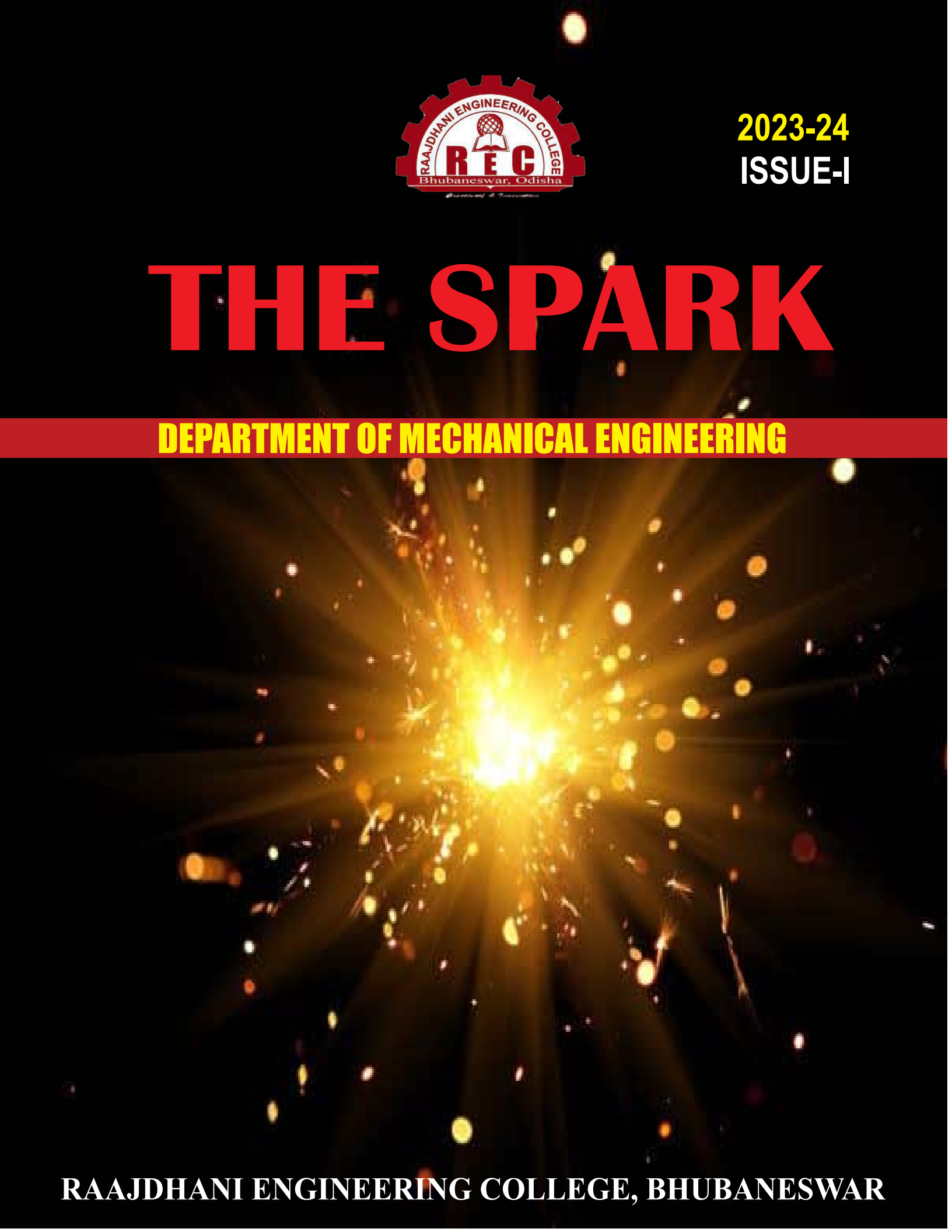
2023-24
ISSUE-I

THE SPARK

DEPARTMENT OF MECHANICAL ENGINEERING



RAAJDHANI ENGINEERING COLLEGE, BHUBANESWAR

Message

From the Desk of Chairman

Hearty Greetings to you.

A College magazine "THE SPARK" is a record of all the activities that have taken place in the academic year and also a platform to display creative thoughts and literary talents. The editorial board deserves a special appreciation for their efforts in compiling this publication.

Let us all wish and hope that the theme chosen for the magazine is ingrained in our minds and our students go out and strive to permeate this all important value in our society to create a better world for all of us.

CA. B. Ramprasad Rao

From the Desk of Vice Chairman

I am very pleased to note that the illustrations of "THE SPARK" brought out is appreciated very well. Heartily congratulations to the editorial team. The magazine, THE SPARK, from the over all departments of RAAJDHANI ENGINEERING COLLEGE invites a wider readership in the Institute. Let this be a forum to exhibit the potential of faculty and students with their literary skills and innovative ideas.

Dr. M. K. Palo

From the Desk of Sectetary

It is a matter of great pride to pen down message for 'THE SPARK', the annual magazine of Raajdhani Engineering College. The Mechanical Departmental magazine is a platform for the students to express their creative pursuit which develops in them, originality of thought and expression. The contents of the magazine reflect the creativity and imagination of our students. I take this opportunity to congratulate the Director, faculty members and students for their strong sense of commitment, service and responsibility that has facilitated in transforming this institution into an outstanding and significant temple of learning.

Dr. S. C. Panda

From the Desk of Director (Adm & fin.)

I am glad to know that our Institution is bringing out its magazine 'THE SPARK' to commemorate the achievements of the students , teachers as well as the faculty members.

I appreciate your devotion & dedication for nurturing future generation by fostering knowledge and social skills and your caring and concern for all round development of the students. I am sure it will help your students to develop wide mental horizon to be successful and will inspire your teachers & students to make greater efforts to achieve excellence and perfection in every field so that they may be a source of pride for their college and their country.

R. Choudhury

Message

From the Desk of Director (T & P)

I am Immensely gratified to let "THE SPARK" take over the opportunity to manifest the talents as well as the standards which the entire team of Editorial , faculties as well as students efforts are put forth. Good health is prerequisite to human productivity and development process. RAAJDHANI ENGINEERING COLLEGE is a blend of technology and Basic science and Humanities which proposes to produce ample amount of professionals who in turn will promote technology not only in our state as well as through our nation. Driems will always strive for excellence and will set high standards in all sectors of education. I wish all the best to all the students for their career and academic pursuits".

G. S. Mishra

From the Desk of Principal

It gives me an immense pleasure as Raajdhani Engineering College is bringing out the annual magazine "THE SPARK" exclusively meant for the latent writing talents with invaluable potential. I congratulate all the contributors and editorial board for this revolutionary creation.

Raajdhani Engineering College has stood above the rest in its approach to technical education and in its pedagogies. Since its inception, we never hesitated to look into our deficiencies consistently and transform us to an efficient agent of social change. Many critics would confirm that our college has certainly gone a long way in enhancing quality of technical education.

This year, I wish the new edition of "THE SPARK" will be a grand success...

Dr. Alok Kumar Mohapatra

From the Desk of Chief Editor

'Creativity is seeing what others see and thinking what no one else ever thought.'

- Albert Einstein

Life is infested with many challenges. The best way to overcome these is to find innovative solutions. It is easier to blame the problem-ridden situation and languish in action. But it takes an inventive mind to overcome the difficulties.

*The Annual magazine "*THE SPARK*" of RAAJDHANI ENGINEERING COLLEGE present technical articles from faculty and students, providing an opportunity for students to share their technical knowledge as well as non technical knowledge.*

It was an eye-opening chapter for the team as they realized the colors of life and created something entertaining, inspiring and memorable for readers.

*No publication is the work of an individual. 1 am gratified to our Director Prof. R Choudhary, Principal, Dr. Bimal Sarangi, for their support and encouragement. I would like to thank all my committee members who are part of the Team "*THE SPARK*".*

I also give Special Thanks to Departmental HOD for his valuable guidance and suggestion to shape this magazine.

From the entire family, we present to you " THE SPARK*"*

We hope you enjoy this edition. Happy reading!

Mr. Asish Tripathy

Prof. Ramesh Choudhary
(Director (REC) Chief Adviser)
Prof. Dr. Bimal Sarangi
(Principal, Chief Initiator)
Mr. Asish Tripathy
(Editor-in-Chief)

Prof. U. Das
(Exam Head)
Mr. Sanjaya ku Behera
(HoD, Civil)
Prof. U.K.Jena
(HoD. Computer Sc.)

Prof. T. P. Satpathy
(HoD (BSc. & H)
Mr. D.Das (HoD, Mechanical)
Prof. P.K.Pani (HoD, ECE)

Non Scholastic Activaties

Galvanic Achievers

Toppers in 2nd Sem. Examination

Binit Prasad
Mechanical

Kabita Sarangi
Mechanical

Ashok Kumar
Mechanical

Samir Sethi
Mechanical

Rakesh Sahoo
Mechanical

Toppers in 4th Sem. Examination

Jitendra Mohanty
Mechanical

Ravi Narayan
Mechanical

Dilip Das
Mechanical

Ravinder Mallick
Mechanical

Rakhi Kumari
Mechanical

Toppers in 6th Sem. Examination

Pooja Patnayak
Mechanical

Rakesh Sahoo
Mechanical

Anita Das
Mechanical

Bidhu Bhasan Sarangi
Mechanical

Dhanajya Panda
Mechanical

THE SPARK

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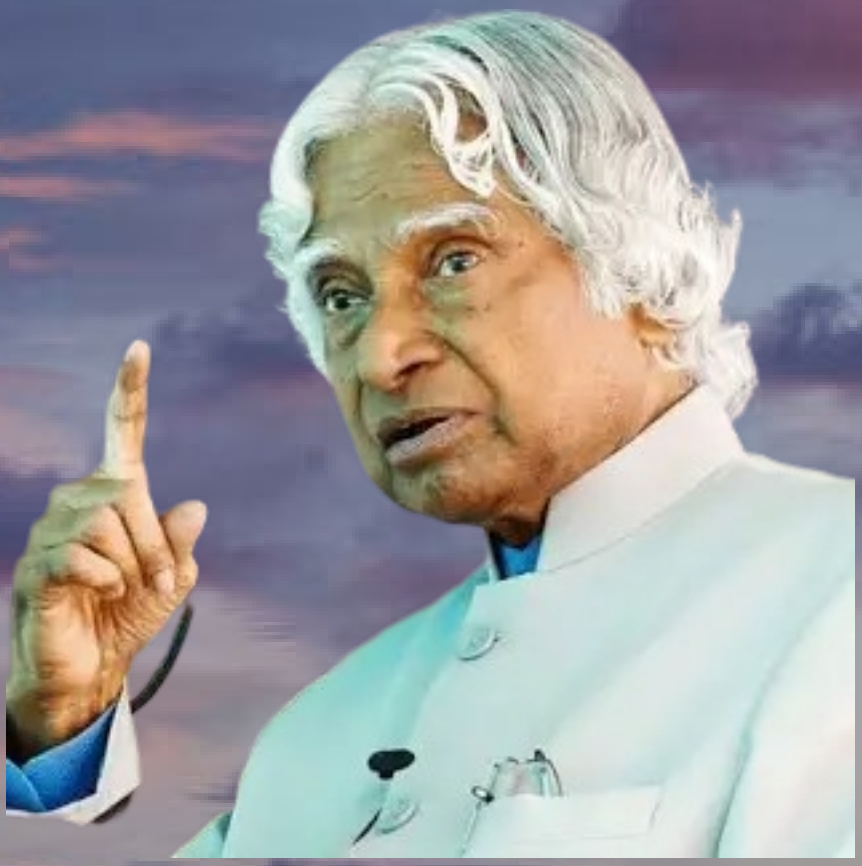
RAAJDHANI ENGINEERING COLLEGE

MANCHESWAR. BHUBANESWAR



"Determination is the power that sees us through all our frustrations and obstacles. It helps us in building our willpower which is the very basis of success."

