachers, students who are more interested in bringing articles with more bright concepts and innovative ideas in the coming issues.

I wish the "Department of Mechanical Engineering" of this organization great success in all their endeavors. I congratulate the Head of the Department of Mechanical Engineering, the Editor and his dedicated committee for their invaluable efforts in bringing this issue to the fore. I wish them all success.

HoD's Message



Dr. S. M. Bhosle
Head of Department,
Mechanical Engineering
VPKBIET, Baramati.

The Mechanical Engineering Department at VPKBIET Baramati is dedicated to give experiential learning experience to students through hands-on-training, by well qualified and experienced faculty from world's reputed institutions. We believe the true learning experience from academic delivery can be achieved through teaching innovations, mentoring practice, and creation of knowledge from experiments. The research opportunities available with us are not limited to faculty and masters students; our undergraduate students work alongside many faculty members. Our student-led emerging technology centers and design groups, under the guidance of faculty members, are always seeking opportunities from industry to collaborate on research and projects. This magazine is our humble attempt to share the views and contributions of the technocrats within and outside the institute for exchange of ideas. We are certainly eager to receive technology review articles from industry. I wish good luck and happy learning to the entire team and students. We look forward to your kind patronage to our magazine.

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Opportunities for Green Hydrogen in India



Dr. Joydev Manna,

Senior Scientist

Hydrogen Energy Division, National Institute of Solar Energy

(An autonomous institute under Ministry of New & Renewable Energy, Govt. of India)

Hydrogen is mostly used in industrial applications, and it has been noted that petroleum refining, and ammonia production are the principal industrial consumers of hydrogen. The global demand for hydrogen during 2018 was around 73.9 million tonnes, of which 51.6% and 42.6% were consumed by petroleum refineries and ammonia synthesis units, respectively. Other industries using hydrogen include industries involved in production of methanol, vegetable oils, steel, flat glass, semiconductors, and synthetic fuel; cooling of generators in thermal power plants; and food processing etc.

Total hydrogen demand in India is estimated to be around 2.6 million tonnes per annum in petroleum refineries and 3 million tonnes in fertilizer industries. This hydrogen is mostly produced by reforming fossil fuels such as natural gas, naphtha, or coal. Recently, Govt. of India has announced to launch a National Hydrogen Mission (NHM) for green hydrogen production during 2021. It is expected to boost demand for green hydrogen for industrial applications. This mission is likely to play a catalytic role for development of activities related to production and utilization of green hydrogen in the country.

Generally, there are three sources of hydrogen: fossil fuel, water, and biomass. The conventional methods such as Reforming, Gasification or Partial Oxidation of fossil fuels emit huge amount CO_2 during hydrogen production. The generated hydrogen by these methods is known as “grey hydrogen”. If the generated CO_2 after these processes is captured and sequestered using advanced technologies, then the produced hydrogen would be known as “blue hydrogen”. The term “green hydrogen” is used when hydrogen is generated using completely 100% renewable energy or biomass.

Hydrogen generated from biomass is considered as “green hydrogen” as released CO_2 during hydrogen generation process almost gets compensated by the amount of absorbed CO_2 while biomass grows. In case of using renewable energy, hydrogen is mostly generated from water by splitting its molecules using three major sources of energy *i.e.*, light (photon), heat, and electricity. If the source of these energies is renewable in nature (such as solar, wind, etc.), then hydrogen so produced is called as “green hydrogen”. Among the various developed process for water splitting, electrolysis is the most developed,

effective and can be used for large scale hydrogen production. Electrolysers are used in electrolysis process to split water molecule into hydrogen and oxygen using electricity.