- APJ Abdul Kalam

CONTENTS

Technical Section

English Section

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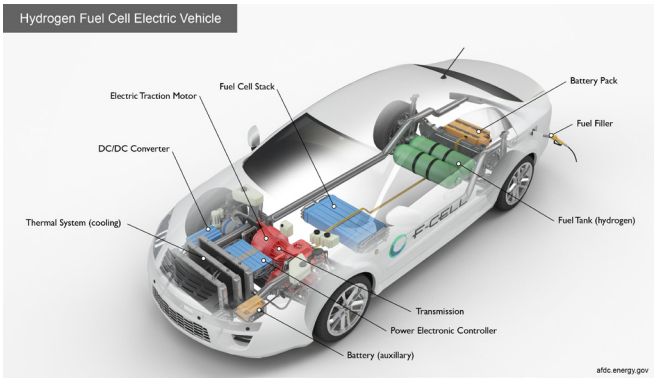
हिन्दी बिभाग

Technical Section

HYBRID ELECTRIC VEHICLES

Dr. Ranjan Kishore Mallick
Mech. Department

Hybrid electric vehicles are powered by an internal combustion engine and one or more electric motors, which uses energy stored in batteries. A hybrid electric vehicle cannot be plugged in to charge the battery. Instead, the battery is charged through regenerative braking and by the internal combustion engine. The extra power provided by the electric motor can potentially allow for a smaller engine. The battery can also power auxiliary loads and reduce engine idling when stopped. Together, these features result in better fuel economy without sacrificing performance.



Key Components of a Hybrid Electric Car

Battery (auxiliary): In an electric drive vehicle, the low-voltage auxiliary battery provides electricity to start the car before the traction battery is engaged; it also powers vehicle accessories.

DC/DC converter: This device converts higher-voltage DC power from the traction battery pack to the lower-voltage DC power needed to run vehicle accessories and recharge the auxiliary battery.

Electric generator: Generates electricity from the rotating wheels while braking, transferring that energy back to the traction battery pack. Some vehicles use motor generators that perform both the drive and regeneration functions.

Electric traction motor: Using power from the traction battery pack, this motor drives the vehicle's wheels. Some vehicles use motor generators that perform both the drive and regeneration functions.

Exhaust system: The exhaust system channels the exhaust gases from the engine out through the tailpipe. A three-way catalyst is designed to reduce engine-out emissions within the exhaust system.

Fuel filler: A nozzle from a fuel dispenser attaches to the receptacle on the vehicle to fill the tank.

Fuel tank (gasoline): This tank stores gasoline on board the vehicle until it's needed by the engine**.**

Internal combustion engine (spark-ignited): In this configuration, fuel is injected into either the intake manifold or the combustion chamber, where it is combined with air, and the air/fuel mixture is ignited by the spark from a spark plug.

Power electronics controller: This unit manages the flow of electrical energy delivered by the traction battery, controlling the speed of the electric traction motor and the torque it produces.

Thermal system (cooling): This system maintains a proper operating temperature range of the engine, electric motor, power electronics, and other components.

Traction battery pack: Stores electricity for use by the electric traction motor.

Transmission: The transmission transfers mechanical power from the engine and/or electric traction motor to drive the wheels.

CROWD COMPUTING

Mr. Dambarudhar Das
Mechanical Department

Crowd computing is form of the distributed work where tasks that are hard for computers to do,are handled by large numbers of humans distributed across the internet.It is an overarching term encompassing tools that enable idea sharing,nonhierarchical decision making and utilization of "cognitive surplus"- the ability of world's population to collaborate on large,sometimes global projects.Crowd computing combines elements of crowdsourcing, automation, distributed computing and machine learning.

How Crowd Computing Works:

Crowd Computing is fundamentally a distributed computing framework where a big non trivial task is divided into numerous independent atomic tasks that are distributed over multiple computing devices for processing.These atomic tasks are sometimes reffered to as micro-tasks which are kept ready in job pool. Available crowd worker are being searched for and a set of suitable crowdworkers is selected.Each micro–task from the job pool is assigned to a different crowdworker from that set (though sometimes the same task can be given to different crowdworker to maintain reliability).These micro-tasks are given as simple programs to the crowd worker without any contextual information. After execution of these independent micro-tasks,eachcrowdworker submits the output to the centralized master where all the micro results are gathered,checked for errors and assembled to get the final result.

Basic Layout of Crowd Computing:

Basic Components

Requester: Who needs PC and submit jobs. Typically, it is a server that hosts the crowd projects. In large crowd computing projects the requester itself maintains the server which hosts the projects that intends to leverage crowd computing.

Crowd worker: People lend their devices to execute the jobs.These crowd devices are denoted as crowdworkers.The devices may range from smartphone to desktops.When the devices are found idle,the jobs are processed following the CPU cycle stealing scheme.

Platform: Middleware for job management along with the server and client application. The server application is responsible for job creation ,discovering suitable crowd worker,job assigning and job scheduling to the designated crowdworker, collecting the results from multiple crowd workers,assemble them and updating them in their server application and for further purposes. It is responsible for implementing failure recovery schemes in case of failures .The client application installed on acrowd device is responsible for getting the job executed ,opportunistically,that is assigned to that particular devices and se nding the result to the server once it is completed.

Network: The computers are connected to the internet either directly or through Wi-Fi.

UNDER-WATER COMPRESSED AIR ENERGY STORAGE (UWCAES)

Mr. Asita Kumar Ratha
Mechanical Department

Now a days, energy consumption is inexorably increasing with a consequent increase of greenhouse gases emissions. The strong connection between CO_2 concentration in the atmosphere and the land and sea temperature anomalies led all the nations of the world to commit themselves to increase their energy efficiency and reducing their emissions. Use of renewable energy represents the most viable choice because it does not emit pollutants and can be exploited on a large scale, within the limits of their global potentials.

As mentioned, the global potential of renewable energy sources is limited. In fact, it is reduced by their intermittency. A solar photovoltaic power plant does not produce electricity during nights or in bad weather conditions, a wind power plant does not work at low or extremely high wind speed, and so on. In addition, energy produced by renewable source does not always match the energy requested by the load. Consequently, there are time windows in which there is an energy surplus that would be lost. Hence, in order to fully exploit the renewable energy sources, the only effective method is to store the extra energy to be used later, when required.

Among all the energy storage systems, Compressed Air Energy Storage (CAES) technology stands out for its high reliability, long service life, acceptable energy efficiency, and reduced environmental effects. Moreover, compared to pumped hydro storage, CAES is easier to site. Typically, in CAES systems, the compressed air is stored into underground caverns, salt domes or, for smaller application, into artificial pressure vessels. Therefore, large scale application is not suitable for site without a specific underground geography. These systems are generally equipped with constant volume reservoirs operating in a specific pressure range. This technology is called isochoric CAES system, as shown in the left image in Figure 1. Consequently, the pressure of the compressed air stored changes at every operation (charging/discharging processes). There are some disadvantages in the isochoric CAES: first of all, a large amount of energy is lost in the regulation (throttling) of the air pressure by way of a reducing valve. In fact, the high pressure compressed air needs to be reduced to a lower pressure before the generation process. A significant low pressure also represents a problem in terms of efficiency of the expander. In this regard, the pressure decreases during the discharge process. For these reasons, isobaric CAES systems have been studied. These systems allow delivering the same power output of an isochoric CAES system with a reduction of storage volume up to 77%. Advantages of isobaric air containment compared to isochoric containment will be clearer in the following section. Isobaric technology obviously required a very deep cavern or a very high altitude of the water tank, in order to obtain enough hydrostatic pressure by the water column, as shown in the right image in Figure 1. Therefore, it is geographically advantageous to place the CAES system under water. This latest technology is called Under-Water CAES (UWCAES) and it is derived from mature CAES technologies.

In UWCAES system, compressed air is usually stored in submerged expandable air accumulators, placed at or near the bed of lakes or oceans, in order to use the hydrostatic pressure resulting from the water column. Accumulators will expand during the charging process and they will contract during the discharging process, depending on the amount of the compressed air stored into them. In terms of mechanical aspect of the system design, the set-up is similar to that of adiabatic CAES. A highly effective thermal recovery process extracts thermal heat energy generated during isentropic air compression and stores it into a thermal energy storage that features high specific heat capacity, high density, and good heat transfer characteristics. During isentropic air expansion, where compressed air is used to generate electricity, the stored heat is used to raise the temperature of the compressed air coming from the accumulators, prior to entering turbo-expansion equipment. The size of the reservoir is strictly connected to the number of the accumulators: the larger the scale, the greater the accumulators. This is a great advantage for smallerscale applications, where smaller reservoirs are needed. Generally, the number of the accumulators decreases with the depth.

IMPACT OF ELECTRICAL ENGINEERING IN DIGITALIZATION

Ms. Jayanti Manjari Sahoo
Mechanical Dept.

Today's world is world of high technology starting from most complex rocket science including AI robots. The technical world is dominating the human. Our country India which is developing country is digitalization in the Sector of electrical machinery, electronic manufacturing, high speed internet, broadband highway etc.

The electrification of Indian rail network was increasing day by day and In future we have high speed bullet train which get more electricity to run in high speed,

The electrification of airports in India was also increasing day by day and in future we have more airports To run this airports in future we want more electricity,

In India the vehicles are increasing day by day which need more petrol or diesel to run but in future we don't have more petrol or diesel to run. To short out this problem In future we have another good technology that is ELECTRIC CAR which needs electricity to run.

In future we have ROBOTS and there also we need electricity and In India the quantity of homes, buildings, and hospitals, super markets etc. are increasing where we need more electricity. In this all field the hand of "ELECTRICAL ENGINEERING" is INVALUABLE.

Electrical Engineering is the main force behind the digital India, make in India and the power ministry focus on three things one is the village electrification, second one is household electrification and umbrella program for 24×7 power supply. For the continuous supply of power to the smart cities, rails networks, airports, etc. is very essential to have strong and smart transmission and distribution systems.

The electrical machinery industry contributes massively to the capital goods sector of India and the electrical machinery industry holds about 69% share in the capital goods industry.

The Indian government has started "MAKE IN INDIA" plan and it is a way ahead. MAKE IN INDIA was launched in 25 September 2014 with objective of job creation, skill enhancement and transform India into global design and manufacturing hub.

Now India is the 4th largest wind power capacity in the world and its capacity stands at 34 GW, 6th largest solar power capacity in the world and its capacity stands at 22 GW and 7th largest producer of hydroelectric power in the world and its capacity at 44,594 MW Biomass power is the installed in India which produces 8.1 GW power as in November 2017. The total power generation in India is 70 GW in 2017-2018. The Indian government has set target of adding 175 GW power in the country by 2022!! After the surveying of all this above information we found that In future ELECTRICAL ENGINEERING is much more helpful for MAKE IN INDIA AND DIGITAL INDIA POGRAM.

TICKET FROM TITANIUM TO TURBINE BLADES

Mr. Debasish Mohapatra
Mechanical Dept.

It seems quite interesting how different combinations of minute things of this world when compiled together transform for a new product, system or technology. With every new design that comes up, a huge number of processes become a part of that design and technology. Such is the story of raw titanium which further plays a vital role in the aviation industry. As we all know, the aviation industry has always been a matter of fascination among people all over the world. Gas turbine engines (GTE) are utilized in the aviation industry, which works on the Brayton Cycle. These GTEs help empower the air crafts. Turbojets, turbofans, turbo shaft and turboprops are the different types of GTE. The basic components of any GTE are the intake, low-pressure compressor, high-pressure compressor, combustion chamber, high pressure and low-pressure turbine, afterburner and exhaust nozzle. The mechanical power production takes place in the turbine which gives the power to drive the compressor and the other accessories as well. This power is withdrawn from the combustion carried out in the combustionChamber. Due to this energy which is taken from the combustion chamber,a very high temperature is attained at the turbine, as high as 1700!. Forthis purpose, the material used for the manufacturing of the turbine bladehas to have good strength as well as carries the capacity of withstandinghigh temperatures. These blades must be corrosion resistant and musthave high creep strength. Generally, nickel super alloys are used for their optimum characteristics, suitable for the turbine blades used in air crafts. Nickel super alloys are used in conventional air crafts. But with the coming times, technology develops.

One such development is the introduction of titanium in the turbine blades. Although titanium alone won't be able to withstand the high temperatures. But with high-grade alloys of titanium, alloyed with 6%aluminium and 4% vanadium, these blades have become a dependableoption for turbine blades. This alloy is lightweight, which is a much required

Property for an aircraft. It offers the form-ability of the blades aswell.

These blades are prepared by the process of investment casting. As in any casting method, here also the first step is pattern making. Patterns are made up of wax. These multiple wax patterns are assembled in a gate runner system in the form of a tree. This entire tree structure is further

Dipped in a ceramic slurry to form a hard shell. This structure on dryingcompletely is flash fired, to remove the wax by the impact of the heatgenerated due to flash firing. This is done on a sand bed. This process isalso known as de-waxing Investment casting is also known as the 'lost waxmethod due to the reason, wax is lost during this firing process. After thisProcess, the mould becomes hollow. Molten titanium alloy mixture ispoured into the hollow mould and is allowed to cool completely. Ceramicshells are broken by the knocking process to achieve the individual castings. These manufactured blades are further sent for the removal of extra material and other finishing tasks and heat treatments to relieve internal stresses. The final step in this process is the inspection and testing of these blades. This final step checks the intermolecular structure of the blades and carries out several impact tests, before assembling it in the turbine casing in the form of blades. This was the travel story of these blades from alloy to a finished product. This transformation from the extraction of titanium and other elements, and forming all those elements into an alloy, until the time it is a turbine blade, ready to take off of an aircraft includes numerous processes. The idea behind this whole system, identifying new techniques, each design, each process, till the end matters a lot. Engineering holds the power of changing the future of this living world. So keep inspiring and aspiring with new developments in technology.

HYDROGEN: FUTURE'S FUEL

Mr. Anshuman Nayak
Mechanical Dept.

Hydrogen is one of the most abundant and promising fuel sources available in the air. it is lighter than air and incredibly pure. When used in the fuel cell it is highly efficient and leaves no carbon emission behind. And best of air it is virtually everywhere .it is found everywhere in the plants, water, manure etc. But the Problem arises before it can be used it has to be separated.

There are a lot of ways to produce hydrogen **Steam reforming:**

Steam reforming of methane is the most common method for the hydrogen production. It combines methane with the high temperature steam to trigger a reaction and separate the hydrogen. At high temperatures (700 – 1100 °C) and in the presence of a metal-based catalyst (nickel), steam reacts with methane to yield carbon monoxide and hydrogen.

$$CH_4 + H_2O \rightarrow CO + 3H_2$$

II. Gasification: Gasification is a process that converts organic or fossil fuel based carbonaceous materials into carbon monoxide, hydrogen and carbon dioxide. This is achieved by reacting the material at high temperatures (>700 °C), without combustion, with a controlled amount of oxygen and/or steam. III. Electrolysis: Hydrogen can also be produced by separating water into its two primary elements—hydrogen (H_2) and oxygen (O_2). This process, known as electrolysis, passes an electrical current through the water to extract hydrogen. The electricity can be sourced from clean, renewable energy such as wind, solar, or hydro.

$$NaCl + 2\ H_2O \rightarrow 2\ NaOH + H_2 + Cl_2$$

FCV concept (using hydrogen):

One such FCV (Fuel Cell Vehicle) concept car is Toyotamirai. The unveiled FCV concept was a bright blue sedan shaped like a drop of water "to emphasize that water is the only substance that hydrogen-powered cars emit from their tailpipes. The FCV uses Toyota's proprietary, small, lightweight fuel cell stack and two 70 MPa highpressure hydrogen tanks placed beneath the specially designed body. The Toyota FCV concept can accommodate up to four occupants. The FCV concept also uses portions of Toyota's Hybrid Synergy Drive technology including the electric motor, power control unit and other parts and components from its hybrid vehicles to improve reliability and minimize cost. The hybrid technology is also used to work together with the fuel cell. At low speeds such as city driving, the FCV runs just like any all-electric car by using the energy stored in its battery, which is charged through regenerative braking. At higher speeds, the hydrogen fuel cell alone powers the electric motor. When more power is needed, for example during sudden acceleration, the battery supports the fuel cell system as both work together to provide propulsion High-pressure hydrogen tanks The Mirai has two hydrogen tanks with a three-layer structure made of carbon fiber-reinforced plastic consisting of nylon 6 from Ube Industries and other materials.

The tanks store hydrogen at 70 MPa (10,000 psi). The tanks have a combined weight 87.5 kg (193 lb) and 5 kg capacity. Safety features: 1. multipatented, carbon-fiber-wrapped, polymerlined tanks are built in a three-layer structure and absorb five times the crash energy of steel. 2. In a highspeed collision, sensors stop the flow of hydrogen. 3. Any leaked hydrogen is quickly dispersed. Since the gas is lighter than air, it rapidly disperses, reducing the time window to cause damage in the event of an ignition. Thus with the help of scientific studies and curious minds if we can create and store this hydrogen easily then it would be revolution in the field of technology. As we would get efficient and pollution free energy for the future.Thus encouraging the concept of sustainable development.

ULTRA EFFICIENT JET ENGINES

Mr. Kshitish Kumar Dash
Mechanical Dept.

Pollution by aviation is one of the major causes of global temperature increase and Ocean acidification caused by the release of carbon dioxide and other greenhouse gases into the upper part of Earth's atmosphere. Globally around 8.3 million people fly daily, twice the total in 1999, burning almost 500,000 metric tons per day. With no much advancement in the alternate fuel research currently same old gasoline is being used causing ever increasing pollution, and many in industry believe the pathway to cleaner jets is through advances in engine technology rather than cleaner fuel.

That's the main idea behind tomorrow's aircrafts with engines that are much lighter, quitter, durable and more energy efficient than the conventional turbofan engines used today in commercial airliners today. Pratt & Whitney is an aerospace manufacturer which has introduced a new series of engines called 'Pure Power' which uses an internal gearbox to slowdown the speed of the fan. The technology effectively saves 16% on fuel consumption compared to the airliners with conventional engines.

Meanwhile CFM International aviation mogul which is a joint venture between GEA viation and Safron Aircraft Engines has introduced its own advanced engine, called the 'Leap', which could achieve similar improvements without a huge break from existing technology. Both new engines have been deployed on different versions of Airbus's new jet the A320neo.

Pratt & Whitney first attempted to build a geared turbofan starting around 1998 with PW800. Soon afterwards Advanced Technology Fan Integrator (ATFI) project commenced using the engine PW308 at the core but along with a new gear box and a single stage fan.

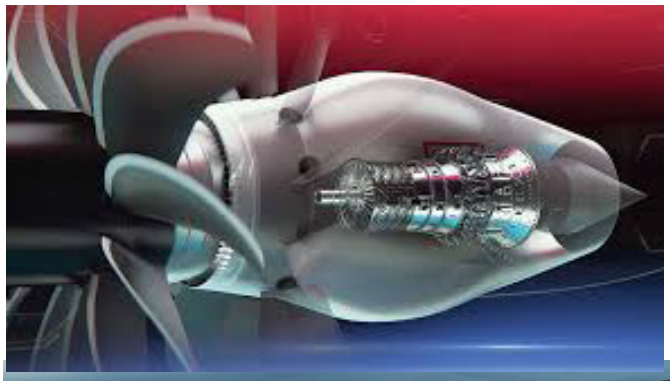
It had it's first run on March 16, 2001. This led to the geared Turbofan program which was developed with German MTU Aero Engines. In addition to Turbofan, initial design included variable area fan nozzle which allows improvements in propulsive efficiency across a range of flight. GTF was then renamed as PW1000G, the first in new line of "Pure Power" engines.

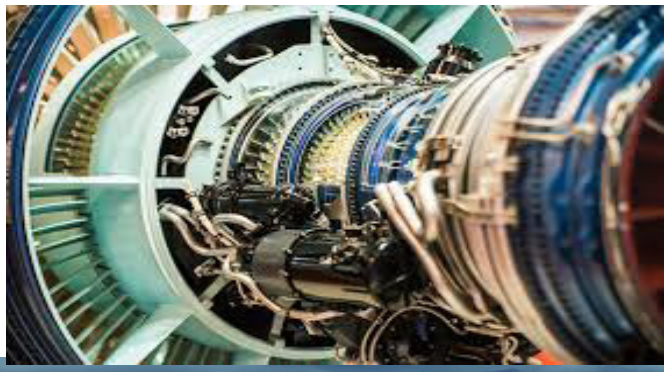
In the Pure Power 1000G engine family, a state of the art gear system separates the engine fan from the low Pressure compressor and turbine, allowing each of the modules to operate at their optimum speeds. This enables the fan to rotate slower and while the low pressure compressor and turbine operate at high speed, increasing engine efficiency and delivering significantly lower fuel consumption, emissions and noise. This increased efficiency also translates to fewer engine stagesand parts for lower weight and reduced maintenance costs.