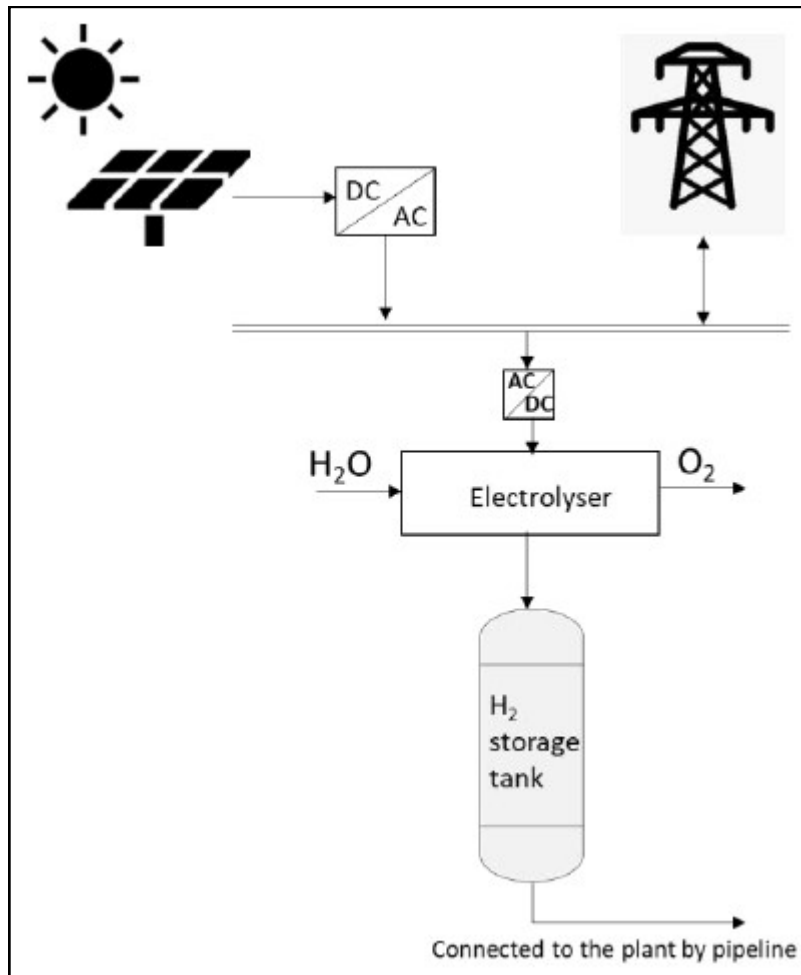


Fig. Schematic of a typical solar PV powered green hydrogen plant

India is rich in renewable energy resources with estimated power generation potential of about 1100 GW, of which contributions from solar, wind (at 100 m height), and biomass energies being 750 GW, 302 GW and 50 GW, respectively. About 93 GW of power generation capacity based on renewable energy has already been established in the country with contributions from wind and solar being 39.247 GW and 40.085 GW, respectively, as on 31.03.2021. Both solar and wind resources are expected to play significant role in making a switch to green hydrogen in India.

As far as hydrogen demand in petroleum refinery and ammonia synthesis is concerned, we have estimated that about 90 MW and 105 MW electrolyser have to be installed for the petroleum refineries and ammonia synthesis units, respectively, in India. It has also been estimated that about 1.7 GWp of solar PV plant will be needed for fully powering the green hydrogen production systems of these industries.

Career in Automotive Design and Job Opportunities

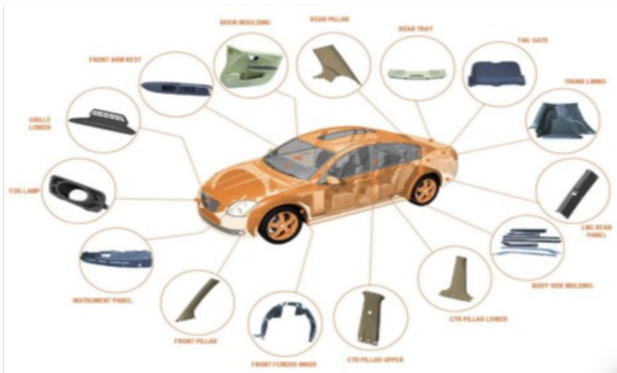


Mr. Shailesh Budhawant
Director,
Auto Alpha Engineering Pvt. Ltd.



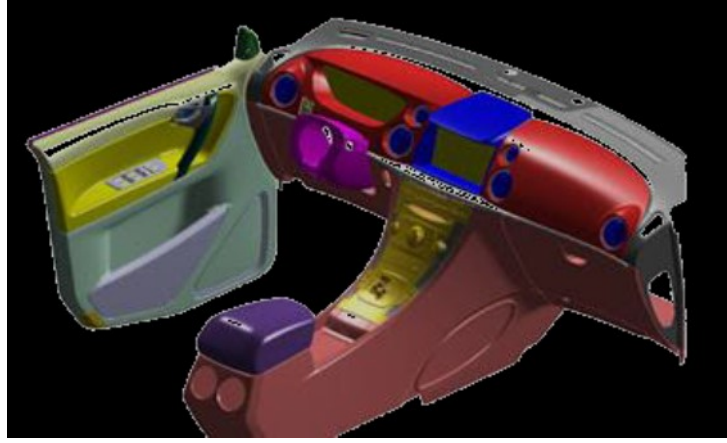
Mr. Sharad Kadam (Alumni 2008 Batch)
Product Development Engineer,
Faurecia India, Pune

The Automotive Industry is in the midst of a technological revolution characterised by the convergence of new digital technologies with the traditional car manufacturers. With the advancement in research and development of electric and driverless technology, auto industry is on the verge of complete revolutionary design of the vehicle. In today's world, people are more focused on stylish, aggressive and luxurious vehicles than the traditional vehicles. This is adding more challenges to auto industry to design & develop unique styled interior & exterior parts that would be more appealing, comfortable, user friendly and attract customers within shorter period of time.