This high-bypass geared turbo fan engine is 16% more fuel efficient as well as being up to 75% quieter. It has a 3:1 gearbox between the fan and the lowpressure spool, eachspinningat its optimal speed of 4000-5000 rpm for the fan and 12,000-15,000 rpm for spool, the high pressure spool is spinning

at more than 20,000 rpm. The 30,000 hp gearbox is designed to run lifelong with no scheduled maintenance other than changing oil.

CFM International introduced their LEAP engine intended to compete with Pratt & Whitney PW1000 engine. This engine basically makes use of advanced material composites and different cool air mixing cycles modulating the amount of airflow to the internal passages inside its high pressure turbine to keep the temperature under control. The fan used in the engine has flexible blades manufactured by a resin transfer molding process, which are deigned to untwist as the fans rotational speedincreases.Currently proposed for the LEAPis a greater use of composite materials, a turbine fan in the compressor, a second generation Twin annular Pre Swirl combustor that cuts the nitrous oxide emissions in half, and a bypass ratio around 10:1. The company is using ceramic matrix composite to build the turbine shrouds.CFM developed a new carbon-fiber blade whose design involves weaving individual carbon-fiberstrands on gigantic Jacquard looms into a complex, three dimensional laminate and infusing epoxy resin into the structure by means of a proprietary transfer molding technique. Each individual blade consistsof 7 kilometers of carbon-fiber and after being cured in autoclave the finished blade is strong enough that an entire Airbus A350 could be suspended fromit without the blade breaking CFM uses a ceramic composite matrix(CMC) material consisting of silicon carbide-and- graphite matrix. Each shroud is a ring of 36 tightly fitting white colored CMC parts forming a ring round he inside of the HTP casing outside the circumference of the first HTP rotating stage. Combining all the material advantages these engines are saving fuel by almost 15%.To sum up these new technologies competingeachotherfor theultra-highefficiencies has made it possible to look into future jet engines or at least bridge the gap between todays and tomorrows engines providing a durable, low maintenance, highly efficient, cleaner, less noisy and advanced engine indicating a reliable future of aircraft





TRENDS IN THE EDTECH ECOSYSTEM

Mr. Ramchandra Parida
Mechanical Department

EdTech (a combination of "education" and "technology") refers to hardware and software designed to enhance teacher-led learning in classrooms and improve students' education outcomes.

The past few years have seen the emergence of many startups in the Indian edtech industry. Technological innovations are helping forge new pathways for growth, and the edtech ecosystem is continuously evolving to provide new and innovative services.

Investors have sensed potential profitability, resulting in the sector attracting large investments. And finally, the onset of COVID-19 and subsequent lockdowns have dramatically changed the way education was imparted, shifting the focus to online education.

Scope for change

Content consumption patterns for online education in India have seen a rise in demand for gamified content, live classes, online assessments, high quality resources, better accessibility and innovative methods of learning.

The technological advancements have augmented this demand, and a large number of entrepreneurs have come up with successful business models for online education.

Technology-enabled learning also has the potential to successfully plug gaps prevailing in our existing education system viz. lack of proper school infrastructure, teacher absenteeism or unavailability, lack of proper training of in-service teachers, lack of accessibility to learning, especially in remote areas and numerous other challenges.

The trends

In the online test preparation segment, India has prominently shown growth and due to the increased competition, edtech players in the segment are offering services at a lower cost.

Technology itself has an ever-growing demand for skills up-gradation. There has been significant growth for roles requiring skilled professionals, such as data scientists, machine learning experts, software analysts etc

Video driven content (including simulations and other visual content) is garnering a lot of demand and has attracted many players who are creating top notch learning and training content.

Convenience, flexibility, and affordability gives the sector a cutting-edge advantage. People are interested in high quality but affordable content, and where learning is flexible and accessible anytime/anywhere.

Conclusion

The growing prominence of digital education

and edtech firms will help enormously to fulfil the government's agenda of 'Education for All' and in improving the quality and scope of elementary as well as higher education in the country as outlined in the NEP 2020. This will help in giving an impetus for further growth to the sector.

ROLE OF SOLAR POWER IN SUSTAINABLE DEVELOPMENT OF INDIAN ECONOMY

Mr. Ashish Kumar Sahoo
Mechanical Department

Now a days, our country has been facing lots of difficulties in improving our economic strategy due to post covid-19 pandemic situations. The Government of India has already started lots of programs by implementing new projects, financial plans, yojanas etc. to improve our economic conditions. Therefore, our country trying to be self-independent in different fields like ministry of defence, science & technology, manufacturing and production, automobiles sector etc. But India needs to pay much more attention in the utilization of Renewable energy resources because utilization of Renewable energy resources can reduce the import of fossil fuels from other countries and which ultimately results in strengthen our economy. India is now a leading country in the world in the proper utilization of solar energy; which is one kind of Renewable energy. However, the Headquarter of International Solar Alliance (ISA), Gurugram, Haryana is in India. So, ramping up solar energy generation and equipment manufacturing can make India's economy sustainable and self-independence which broadly speaking transforming Indian economy towards a leading country in the world.

As per the current path of economic recovery, lots of countries around the world are preparing plans for recovery of economic growth post covid-19 pandemic situations, so the debate has been started to choose the correct economic growth model. The old quantitative economic growth model depends upon fossil fuels for energy. But the new quantitative economic growth model depends upon Renewable energy. Major countries of the world have shown a clear shift from the old economic growth model to the new economic growth model. India has been showing real commitment to use clean green Renewable energy for economic growth. Now, India has touched a target of 168.69Gigawatt Renewable energy capacity by the end of February 2023 including both from solar energy and wind energy but around 65% out of total renewable energy from Solar Energy. But solar energy generation and solar equipment manufacturing sector have not received the due importance in new economic planning model of India.

India has a very well potential for generation of solar power. It is a tropical country with 270 to 300 clear sunny days in a year. Development of solar power sector can help India in achieving self-reliance in following ways: -

- Employment Generation
- Rural Development
- Reduction in fossil fuel import bills
- Reduction in dependency on oil producing countries
- Faster installation of power generation units
- Clean environment and enhanced quality of life

Solar power sector can provide employment to all kinds of labors (skilled, semiskilled and unskilled) in various activities like manufacturing of solar equipment, development of solar power plant, installation and maintenance of Roof Top Solar Panels. Demand of installation of roof top solar panels will create entrepreneurship and jobs in rural India in solar power sector. Availability of power will promote cottage and small industries in rural India. It will also bridge the income disparity between rural India and urban India. Solar power can transform rural India bright and shining.

India is among fastest growing economies but depends upon heavily on imports of energy. This places Indian strategic interests at risk and dampens sustained growth rate. Now, India is the 2nd highest fossil fuel importing country in the world. Renewable sources of energy play an important role in reduction of fossil fuel import bills and dependency on oil producing countries.

A 500-Megawatt capacity solar plant can be constructed within 18 months while a similar thermal or hydel plant might take 2 to 3 times more. Costs of construction and financing for a new solar plant is 14% less than that of thermal or hydel plant. An important feature of solar power plant is that it is environmentally friendly. Despite the ambitious target of Solar power generation; India has an annual solar cell manufacturing capacity of about 3-Gigawatt while the average annual demand in India is 20 Gigawatt.

Seven of India's top 10 module suppliers are Chinese firms. In the past five years, India has already imported $16 billion (1600 crores) worth of solar equipment. Unless, an indigenous capacity is ramped up, India may import an additional $42 billions (4200 crores) of solar equipment by 2030. So, India needs a solar manufacturing strategy. The solar manufacturing occurs in four phases, and which are; -

- ❖ Semi-conductor ingot production
- ❖ Semi-conductor wafer (thin slice of crystal semi-conductor) production from ingot
- ❖ Photovoltaic cell manufacturing from semi-conductor wafer
- ❖ Solar panel manufacturing by assembling photovoltaic cells.

In producing semi-conductor, India has very poor rank in the world. Most of the times India imports semi-conductor from China and USA. To achieve self-sufficiency in manufacturing of solar equipment, India needs a new solar sector development policy with focus on the following issues; -

- ❖ Development of core competency in Semiconductor manufacturing (i.e., Government needs to support semiconductor production with determined industrial policy)
- ❖ Government policy to subsidize solar manufacturing sector (i.e., subsidies should be given to land acquisition, raw material procurement, labour laws, tax, exports)
- ❖ Cost of capital (i.e., cost of debt interest should be low so as to increase the growth rate of Ease of doing business)

From present scenario of Indian thermal power generation sector; lots of thermal power generation sites have been shutting down or cease of operation due to deficiency of coal like NTPC, NSPCL, NALCO (expecting to be shut down soon), Vedant etc. So, development of solar power sector may act as a substitute of the thermal or hydel power plant.

Lists of 10 major Solar Parks in India:

1. Bhadla Solar Park, Rajasthan, 2245 MW (Largest in the World).
2. Pavagada Solar Park, Karnataka, 2050 MW (Second largest in the World).
3. Kurnool Ultra Mega Solar Park, Andhra Pradesh, 1000 MW.
4. NP Kunta Ultra Mega Solar Park, Andhra Pradesh, 978.5MW.
5. Rewa Ultra Mega Solar, Madhya Pradesh, 750MW.
6. Kamuthi Solar Power Project, Tamil Nadu, 648MW.
7. Charanka Solar Park, Gujarat, 615MW.
8. Ananthapuramu Solar Park, Andhra Pradesh, 500MW.
9. Mandsaur Solar Farm, Madhya Pradesh, 250 MW.
10. Galiveedu Solar Park, Andhra Pradesh, 100MW.

IRON MAN ARC REACTOR

Proof that Tony Stark has a heart

Bikash Parida
Mechanical Department

The Marvel movie version of Tony Stark graduated from MIT in the early 1990s. He built an ARC reactor at Stark Industries later on, but apparently, some of the initial research he did as an undergrad stuck around in some notebooks somewhere on a dusty shelf at MIT. It took them only a few decades, but a team of MIT researchers has been able to develop tentative plans for a fully armed and operational ARC fusion reactor of their own.

ARC stands for "affordable, robust and compact." The design is a fusion reactor that's based on the tokamak, using magnetic fields to contain plasma at a high enough temperature (tens to hundreds of millions of degrees Celsius) to maintain the conditions necessary for fusion. A tokamak called ITER is currently under construction in France, and it may be operational by the 2030s at a cost of tens of billions of dollars. A bunch of different research institutions are working on newer approaches that are designed to be much faster and much, much cheaper; ARC is the latest of these.

What makes MIT's ARC design different is its use of a new class of commercially available superconductors called rare-earth barium copper oxide (REBCO) superconducting tapes. These superconductors can generate significantly higher magnetic fields inside the reactor. And since any magnetic field increase raises the level of fusion to the fourth power, using REBCO superconductors to nearly double magnetic field strength yields a potential fusion power increase of an order of magnitude over standard superconductors.

With this massive boost in power, MIT has been able to design a much smaller (and therefore cheaper) reactor that can still produce significant amounts of electricity. The first prototype ARC reactor would be a 270 MWe power plant, producing between three and six times as much energy as it requires to keep itself running. The reactor, which would generate enough energy to power some 100,000 homes, would be relatively compact at half the size of ITER. It would have the added benefit of having a module core, making it much easier to both service and experiment with.

The reactor design would also be simplified through the use of a liquid (a fluorine lithium beryllium molten salt) as a shielding material, a neutron moderator, and a heat exchange medium. The liquid coats the reactor, gets heated by the fusion going on inside, and then is fed through a high efficiency Brayton cycle engine to generate electricity.

The ARC reactor is based almost entirely on existing, proven technology, and MIT says that devices of a similar complexity and size have been built within about five years. It would cost, says MIT, "a fraction" of what it will take to build ITER. For all we know, that fraction is nine-tenths, but the implication is that the ARC reactor would be substantially cheaper, largely due to its smaller size.

We should point out, as the researchers do, that "a full engineering design is beyond the scope of the ARC study." However, there's no theoretical or technological showstopper preventing an engineering design for an ARC reactor to be developed. If it is, we could see a completed one up and running in as little as a decade.

THE NEXT STEP IN LIFE

Iran Behuria
Mechanical Department

What is the next step in life? A question that always haunts the mind. It is quite interesting to share because we encounter this thought whenever we achieve something. Consider you complete a task in your daily work life and immediately you start thinking, what is next? Do we have to think about it? Yes we do, but we should not to waste all our time in thinking of the next step. This is because we will find it intolerable to forget to live in the present and experience every moment of life. There are two possible results of next step: success or failure. We plan ahead but we never think of these outcomes, and this is why we need to be prepared. Dr. A. P. J. Abdul Kalam has inspired by saying that the key to success is, "I must have a dream. I must continuously acquire knowledge, hard work and perseverance. One should not be afraid of problems. That would be success." These words portray that we can relate our dreams with the next step of our lives. To achieve that we must gain knowledge. We should never forget to live in the present moment but focus on it and work hard for the next step. Finding the next step is like finding the purpose of life. Every step gives us some experience, a chance to improve or develop ourselves. We personally know this as we have experienced that planning about the next step has helped us a lot. We were an introvert and bringing about a change in ourselves was not an easy task. The moral that we have learnt from our childhood is that no matter how many mistakes we made, We had the courage to try again till We were able to succeed. We have also learnt to be confident and fearless. We do read our ideals which helps us to become mentally strong to face each struggle in the next step. Partaking in deep, long and purposeful conversation with our parents who always support us in any decision has been my go-to. We read a lot to inspire and motivate ourselves which leads to an optimistic attitude. These are the actions that bring us one step closer to our goals.

BONE TISSUE ENGINEERING USING 3D PRINTING

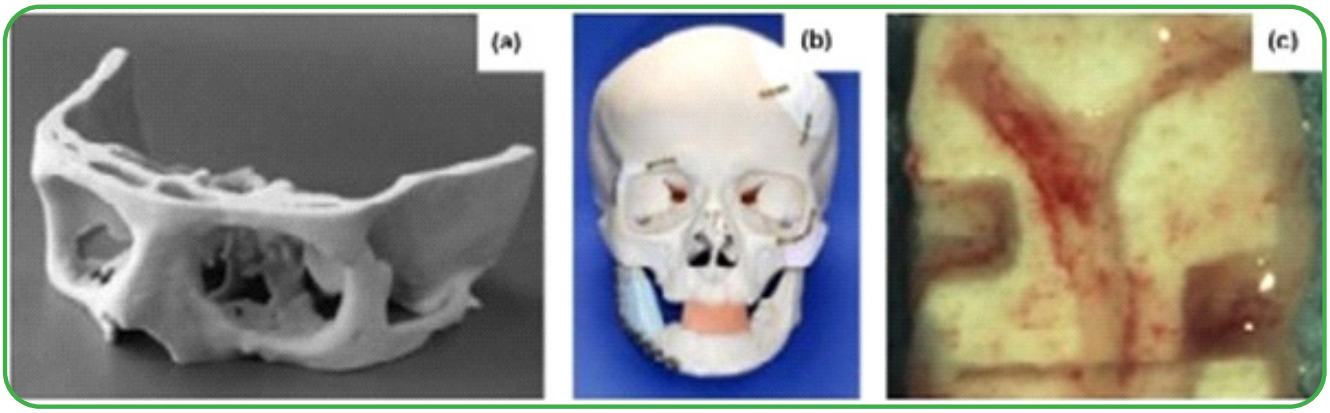
Jaya Mudili
Mechanical Department

The addition of SiO_2–ZnO dopants to TCP scaffolds increases cell viability in different pore size ranges [76]. The biocompatibility of 3D printed CaP ceramics has also been studied using osteoclasts. Tartrate resistant acid phosphatase (TRAP) staining, lacunae formation and microscopic images confirmed the monocyte differentiation to multinuclear osteoclast-like cells on a wide range of compositions . It has been shown that the use of phosphoric acid instead of polymeric binders can improve both resolution and compressive strength [64]. HA scaffolds with high surface areas showed no cytotoxicity and adequate cell adhesion with MC3T3-E1 fibroblast cells . In addition to in vitro experiments, in vivo biocompatibility and osteoconductivity of 3D-printed scaffolds showed that the 3Dprinted brushite and monetite cements with controlled open porosity increased osteoconduction in vivo in a goat model . 3D-printed TCP samples with micro and macro-porosity also facilitated osteogenesis in a rat femur model . Cytotoxicity results of MC3T3-E1 cells on two different bone cement based compositions of TTCP/b-TCP and TTCP/calcium sulfate dihydrate have been reported for bone tissue engineering. A wide range of binders were used. It has been reported that the shortest hardening time can be obtained between 20–40% of citric acid, and 30–40% of lactic acid; however, a lower range of those binders and a different concentration of sodium hydrogenphosphate with sulfuric and phosphoric acids can be used to increase the hardening time for the cements [68]. Fig. 3a and b show patient specific 3D printed CaP implants. These results point to the application of 3DP in a large variety of materials and structures for bone tissue engineering scaffolds.

Mechanical properties of 3D printed scaffolds

Low mechanical strength is a major challenge in porous scaffolds, and is primarily controlled by pore volume. This is also true for 3D printed ceramic scaffolds and limits their use only in non-load bearing and low-load bearing applications. Optimized post processing approaches and compositional modifications can improve mechanical properties of ceramic scaffolds. The compressive strength of 3D printed TCP sintered scaffolds is shown in Fig. 2b. Inagreement with observedshrinkage and increased density,microwave sintering results in a higher compressive strength. The strength of the scaffold increases with decreasing pore size or volume, and a maximum strength of 10.95 1.28 MPa has been observed for scaffolds with 500 mm pores, with 42% total open porosity, when sintered at 1250 8C for 1 h in a microwave furnace . In another study, when a mixture of TTCP/b-TCP was sintered at 1400 8C, it increased the strength of the 3D printed scaffold. However, sintering a TTCP/calcium sulfate dihydrate composite caused a decrease in the strength due to water release . Tarafder et al.reported an effective densification approach, using microwave sintering compared to conventional heating, and improved the mechanical properties of 3D-printed TCP scaffolds . Bioactive liquid phase sintering aids have also been reported to increase strength. 3D printed HA/A-W glass, where the glassy phase is added as a liquid phase sintering aid, showed an increase in strength from 1.27 MPa to 76.82 MPa when sintered at 1300 8C for 3 h . The enhancement of tensile properties was also found in PE scaffolds as a result of thermally induced densification and binder degradation . To increasethe strength of ceramic scaffolds without

impairing biological properties of scaffolds, another approach is monomer or polymer infiltration. A mixture of bismethacrylated oligolactide macromer (DLM-1), containing 10 wt% of 2-hydroxyethyl methacrylate has been used to increase the strength of scaffolds before and after sintering . The immersion of HA scaffolds in triethylene glycol dimethacrylate (TEGDMA), 2,2-bis[4 (2-hydroxy-3thacryloyloxypropyloxy)-henyl] propane (bis-GMA) resulted in an increase of the flexuralstrength byat least20 times . summarizes the mechanical properties of 3D printed scaffolds tailored for bone tissue engineering.

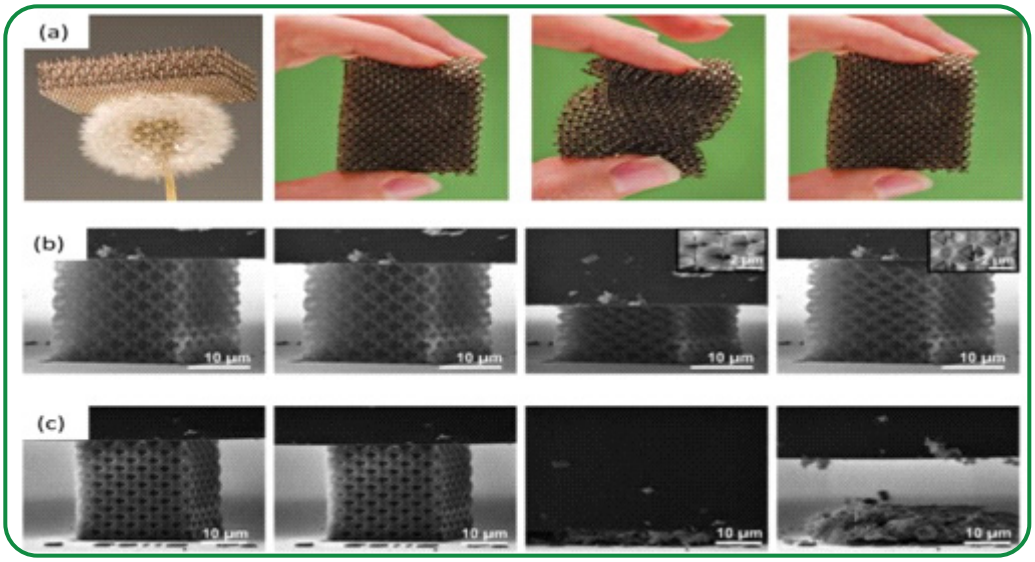


MECHANICAL METAMATERIALS AND THEIR ENGINEERING APPLICATIONS

Manas Nayak
Mechanical Department

Mechanical properties of materials have been one of the most fundamental and widely studied areas in materials, owing to its crucial importance for real-life applications. For centuries, the development of materials has solely relied on the modifications of its composition to alter mechanical properties. Despite being effective, it usually takes more than a decade for a newly discovered material to be in the market. Over the course of history, the range of accessible materials kept on growing, allowing us to select a more suitable material for specific applications.However, there are often definite couplings between the intrinsic properties of these materials, such as the intimate coupling between strength and density, where high strength materials are generally high in density and vice versa.

Cellular materials are basically consisted of intersecting (an interconnected network of) struts and plates which form the edges and faces of the unit cells, and these small compartments are packed and assembled together to fill the space. Cellular solids are widely found in nature: cork, wood, coral, sponge, and honeycomb. Evolution through billions of years has given them the internal structures which provide structural privileges as well as other beneficial properties. In many cases, the primary function of such cellular materials is to enhance the mechanical properties, such as cancellous bone which gives a stiff support in a weight-efficient way by incorporating pores and cavities. In recent years, these cellular structures have been adopted as tools in the design of mechanical metamaterial to manipulate the structure-property relationship, resulting in the emergence of novel metamaterials with unprecedented properties.