As we all know, electric vehicles are the new normal in today's world. The benefits of using electric vehicles are very well known to everyone. When we see it from mechanical engineering point of view, this means - Vehicle has to be light weight to improve performance/mileage. The body shapes have to be lower, wider and longer to improve aerodynamics and body space saving with double doors technology. Companies are spending lot of money in R&D and innovation work on Exterior and BIW of the vehicle, thus opening doors for young, talented and creative engineers to showcase their skills and be part of automotive revolution.

Similarly, Interior of the vehicle is also going through a huge transformation and I bet, you have already started noticing it in the new vehicles. Let me talk about few top technologies, which companies are focusing and working on implementation.



First, Driverless Automation Technology- With increasing driving assistance, Predictive ride technology and safety features like adaptive cruise control and lane departure warning are becoming commonplace. Second, Connected Vehicle Technology for connected wireless networks within vehicle and vehicle to vehicle for bi-directional communication, route planning based on traffic conditions, finding parking in real time. Third, Heads Up Display (HUD) is a transparent display that presents data like speed, fuel level, time etc. in the automobile without requiring drivers to look away from roads. To fully implement these Automation, Connected Vehicle & HUD technologies, interior of the vehicle needs huge transformation to incorporate these changes, **which in turn is creating large scale job opportunities in design and development of the Instrument Panel, Door Trims, Consoles, Seating System and other interior parts of the vehicle.**

In addition to this, alternate materials like Carbon fiber composites are promising as the next big frontier in automotive market. The biggest advantage is a high strength to weight ratio, while also demonstrating stiffness and ability to be worked into complex shapes. New material will bring new challenges, requirements, and design and development activities to validate in all aspects.

With the modern manufacturing environment & increased global competition, Industries cannot survive unless they introduce new products/features with better quality, lower costs and with shorter lead time.

In addition to this, dramatic changes in computing power & wide availability of software tools for design & production, companies are now widely using CAD, CAM & CAE systems to automate their design & production process to save time, money and launch new vehicles in shorter span.

These advancements have not only reduced Product Development timing (i.e. Concept to Launch) from 5 years to 2-3 years, it also opened job opportunities for skilled design engineers to meet customer's ever changing requirements with best quality and stringent program timing.

Technologies Deployed in MultiParking System



Mr. Sameer Chikate

Business Head – Sales

KLAUS Multiparking India

KLAUS Multiparking system has its expertise in multilevel parking solutions, the basic engineering philosophy is Hydraulics. KLAUS has indeed made a lot of technological innovations in line with ever evolving automobile sector. User-friendly HMI (Human Machine Interface) systems which guide the user while storing and parking the cars in automatic car parking systems is a prudent example of the same. With new normal in place Klaus has its team engaged in moving towards touchless operations of parking systems.

How does Multiparking System facilitate the motorists in navigating the parking space?

Metropolitans in India are expanding fast and so have the number of vehicles expanded, but unfortunately the parking space has remained constant or rather reduced due to growing population. Vehicles continue to outnumber existing parking spaces, thus clogging roads. Now, the rising demand for parking space has turned out to be the next big problem after traffic congestion in the current urbanization.

A solution to this problem could be smartly tackled by providing an effective technology based solution like multi parking systems. With a multilevel parking system, there is the possibility to go up to a maximum of 6 parking pallets in the footprint of one parking space which can free up a lot of space for amenities. Apart from the space constraint, cars parked in a system are also safe from theft or damage as compared to parking on a street outside your home and office. And users do not need to drive around for several minutes to find a parking spot, thereby reducing fuel consumption and having a net positive effect on the environment as well.

What are your product offerings under the Multiparking System?

Multilevel parking systems can be either fully automatic or semi-automatic. The car needs to be driven to an entry point where the driver /passengers exit the car. It is then moved in an automatic or semi-automatic way to its assigned space. Klaus Multiparking has a multitude of parking systems specially designed for every need.

Dependent Stack Parking System - which provides dependent parking spaces. In this parking system, the access to the above parking space is possible only after removal of car below.

Semi-Automatic Parking System - where parking spaces are arranged on maximum three different levels, one level above the ground one on ground & other level in the pit. There are multiple combinations available considering the architectural and constructional constraints.

Fully Automatic Parking System - is a completely automatic system which requires no human assistance other than entering the car at parking room. It is the pallet based system where car is parked inside the storage system.

How do you look at the future of Multiparking System in India?