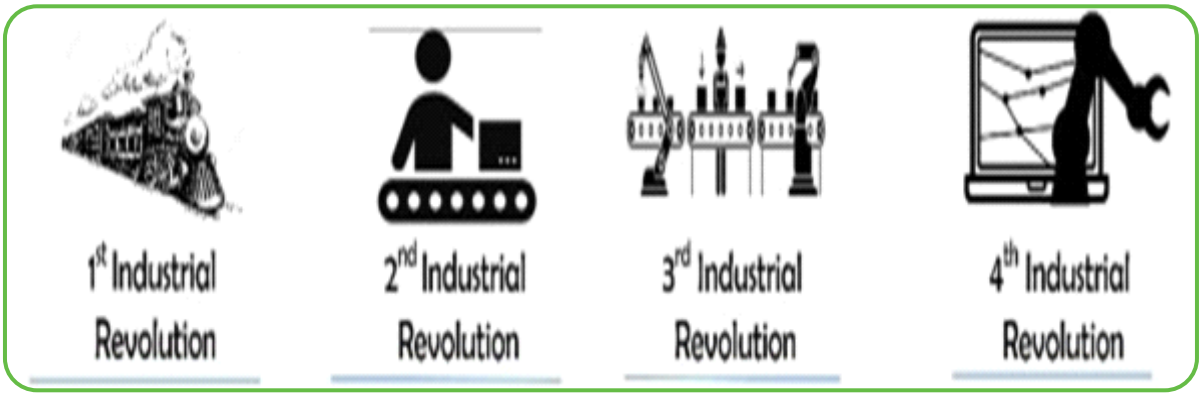


INDUSTRY 4.0: A BIBLIOMETRIC ANALYSIS AND DETAILED OVERVIEW

Mr. Asita Kumar Ratha
Mechanical Department

The fourth industrial revolution is upon us and is making rapid strides day by day. In the eighteenth century, the first industrial revolution brought major changes in industries by utilizing steam as the source of power. The second industrial revolution used electric power and the assembly line for mass production. Integration of information technology and computers in manufacturing was seen in the third industrial revolution. Now, the fourth industrial revolution is around the corner, which is said to take us to the next level of manufacturing where machines will redefine themselves in the way they communicate and perform individual functions. Fig. 1 depicts the transformation that takes place. However, the fourth industrial revolution, commonly termed as industry 4.0, is not just about industry. It is about overall transformation using digital integration and intelligent engineering. It is quoted as the next level of manufacturing where machines will redefine themselves in how they communicate and perform individual functions. The notion of Industry 4.0 was coined by Kagermann et al. (2011) which fuses the virtual and the real world with emphasis on engineering applications such as robotics, digitization, and automatization. For any system to be regarded as Industry 4.0, constant connectivity, human assistance and decentralized decision making are absolute necessities. The essential components of Industry 4.0 comprised cyber–physical systems (CPSs), additive manufacturing, virtual and augmented reality, cloud computing, big data analytics, data science etc. to name a few. Various studies have shown that digitization of products and services Corresponding author. E-mail address: pranabmuhuri@cs.sau.ac.in (P.K. Muhuri). has become a necessity for a sound industrial ecosystem. However, these requirements and advanced technologies have made the systems

more complex and led to many other challenges such as information security, reliability, integrity, etc. These are the major bottlenecks which needs to be overcome for the successful design and deployment of Industry 4.0.



MACHINE LEARNING IN PREDICTIVE MAINTENANCE TOWARDS SUSTAINABLE SMART MANUFACTURING IN INDUSTRY 4.0

Rahul Kumar Sahoo
Mechanical Department

Industries are currently going through "The Fourth Industrial Revolution," as professionals have called it, a term also known as "Industry 4.0." (I4.0) Integration amongst physical and digital systems of the production contexts is what mainly concerns Industry 4.0 . With the appearance of I4.0, the concept of prognostics and health management (PHM) has become unavoidable tendency in the framework of industrial big data and smart manufacturing; plus, at the same time, it offers a reliable solution for handling the industrial equipment health status. I4.0 and its key technologies play an essential role to make industrial systems autonomous and thus make possible the automatized data collection from industrial machines/components. Based on the collected data type machine learning algorithms can be applied for automated fault detection and diagnosis. However, it is very cruel to select appropriate maching learning (ML) techniques, type of data, data size, and equipment to apply ML in industrial systems. Selection of inappropriate predictive maintenance (PdM) technique, dataset, and data size may cause time loss and infeasible maintenance scheduling. Therefore, this study aims to present a comprehensive literature review to discover existing studies and ML applications, and thus help researchers and practitioners to select appropriate ML techniques, data size, and data type to obtain a feasible ML application. The industrial equipment predictive maintenance (PdM) can perceive the degradation performance because it was designed to achieve near-zero; hidden dangers, failures, pollution, and near-zero accidents in the entire environment of manufacturing processes . These huge amounts of data collected for ML contains very useful information and valuable knowledge which can improve the whole productivity of manufacturing processes and system dynamics, and can also be applied into decision support in several areas, mainly in condition-based maintenance and health monitoring . Due to the recent advances in technology, information techniques, computerized

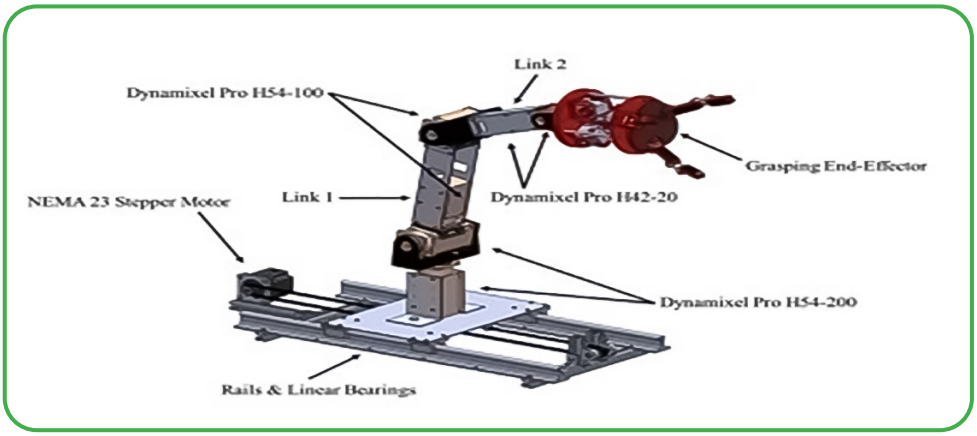
control, and communication networks, it is now possible to collect vast volumes of operational and processes conditions data generated from several pieces of equipment in order to be harvested in making an automated Fault Detection and Diagnosis (FDD). The datasets collected can also be applied to develop more efficient methodologies for the intelligent preventive maintenance activities.

DESIGN, INTEGRATION, AND FIELD EVALUATION OF A ROBOTIC APPLE HARVESTER

Satya Ranjan Beherra
Mechanical Department

During the twentieth century, technological advances in agricultural mechanization fundamentally altered the structure of modern agriculture. The tractor and combine harvester have all but eliminated the need for manual labor during the production of bulk commodity crops like corn and wheat. Despite this rapid progress in agricultural automation, the production of high-value specialty crops, which the U.S. Department of Agriculture (USDA) defines as fruits and vegetables, tree nuts, dried fruits, horticulture, and nursery crops,1 is still largely dependent on manual labor. For example, in the U.S. Pacific Northwest, a large, seasonal labor force is required for the production of fresh market apples. Activities requiring significant manual labor include pruning, thinning, and harvesting. During 2013, seasonal employment in Washington State for apple pruning and thinning peaked at 8,508 and 17,349 workers, respectively. However, the most labor-intensive task in tree fruit crop production is harvesting, which required 36,425 seasonal agricultural workers during September, the peak harvesting month.2 Local growers report that harvesting labor accounts for approximately a third of their annual variable costs—as much as pruning and thinning combined.3 Harvesting is also a timesensitive operation where variable weather patterns create uncertainty during employment planning. For example, the threat of an early fall frost can cause a short-term surge in the demand for apple pickers. Like many agricultural sectors around the world, the fresh market apple industry is struggling to cope with rising labor costs and increasing uncertainty surrounding the future availability of farm labor.4,5 In the United States, the majority of the seasonal labor force is supplied by migrant Latino populations. A recent study by the Pew Research Center found that over the past five years net migration from Mexico to the United States has been negative.6 All fresh market apples are picked by hand using a ladder and bag. Picking fresh market apples is semi-skilled work that is both physically strenuous and highly repetitive. Apple picking exposes workers to fall hazards as well as ergonomic injuries through heavy lifting and repetitive hand actions.7 There are harvest/ labor assist systems commercially available, like mechanical platforms that raise workers to the fruit and raise the fruit bin to the workers, but adoption is not widespread in Washington or in orchards in the Eastern region of the United States.8 A recent survey of 316 Washington apple operations9 found that only eleven percent of growers used mechanical platforms. Incompatibility between the platforms and the existing orchard architecture and tree structure was cited as the most significant impediment to their use. A study of platform use during pear harvesting in California orchards10 also cited the issue of orchard–platform compatibility as a significant problem. So, in addition to the risks associated with labor availability and rising costs, worker safety concerns also motivate increased

interest and research in harvest mechanization in fresh market apple production. The lack of mechanical harvesting for fresh market apples is a critical problem that threatens the U.S. tree fruit industry's long-term sustainability.



MECHANICAL METAMATERIALS AND THEIR ENGINEERING APPLICATIONS

Debashish Behera
Mechanical Department

Mechanical properties of materials have been one of the most fundamental and widely studied areas in materials, owing to its crucial importance for real-life applications. For centuries, the development of materials has solely relied on the modifications of its composition to alter mechanical properties. Despite being effective, it usually takes more than a decade for a newly discovered material to be in the market. Over the course of history, the range of accessible materials kept on growing, allowing us to select a more suitable material for specific applications.However, there are often definite couplings between the intrinsic properties of these materials, such as the intimate coupling between strength and density, where high strength materials are generally high in density and vice versa. On the other hand, numerous materials found in nature often exhibit intriguing properties unachievable with conventional materials. These natural materials, particularly cellular materials, have evolved over the course of several million years such that they developed an optimized architecture which could span over multiple hierarchies across different length scales. Forinstance,the highly complex porous architecture of a bone core consisting of intricately-shaped ligaments and density gradients allowsitto achieve amuch higher structural efficiency comparedto most of the synthetic cellular materials developed by humans, which possess significantly less sophisticated architectures and are far from ideal. Another well-known example on the exploitation of architecture is the comparison between the Great Pyramid of Giza and the Eiffel Tower. The Eiffel Tower is approximately twice as tall as the Great Pyramid of Giza but exhibits similar structural integrity and is almost three orders of magnitude lighter due to its hierarchical and three-dimensional architecture.