It is generally noted that most of the drivers spend nearly 15-20 minutes searching for a parking space. In case of unavailability of space few of them resort to unauthorized parking or then just cancel their planned activity.

It is a welcome move that the government has finally brought parking spaces under the law. With the implementation of RERA Act & New Development plans (DP's) by local governing authorities, it is now mandatory to provide parking spaces in the new constructions. India today is growing economically and technologically. There are also a lot of new car variants entering the market, which many people aspire to buy. Keeping this growth in real estate as well as the automotive industry in mind a multi parking system will be seen as a technology very much in demand and a solution acceptable to its customers. This technology will ensure optimal utilization of the limited space and will try to ease of the parking woes. In addition these multiparking systems will be fast, safe and user friendly. KLAUS Multiparking Systems ensure happy users with a PARK & SMILE.



Engineering in North America



Mr. Siddharth Krishnarao Jadhav

Electrical Design Engineer – Laporte Engineering Inc. Toronto, Ontario, Canada.

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I feel fortunate to portray my thoughts on the varied discipline of engineering sciences for students at this institute. I certainly do not claim to be an expert on anything, my intention is only to share my thoughts and experience. My insights are primarily premised from a design engineering standpoint since my experience relies upon designing systems for buildings in the United States and Canada. There is a strong culture of all varied fields of science in the US and Canada. There is a strong bond between the Universities and industry which exposes students to hands-on experience and get a grasp of work cultures in the industry. My experience working in design engineering has been very enriching and intriguing on how well oiled the machinery is. From a design engineering standpoint, a lot of emphasis is on codes (Engineering standards are called codes in the US and Canada) and specifications of engineering equipment and systems. There is high demand for design engineers in North America, and the expectation is to get a few years of experience with designing and later escalate to a senior engineering position more focused on the business side of managing clients.

For students who are currently in institute, I think there is huge scope to learn about various aspects of engineering and get acquainted with various options that they have after graduation. Keeping your eyes and ears open for opportunities in the industry always helps in getting in line with the expectation of the industry. I have often heard people saying that they need more practical experience, which is commendable, but it is also true that the speed of grasping practical experience is highly dependent on how strong the theoretical fundamentals are. So, I would suggest students focus on the variables which are controllable and try to gain more fundamental knowledge of the respective discipline of engineering.

Failures will happen, no matter how much one tries to attain perfection, but the most important part is to learn from the errors and try to improve them the next time. Apart from the technical aspects of the day-to-day life of an engineer, something that I got to learn is working in a very diverse and cross-functional team. Usually, while working in teams at universities and in companies as well, we get a chance to work with team members from countries like China, Germany, Ghana, Korea, and many more. In my opinion, working in cross functional teams is a very humbling experience because it triggers many different think tanks in our brains to only make us realize how much talent there is on this planet and there is a long way yet to arrive (This is termed as exposure in our sub-continent). I am very optimistic for students who are pursuing engineering or intend to pursue their careers in engineering. Nonetheless, on the social aspect, there is always some sense of self-discipline and integrity involved from the individual who intends to invest their time in any field. I also highly encourage students to reach out to me for any questions that they may have, I will be more than happy to interact and listen to their point of view.

Why I Quit Corporate Job ?



Mr. Ajinkya Malvadkar

(Alumni 2018-19)

I completed my engineering in June 2019 and joined an IT company in September 2019. In this article I will try to share my opinions on the IT sector after two years of experience. Being a Mechanical Engineer, I had very little exposure to programming languages and other IT skills. I was trained by the company in a few IT skills. The training was good and after that, I started working on actual projects. In the beginning, things look quite stable and you peacefully learn new technologies and grasp new concepts.

Student life and corporate life are very different and one needs to be very careful before committing to a task while working in a corporation. Most of the time you are given tasks that need a lot of research and prior hands-on experience. With short deadlines it becomes even more difficult to complete the tasks. In this process, I learned a lot of new technologies while in Infosys and applied this knowledge in actual projects. But this also has a negative side, there's so much work that you end up working on weekends and holidays. Also, not everyone's work is appreciated and you constantly try to get recognition in order to climb up the corporate ladder. Keeping your boss happy becomes the sole aim of your existence and at this point I realized that I need a career change.

From my personal experience, I would recommend that one must have a clear idea of the field before entering the IT sector. Most of the times people are attracted towards good salaries and forget what they are signing up for. You start earning at an early age, good, but at the same time you close a lot of other career and higher education opportunities. People must realize that there are many more things in life other than the IT sector.

There are many positive things you get to learn while working in the IT sector, you earn a decent salary and most of the time your parents are happy and want you to continue working there. But do ask these questions to yourself - Are these things worth your time, health and mental wellbeing? Have you explored opportunities outside the IT sector? Are you ready to work in an environment where everyone is trying to surpass you?

Key Highlights for Students in/after Graduation



Mr. Shubham Kadam (Alumni 2019-20)

Mechanical Engineer

Quality Management (Bodyshop)

Hello friends I'm graduated in 2020 from "VPKBIET" Baramati, one of the best educational institute having higher qualified and experienced staff. Institute provides number of opportunities for students to improve their knowledge in multiple streams such as innovation centre, projects, technical examinations, trainings in multiple modules etc. Currently I'm working with "Mercedes-Benz India" which is a CKD plant situated in Pune and builds world's best luxurious brand. I'm working with Quality management team which continuously focus and ensure to build best product quality. My achievement contains major role of respected staff from our institute and my hard work. The dream of every student is to get placed in Multi-National organization after graduation, but due to lack of many things, student's remains away from their dream. Here I am mentioning some areas of improvements which I think are most important in terms of technical as well as personal point of view. Academics, Projects, Extracurricular activities, Technical/Non-technical courses.

This areas are like keys to unlock several locks towards being successful. Companies like Mercedes-Benz firstly focus on student's academics and personal skills during interviews. Academic project is the most important topic while attending any interview because companies want to check technical knowledge and skills like team work of the candidate. Focus on the extracurricular activities such as participation in events, projects, courses etc. such things represent your potential and skill in your resume.

Improve your LinkedIn connections due to which you are directly in contact with number of companies and will help more. Check the companies' websites which are related to your scope and area of interest. Many MNCs and automotive leaders like Mercedes, BMW, Audi, and Jaguar have number of openings on their websites for different streams such as mechanical/IT/Comp/Electronics etc. I also would like to extend my gratitude towards our Principal, Vice Principle, HoD & all staff for contributing in my success and guiding me towards the path of success.

Best of luck friends...Do your Best... Success is yours...

Thunderstorm



Chetan Bankar (Alumni 2020-21)

Pursuing M.Tech. in Earth Sciences,
Centre for Earth Sciences, IISc Bangalore

In our busy schedules, we miss noticing many amazing phenomena happening in nature. One such phenomenon is thunderstorms. Thunderstorms are associated mostly with unseasonal rains or pre-monsoon rains in India. Thunderstorms bring hail, strong gusty winds, flash flooding, etc. with them, so they play an important role in agriculture crop management. The goal of this article is to explain different stages in the life cycle of a thunderstorm: the developing stage (images 1-7), the mature stage (images 8-9), and the dissipating stage (images 10-12).

To understand thunderstorms, let us first understand the formation of clouds which is a highly non-linear process depending on many factors such as temperature, amount of radiation, relative humidity, air pressure, aerosol concentration, etc. In the morning, when the ground starts to heat up due to the sun's radiation, air near to ground also heats up. This warm air is less dense than colder air in the upper atmosphere. Hence, warm air parcel starts to move up in the atmosphere. As it rises, it encounters less air pressure and expands adiabatically. In the process, it cools. If the air parcel contains a sufficient amount of moisture and aerosol concentration is just right, moisture condenses on aerosols and we see clouds. As more and more moisture condenses, the cumulus cloud forms. When conditions are favorable, thunderstorm formation begins as explained with the help of the following images.



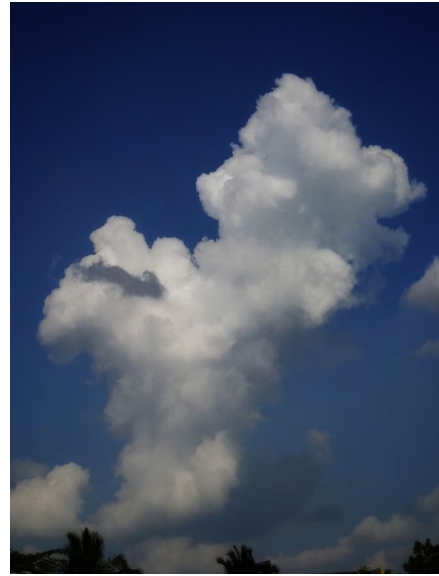
1) Cumulus cloud formation; 10 - 11 AM



2) Many cumulus clouds start to form; 11 AM - 1 PM.



3) Nearby cumulus clouds merge together to form a single bigger cumulus cloud; 12 - 2 PM.



4) Cumulus clouds are being pushed upward by the rising column of warm moist air called updraft; mid-afternoon.



5) Rising cumulus clouds look like a tower, so known as towering cumulus and cumulonimbus clouds begin to form; late afternoon.



6) Typical turbulent convecting cauliflower structure when cumulus converts into cumulonimbus cloud; evening.



7) Moist surface air is being pushed upward due to mountains resulting in cumulonimbus cloud formation; in the afternoon.