English Section

OF BEGINNINGS AND ENDINGS

Aman Khilla
Mechanical Department

Each day is a struggle,
In the end is the beginning they say,
To get there is no child's play
Surpassing the indefinite is not less than a dream,
The dark of the night, a place to hide.
Yet, I dream, swept away
in the ocean of what could be!
My hopes lay rooted, away from the surface . Lost, awaiting their rescue.
I walk through the tunnel towards the light, Just this once I'll cross the divide
A sudden stop? A mental block?
Nothing but man's self- imagined plight!
Life is a series of change,
From the beginning's beginning to the end's end.
Amendments, adjustments.
Revision of oneself, modification of its ways
And I am lead to a new turn. No stops in my path,
Just a few bumps until I breathe my last.
Because after each day is the night,
Yet follows the light…

LULLABY

Brajabanshi Sahoo
Mechanical Department

Sing me a lullaby to death
Like the sound of the drizzle
Takes away my breath.
Show no reluctance to make it dreary,
It's all that my death is the cake
And your lullaby is the cherry.
It's a little request to be benevolent
Sing me a lullaby until
My demise makes you silent.
This piece of flesh forbids to part from soul
Only wants to collapse in your arms
Before you stop singing and start to condole.
So, it's time for you to sing a lullaby,
Set me free from all the pain
Promise, I'll sing you carols from the sky.

LOVE FOR NATURE

Bikash Parida
Mechanical Department

Nature expresses her stories of love of how much the thorns adores the rose
That he protects her from all troubles.
The birds keep staring at each other with never ending ardour. I walked by the sea and she whispered to me of how,
To the rhythms of moon dances the waves of sea
How much she love to shore,
Oh! They were always meant to be together!!
The story of how the sun dies into the darkest night,
TO LET HIS LOVE, THE MOON TO SHINE!
And when the sun sets down and the moon comes to rise, The eve becomes the most enchanting scene!

WE ARE ENGINEERS

Deepak Kumar Nayak
Mechanical Department

We the brain behind the beauty,

The soul behind the beast,

We have our own style with an extraordinary lifestyle,

We are the ghost with a subsequent nightmare,

We creat our own filmware.

We struggle against the forces of evil,we are

Civil.

We perform logical, we are Electrical.

We have our own tutor, we are Computer. We love to be single , we are Mechanical. We have water allergy, we are metallurgy. We use logical tricks , we are electronics.

We build the nation to fulfill your imagination.

We sleep in the morning and wake up in night,
From attendance to existence we fight.

We create the world,

We design the world,

We lighten the world,

We always work for invention with a better intention,

We the warrior and your dream carrier

We fill your carts with our beautiful arts, From corporate tank to private bank,

We exist.

LIFE IS PRECIOUS

Ayushman Bala
Mechanical Department

Life is so precious,
This we all know.
Live it wisly,
And let yourself glow.
Life is beauty, admire it
Life is dream, realize it
Life is a challeng, meet it
Life is a game, play it.
Life is a precious gift.
But it can be bitter sweet
Everyone makes choices
GOOD or BAD.
God gave us this gift,
This we all know,
Never take it for granted
Live it and grow.
Life is so short
Just a second in time
I will spend it wisely
For this time is mine.
THANK YOU LORD
For this gift you have given.
May be life isn't always easy
But i love living it anyway.
SO ENJOY
YOUR SPECIAL PRECIOUS LIFE,
Like a butterfly
In the sun.

FAULT

Rajesh Das
Mechanical Department

In the airport bar, I tell my mother not to worry. No one ever tripped and fell into the San Andreas Fault. But as she dabs at her dry eyes, I remember those old movies where the earth does open.

There's always one blonde entomologist, four deceitful explorers, and a pilot who's good-looking but not smart enough to take off his leather jacket in the jungle.

Still, he and Dr. Cutie Bug are the only ones who survive the spectacular quake because they spent their time making plans to go back to the Mid-West and live near his parents

While the others wanted to steal the gold and ivory then move to Los Angeles where they would rarely call their mothers and almost never fly home and when they did for only a few days at a time.

POETRY

Suvam Kumar Mishra
Mechanical Department

In the same way that the mindless diamond keeps
one spark of the planet's early fires
trapped forever in its net of ice,
it's not love's later heat that poetry holds,
but the atom of the love that drew it forth
from the silence: so if the bright coal of his love
begins to smoulder, the poet hears his voice
suddenly forced, like a bar-room singer's—boastful
with his own huge feeling, or drowned by violins;
but if it yields a steadier light, he knows
the pure verse, when it finally comes, will sound
like a mountain spring, anonymous and serene.
Beneath the blue oblivious sky, the water
sings of nothing, not your name, not mine.

THE GOOD LIFE

Aditya Nayak
Mechanical Department

When some people talk about money
They speak as if it were a mysterious lover
Who went out to buy milk and never
Came back, and it makes me nostalgic
For the years I lived on coffee and bread,
Hungry all the time, walking to work on pay-day
Like a woman journeying for water
From a village without a well, then living
One or two nights like everyone else
On roast chicken and red wine.

WAITING

Anita Nayak
Mechanical Department

The song I came to sing
remains unsung to this day.
I have spent my days in stringing
and in unstringing my instrument.

The time has not come true,
the words have not been rightly set;
only there is the agony
of wishing in my heart…..

I have not seen his face,
nor have I listened to his voice;
only I have heard his gentle footsteps
from the road before my house…..

But the lamp has not been lit
and I cannot ask him into my house;
I live in the hope of meeting with him;
but this meeting is not yet.

A HOUSE

Dipankar Parida
Mechanical Department

In 1906 the religious order of Franciscans finished building a new house for their order and moved in. They called it Greyfriars. It was spartan and remained so. By the 1920s the house was fed up with the monks' ideal of poverty; it was always cold and in disrepair.

In 1940 the house was commandeered by officers of the Black Watch. When the soldiers left in 1949, the house had learnt all it never wanted to know about debauchery in all its forms.

Greyfriars thought its days were numbered until 1956 when a couple bought it for a song and its happy days began. The new owners were Jackson and Elizabeth; known to all as Izzy and Jacks.

As Izzy's health deteriorated, Greyfriars was no longer spick and span. When dust clouds blew in sudden draughts, Jacks heard Izzy bellowing,

For fuck's sake, Jacks, get the bloody hoover, will you? He didn't bother with cleaning but concentrated on caring for Izzy, to the exclusion of all else. Now, once the home of laughter and the convivial visits of many friends, are no longer, Greyfriars is angry. Not only is the house dirty but its impatient for the joy of human companionship. It no longer finds consolation in happy memories of the love between Jacks and Izzy that blossomed within the safety of its walls.

In the early days of Izzy and Jacks' life in Greyfriars it fell in love with her finding her beautiful. It felt lucky that it was furnished with invisible access to her body in various states of dress and undress. It never watched as she and Jacks made love; that was taking privilege too far. More than this, it couldn't bear to watch them in bed together; that made it fearsomely jealous. But the cause of its love was not her body but her mind and vivacity.

When darkness in the house was at its worst, and loneliness crushed him, Jacks ventured into the garden. He knew he could escape Greyfriars, whilst it couldn't escape itself, except by demolition. He shudders at the thought; he loves the place as does Izzy. Little did he know of Greyfriars' passion.

Finally, as an elderly lady, she has a dangerous heart condition; in an emergency, Jacks places a tiny tablet under her tongue to save her life. One night, when Jacks is drunk, he can't find the bottle in time. Izzy dies in his arms in their bedroom. Enraged, the house sees her death as murder. Greyfriars takes revenge. It locks the bedroom door with Jacks trapped inside, who, hysterical at Izzy's death struggles to escape, frantic like a moth in a jar. The house makes every door and window impassable.

Belatedly, neighbours raise the alarm; there's been no sign of life in Greyfriars for weeks. Greyfriars opens its doors to the police who find Jacks' and Izzy's dead bodies. Greyfriars gives up the ghosts of those it has loved and lost. Six months later it's a ruined corpse

ଓଡିଆ
ବିଭାଗ

ଆତ୍ମନେପଦୀ

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ମୋତେ ଭଲ ଲାଗେନା ଜେମାମଣି କାନ୍ଦଣା ଗୀତ
ଭଲ ଲାଗେନା ଥାଳ ଧରି ମାରିବା କୁହାଗ
ଚାହେଁନା ଛାତି ଚିରି ମାଂସ ବିଦାରି ଦେଖାଇବା ରକ୍ତ
ବରଂ, ଲୁହ ଗୋପେ ହେଇ ରହିଯିବା କା' ଆଖିରେ
ସେଇ ମୋର ଭାଗ୍ୟ !
ଜୀବନସାରା ତ କେତେ ଲୁହ ପୋଛିଦେଇଚି ପାପୁଲିରେ
କେତେ ଲୁହ ଶୁଖିଯାଇଚି ଆଖିପତାରେ
ତା'ର ହିସାବ ନେବା ପାଇଁ ସମୟ କାଇଁ ଯେ !
ଯୋଉମାନଙ୍କୁ ଭାବିଲି ନିଜର ବୋଲି
ଆଦର କଲି, କୋଳେଇ ଧରିଲି,
ସେମାନେ ଯେ ମୋତେ ଶକ୍ତ ଆଘାତ ଦେବେ
ଛାତି ମୋର କୋରିନେବେ ବିଶ୍ୱାସଘାତକତାର ଛୁରୀରେ
ମୁଁ କ'ଣ ଜାଣିଥିଲି ?
ଜାଣିଥିଲେ ବି କ'ଣ କରିପାରିଥାନ୍ତି ?
ସେମାନେ ଯେ ହଳଦୀବସନ୍ତ ପରି ଚୋରାଇ ନେଇଥିଲେ ମନ
କୋଇଲିର ଲଳିତ ସ୍ୱରରେ ଛନ୍ଦିଥିଲେ ପ୍ରାଣ
ରଜନୀଗନ୍ଧା ପରି ମହକାଇଥିଲେ ରାତିର ଅଙ୍ଗନ
ଛୁଇଁଥିଲେ ସଂଭ୍ରମରେ ଯେମିତିକା ଭୋର୍‌ର ପବନ
ସେମାନେ ଯେ ଆସୁଥିଲେ ଯାଉଥିଲେ ମାୟାଲୋକେ
ବଦଳାଇ ନିମିଷକେ ରୂପରଙ୍ଗ ଚେହେରା ଚରିତ୍ର
ବଦଳୁଥିଲା ଋତୁଚକ୍ର, ପାଣିପାଗ ଘନଘନ
ଜାଣି ବି ହେଉ ନ ଥିଲା କିଏ ଶତ୍ରୁ ଅବା କିଏ ମିତ୍ର !
ଛଳନାର ଛଟା ତଳେ ମୁଖାପିନ୍ଧା ମଣିଷଙ୍କ ନାଚ ! କାହାକୁ ପାରିବ ଚିହ୍ନି,
କାହାର ଯେ ନାହିଁ ଆଗପଛ କିଏ ସେ ମାରିଲା ଛୁରୀ କଅଁଳ କଥାର ଲହରେ
ଜାଣିବା ସହଜ ନୁହେଁ, ଯଦିଓ ମୁଁ ଜୁହୁବୁହୁ ରକ୍ତରେ ।
ସାରା ଜୀବନ ଏମିତି କ୍ଷତମାନଙ୍କୁ ପୋଛି ବଞ୍ଚିବା ଶିଖିଚି
ବାହୁ ନି କେବେ କହିବାକୁ କେମିତି ବଞ୍ଚିଚି
ଶୁଖି ଯାଇଥିବା ଆଖିପତାର ଲୁହକୁ ଦେଖି ଯଦି କେହି
ବୁଝି ପାରିଲା ଦୁଃଖ ମୋର, ଯଥେଷ୍ଟ ତାହା ହିଁ ।