8) Updraft continues to feed the storm and precipitation (rain) begins to fall, and the storm enters the mature stage; evening.



9) Rain creates the downdraft - a column of cold air moving downwards - which causes gusty winds on the ground; evening.

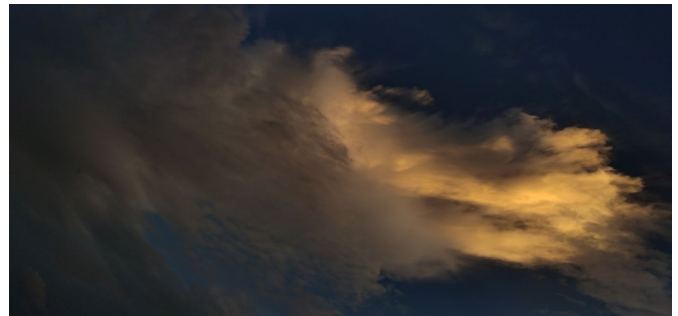


10) Eventually, due to the large amount of rain, updraft is overcome by downdraft and storm enters dissipating stage.



11) Lightning bolt from cloud to ground creating sound waves that we hear as thunder hence the storm is called the thunderstorm.

(Image Credit: Omkar Bankar, used with permission)



12) Strong downdraft cuts off the supply of moist warm air and rainfall decreases. Cloud growth abruptly stops and the storm ends.

Thunderstorm got its name due to thunder caused by lightning during the storm which in itself is a partially understood phenomenon. The whole process lasts for about 10 to 12 hours. The initial stage of a thunderstorm takes 8 to 9 hours and within 1 to 2 hours the thunderstorm reaches a mature stage and dissipates. Why the storm dissipates so rapidly is still not well understood. Intuitively, it feels that as the amount of moisture decreases in the air due to rain, the storm dies. But complex physics is involved in it, at microscale as well as at macroscale and the answer is not so simple!

Hydrogen: The Country's future fuel for vehicles - A Perspective



Dr. P. R. Chitragar

Professor & Dean (Alumni Affairs),
Department of Mechanical Engineering,
VPKBIET, Baramati.

Petroleum and its derivatives have exceptionally useful properties that have made them useful during the last centuries in most of the IC engines; however presently they are in phase of depletion, secondly the unstable prices of them are scaring the mankind and our country which majorly depends on import of the same. Last year country has spent approximately USD 62.2 billion on it. Even crude oil usage is associated with considerable environmental and societal difficulties. These are the strong drives for investigation, development and demos of alternative fuel sources for transport sector nowadays. Among the available alternative fuels considered today, hydrogen finds prominent place in view of its immeasurable source potential and clean-burning characteristics. Hydrogen is been known as a fuel having some exclusive and extremely desired properties for application in transportation vehicles and yields near zero emissions. Hydrogen can be used in fuel cell operated vehicles or directly in spark ignition engines.

The following table provides qualities of hydrogen compared with other present fossil fuels.

Properties			
Thermal, Transport & Premixed Combustible Characteristics of Hydrogen, Gasoline and Diesel .			
Property	Hydrogen	Gasoline	Diesel
Chemical formula	H ₂	C ₈ H ₁₈	C ₁₂ H ₂₃
Molecular weight g/mol	2.015	110	≈200
Flammability limits (%)	4-75	1-7.6	0.6-5.5
Minimum ignition energy (mJ)	0.02	0.24	—
Stoichiometric A/F ratio on mass basis	34.3	14.6	14.5
Flame temperature (K)	2318	2473	2600
Auto ignition temperature (K)	858	500-753	453-593
Quenching distance at NTP (mm)	0.64	2.0	—
Density at 1 atm and 300K (kg/m ³)	0.082	730	830
HHV (MJ/kg)	141.7	48.29	44.8
LHV (MJ/kg)	119.7	44.79	42.5
Diffusion coefficient into air at NTP (cm ² /s)	0.61	0.05	4.63
Flame velocity (m/s)	2.65–3.25	0.30–50	0.22–0.25
Octane number	130+	87	30

The hydrogen, is a fuel, a carrier and a store of energy without carbon content and is topmost in the global green agenda as On August 15, 2021, our Hon'ble Prime Minister Narendra Modiji announced a “National Hydrogen Mission to make India a Global Hub for Green Hydrogen Production and Export” to boost country's energy self-dependence and to inspire clean energy transition all over the world. It is a substitute for today's transition fuel-compressed natural gas. In November 2021 at COP 26 in Glasgow, Prime Minister Modi made five commitments- achieves Net Zero emissions

by 2070, and by 2030, take cumulative non fossil fuel generation capacity to 500 GW, meet 50 percent of energy needs from renewable energy, reduce the energy intensity of the economy by 45 percent, and reduce carbon emissions by 1 billion tons. The main 3 criteria's to be addressed more urgently on green hydrogen are:

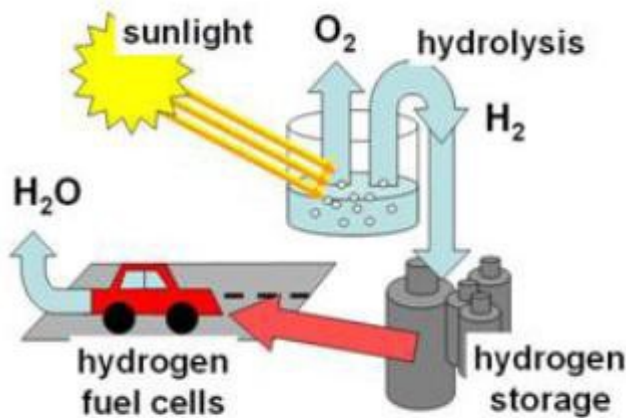
1. Production of the hydrogen: The hydrogen is produced from wide range of primary resources adopting wide range of techniques. It can be produced from water or from fossil fuels.

With just over a month to go for the fiscal year to end, the Ministry of Power announced on 17 February “phase one” of the policy, listing the initiatives it proposed to take for facilitating the manufacture of Green Hydrogen (GH) and planned to exempt paying of ISTC for next 25 years the industries producing the same.

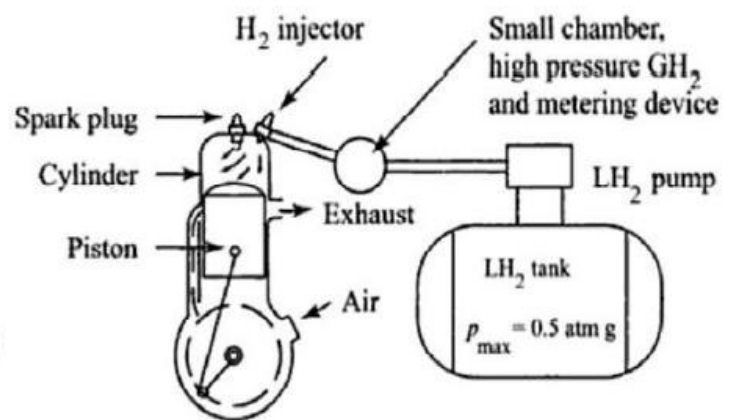
2. Storage of the hydrogen: Hydrogen can be stored in a liquid form via cryogenics or in compressed gaseous form.

3. Use of the hydrogen: Hydrogen can be used in Fuel cell vehicles (FCV) or in I. C. Engines called as H2ICE.

In cognitive to the government's announcement, Union Minister of Road Transport and Highways



Hydrogen Fuel Cell Vehicle



Use of Hydrogen in Spark Ignition Engines

Hon'ble Nitin Gadkari launched green hydrogen-based advanced fuel cell electric vehicle (FCEV), Toyota Mirai last Thursday 17th March 2022 in New Delhi. This is a mile stone for our country that an era of hydrogen vehicles has started in transportation to fleet vehicles on road soon. There were some old examples of blending of hydrogen with ethane in some of the auto rickshaws in New Delhi long back in 2009. Let us hope to have ecologically balanced transportation in India soon via use of hydrogen fuel operated vehicles.

Transformations in Plastic Manufacturing Industries: Go Green Strategies



Mrs. P. D. Kale

Assistant Professor,
Department of Mechanical Engineering,
VPKBIET, Baramati.

Process used for the manufacturing of plastic parts includes Injection molding as the most convenient process. It is a common process used for mass production. The process is highly economical, reliable and offering good quality components with higher dimensional stability and accuracy. Injection moulding products vary widely in their complexity, size and application.

Application of Injection moulding is most common for toys, some musical instruments, wire spools, and many more as such which are used in day to day life. It is evolving as a new technology. People can receives quality products that satisfy wants and needs of today's society by using innovative ideas created by researchers in this field.

Industries are leaning towards recycling which can reduce the hazardous effects of waste on the health of the general population by using eco-friendly materials and production methods. China is accumulating most of the plastic waste from developed countries but now currently a trend has been set up for manufacturers to generate a recycling plan for plastic scrap which will reduce waste and its environmental impact.

We can take surplus of plastic and melt it for recycling. A waste material can be melted, blended, and injected back into the various recycling plants which can facilitate the movement of plastic scraps. Use of high-grade and high-performance materials is also one of the way to reduce scrap. The evolving needs of society necessitates for upgrades in manufacturing methods. A large amount of plastics that can be blended to improve properties which will give long lasting, corrosion-resistant, and temperature resistant material.

Apart from these all, the use of Hot runner mould can be one of the solution to reduce the scrap and ultimately to reduce the plastic waste. A research is going on the effective usage of hot runner system with low cost which will lead to ecofriendly environment along with plastic components.

Nano Engineering



Mr. Sachin Phanse

Student,
BE-Mechanical (2021-22)

Nano engineering is a subfield of engineering that focuses on the design, building, and operation of nanoscale engines, equipment, and structures. Nanoengineering is the study of nanomaterials and their interactions with other materials to build useful products, structures, devices, and systems. While nanoengineering is not a new science, it is a highly effective technique that has applications in a range of areas, including electronics, energy, health, and biotechnology. Although the phrases nanoengineering and nanotechnology are sometimes used interchangeably, the former refers to the subject's engineering components, while the latter encompasses a broad variety of scientific and technological concerns. Most likely, the phrases nanofabrication and nanomanufacturing are used interchangeably in this context.

Chemical manufacturing is a commercial activity characterised by industrial production areas and various automated integration lines, owing to the industrial scale outputs and advantages associated with the brand name. On the other hand, nanofabrication is a research endeavour focused on the creation of innovative materials and procedures; it is a realm of specialists rather than a mass-produced area. Engineering is the scientific and technological discipline concerned with the design, building, and operation of engines, machines, and structures. On the other hand, nanoengineering exploits the unique properties of nanoscale objects (size and quantum effects) to develop and create devices and systems with whole new functions and capabilities at the atomic and molecular scales. Building materials' characteristics may change significantly at the nanoscale for two reasons.

To begin, nanoparticles have a far higher surface area than the same quantity of biological materials. This may alter an object's chemical performance, as well as its energy and electrical qualities. Second, quantum effects have the potential to influence nanoscale behaviour, particularly in the lower extremities, altering optical acuity, electrical activity, and magnetic activity. The materials are challenging to employ because they are too tiny to be seen with the naked eye, too small to grip, and often have unsuitable meeting points inside the designed constructions. As a consequence, advanced nanoarchitecture will need nanoscale-based engineering methodologies. Nano engineers do this by using a number of techniques to manipulate atoms and molecules for industrial purposes. The need for high control on a nanoscale scale for setup and setting is one of the primary obstacles researchers face while creating nanoengineering methods and procedures.

Ukraine-Russia War Impact on Engineering and IT Services Availability



Mr. Aditya Ashok Raut

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Ukraine is one of the top locations for offshore and near-shore third-party services, especially for engineering and IT skills. Thus, Russia's invasion of Ukraine this year has had a significant disruptive impact on American and European companies. The disruption in global service delivery from the war in Ukraine will affect three types of service situations:

- ⇒ American companies with workflows outsourced to service providers in Ukraine, Russia, or Belarus.
- ⇒ American companies with work outsourced to service providers in India or other countries, many of which supplement their capabilities by using resources in Ukraine or by acquiring provider firms in Ukraine.
- ⇒ American companies that have their Global Business Service (GBS) centers that use workers in the war region

Ukraine is a key global delivery location for IT and engineering R&D services, so the war creates widespread uncertainty and significant concerns for companies with service operations in the region.

Impact on Service Pricing- Unfortunately, this war and the consequent services market disruption are happening simultaneously as the acute global talent shortage. That shortage was already affecting the price of talent. Be prepared for an increase in pricing now, as the impact of the war adds to already strong inflationary pressures.

The Impact Numbers-

- ⇒ 30,000+ estimated people working for third-party service providers (many in the hot digital engineering space) with clients in the banking, retail, automobile, and healthcare industries.
- ⇒ 20,000 estimated people employed in GBS centers in Ukraine
- ⇒ 20,000 estimated people working for third-party service providers in Belarus and Russia
- ⇒ 10,000 estimated people working in GBS centers in Belarus and Russia

From the Editors

Dear readers,

We are happy to share our department's technical magazine 'Yantra Vidya' March Issue (2022). Our magazine is available in print, mobile and digital edition that makes magazine content easier to explore and engage with. As a technical magazine, it is going to cover many issues related to emerging technologies in Mechanical Engineering, career opportunities, technological innovations, overall development and much more. We aim for inspiring our readers by keeping them updated with the latest technological developments. Also, we aim for motivating our writers and content providers by giving them a platform for sharing their views. We highly appreciate and thank our proficient writers, who have allowed us to share their views and stories. We are glad to present our magazine's March 2022 Issue, which features clean and thoughtful layout and new approach for reader's experience.

Thanks for your time!!

Let us know, what you think,
your suggestions are highly
appreciated!!!

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