ନଦୀ

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ଏ ମଣିଷ ସିନା
ଅଗକାଏ ନଦୀକୁ, ବାନ୍ଧେ ବନ୍ଧ
ଅନ୍ୟର ଦାବିକୁ କରେ ପ୍ରତ୍ୟାଖ୍ୟାନ
ନଦୀ କେବେ କାହାକୁ କରିନି ମନା
ତା ଦେହରେ ବୁଡି ଗାଧେଇବାକୁ
ତା ଜଳକୁ ନେଇ କ୍ଷେତରେ ମଡାଇବାକୁ ଅବା ତାକୁ ନେଇ ଶୋଷ
ମେଣ୍ଟାଇବାକୁ ।
ମଣିଷ କଥା ଛାଡ
ସେ ତ ଆଉ ମଣିଷ ହୋଇ ରହି ନାହିଁ ଯେ ତା ଠୁ ଆଶା କରିହେବ କିଛି
ନିର୍ଜୀବ ହେଲେ ବି ଏ ନଦୀର ବରଂ ଅଛି ହୃଦୟ
ତା ପାଖରେ ବସିଲେ ଯାଇ
କୁଳୁକୁଳୁ ଶବ୍ଦରେ ସେ ଦିଏ ଆଶ୍ୱାସନା
ଶୀତଳ ପବନରେ ସାଉଁଳି ଦିଏ ଅଲରା କେଶ ।
ଏ ମଣିଷ ସିନା ପାଣିରେ ମିଶାଏ ବିଷ
ଏ ମଣିଷ ସିନା ତାରି ରକ୍ତରେ
ନଦୀକୁ କରେ ଲାଲ୍ ।
ଏ ନଦୀ ତାର ସେମିତି ବହି ଚାଲିଥାଏ ନିର୍ବିବାଦରେ
ଯେ ଯାଏ ବୋହି ଯାଇନି ତା ଦେହରୁ ସେ ବିଷ
ଯେ ଯାଏ ପୁଣି ନୀଳ ନ ହୋଇଚି ତାର ପାଣି ।
ଏ ନଦୀର ବି ଖୁବ୍ ଧୈର୍ଯ୍ୟ
ନିହାତି ତାକୁ ନ ବାଧିଲା ଯାଏଁ
ସେ ବହି ଚାଲିଥାଏ ତାର
ଗାଇ ଗାଇ କୁଳୁକୁଳୁ ଜୀବନ ସଙ୍ଗୀତ ।

ଯୁଦ୍ଧ ପାଇଁ ଗୋଟେ କବିତା

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ଜିତିଲେ ରାଜ୍ୟ ଭୋଗ
ମଲେ ପ୍ରେତପୁରୀ ନ ଯାଇ
ସିଧା ସ୍ୱର୍ଗ
ତମ କଥା ତ ସେମାନେ ମାନି ଥିଲେ
ଏ ଥିଲାଗି କମ୍ ଭୋଜ ବିଦ୍ୟା ତମେ ନ ଦେଖେଇଛ
ନିଜ ପାଗିରେ ଖେଳେଇଛ ଗୋଗେ
ବହ୍ମାଣ୍ଡକୁ
କେହି ଏଠି ମରନ୍ତିନି ପ୍ରମାଣ ଦେବାକୁ
ତମେ ଜିତିଲ ନା ହାରିଗଲ
ଏହି ଅସମାହିତ ପ୍ରଶ୍ନ ଏବେ ବି ଲାଖି ରହିଛି
କଣ୍ଟା ପରି ଟଂଗି ପାଖରେ ଅନେକଙ୍କର
ଜିତିବା ପରେ କାହିଁକି ହୋଇଗଲେ ଏତେ ବିଷାଦଗ୍ରସ୍ତ
ବିଜେତାମାନେ
କୁଆଡ଼େ ଗଲା ଆକୁମାରୀ ହିମାଚଳ ଶାସନ କରିବାର
ଆତ୍ମପ୍ରସାଦ
ରକ୍ତ ନଦୀରେ ଭାସୁଥିବା ଅବୋଧ ଭବିଷ୍ୟତର ଶବ
କେବଳ ବୋହି ନେଇପାରେ ନିଜ ହକ୍ ପାଇଁ ଲଢୁଥିବା
ଜଣେ ରାଜାର
ଅଗଣନ ବିଧବାଙ୍କ ଲୁହ ଆଉ ଦୀର୍ଘଶ୍ୱାସରେ ତିଆରି
ଶିଆଳି ଲଗାରେ ତମେ ଦେହତ୍ୟାଗ କଲ
ଜାରାଶବର ନିମିତ୍ତ ମାତ୍ର
କେଉଁ ସ୍ୱାମୀହରାର ଆଖି ଲୁହ ପୋଛି କହିପାରିଲ
କାହିଁକି କାନ୍ଦୁଛ ଏ ଆତ୍ମା ପରା ଅବିନାଶୀ
କାହିଁକି ପୋଛି ପକେଇଲ ସିନ୍ଦୂର
ଭାଙ୍ଗିଦେଲ ତମ ଶଙ୍ଖା
ପିନ୍ଧ ପିନ୍ଧ
ରାହା ଧରି କାନ୍ଦୁଥିବା ଶିଶୁଙ୍କୁ କ'ଣ ପାଗିଖୋଲି ଦେଖେଇପାରିଲ
ହେଇ ଦେଖୁନ ତମ ବାପ ମାନେ ବଂଚିଛନ୍ତି
ମୃତ୍ୟୁ ଖାଲି ମିଛ ଖେଳ !
ଶାନ୍ତିର ବାର୍ତ୍ତା ବହନ କରି ଉଡିପାରିଲାନି
ଗୋଟିଏ ବି କପୋତ ଆକାଶରେ
ରକ୍ତନଦୀ ନୁହେଁ ରକ୍ତାକ୍ତ ଇତିହାସଟିଏ ଲେଖାଗଲା ତମରି ପାଇଁ
କାଳର କପୋଳରେ
ରକ୍ତ କମଳ ର ଆରକ୍ତ ପାଖୁଡ଼ାରେ !

ପ୍ରେମ ନାଆଁରେ

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ପାଗଳାମି ବୋଧେ ମୋ ରକ୍ତରେ ଅଛି
ଦୁନିଆର କୋଉ ନାରୀ
ସେମିତିକା ପ୍ରେମ ଦେଇପାରେ
ଯାହା ଭାଙ୍ଗି ଦେଇପାରିବ ମୋ କଲିଜାର ବେହୋସି ।

ହୁଏତ ମୋ ହୃଦୟ ଧସି ଯାଇପାରେ
ଅତଡ଼ା ପରି ଭରା ନଈକୁ
କିନ୍ତୁ ସହଜରେ ଭାସିଯିବନି ସୁଅରେ
ଦେଖୁ ଦେଖୁ ସଦର୍ପେ ମୁଁ ପାହାଡ ପରି ଛିଡ଼ା ହେବି ।

ବିଜୁଳି ଠୁ ଆହୁରି ଉଗ୍ର, ଆହୁରି ଉନ୍ମତ୍ତ ମୋର ପ୍ରେମ
ଯୋଉ କେଳା ଚୋଗ ଖାଇ ବି ସାପକୁ
ନିର୍ଦ୍ଧୁମ ନଚେଇ ପାରେ
ସେଇ କେଳା ମୁଁ ।

ଗରମ ପେଜର ବାଙ୍ଗ ପରି
ଚନ୍ଦ୍ରର ସିଲ୍‌ଭର୍ କଂସାରେ
ଚମକେ ମୋର ରେତ
ମରଣର ମୁହଁ କଇଁଥା ପଡ଼ିଯାଏ
ମୋର ଚତଲା ଚୁୟନରେ ।

ଅରଣ୍ୟର ନିର୍ଜନତା ଠୁ ଆହୁରି ନିର୍ଜନ
ମୋର ପ୍ରେମିକ ଅହଙ୍କାର
ପ୍ରପାତ ଜଳଠୁ ଆହୁରି ଉଦଣ୍ଡ
ମୋ ପାଦର ମହବଳୀ ଲଙ୍ଗ ।

ପୀଡ଼ା ବୋଧେ ଜାଣେନା
ଛାତିର ବାହାରେ ବି
ରହିପାରେ ଜୀବନର ଅନେକ ଦହନ
ପତ୍ର, ଫୁଲ ଫଳଙ୍କ ଅଗୋଚରରେ
ରହିପାରେ ଗଛର ନଗ୍ନ ହେବାର ଦୁଃଖ ।

ଜୀବନର ଗୋଗେ ଗୋଗେ ବିଶ୍ୱାସଘାତକତା
ବନାଗ୍ନିର ଜ୍ୱାଳା ଠାରୁ ଆହୁରି ଉତ୍ପୀଡକ !
କାକର ବୁନ୍ଦା ଭିତରେ ଲୁଚି ଥାଏ
ତାକୁ ଚାଗି ନେବାକୁ ସମୁଦ୍ରର ଶୋଷ ।

ଆଜିଯାଏ ମୋ ଭିତରର ପାଗଳାମିକୁ
କେହି ଦୂରେଇ ପାରିନି
ମୁଁ ଚାହିଁଲେ ଝଡ଼ର ଗାଆଁଶା କେଶକୁ
ଭିଡ଼ି ଭିଡ଼ି ବୁଲି ଆସିପାରେ ଆକାଶ ପାତାଳ ।

କାଳେ କାଳେ ପ୍ରେମ ନାଁରେ ଲୁହ ବୁନ୍ଦାସବୁ
ଚୁପ୍‌ଚାପ୍ ଝରିଯାଇଛି ବିନା ପ୍ରତିବାଦରେ
କିନ୍ତୁ ତାହା କେବେ ଭୁଲି ହୁଏନି
ଯାହା ଚତଲା ଚେଙ୍କ ପରି ଛାତିରେ ଫସି ରହିଛି !

ନିଦ

Jitendra Patra
Mechanical Department.

ଗୋଟେ ସୁନ୍ଦର ଓ ନିବିଡ଼ ନିଦ ଲୋଡ଼ା
ନିଦ ଭାଙ୍ଗିଲା ବେଳକୁ
ଶ୍ୟାମଳ ଦିଶୁଥିବ ଚାରିପାଖ
ଫୁର୍ତ୍ତିରେ ଫୁଲ ଫୁଟୁଥିବ
ଆମ୍ଭର ଆନନ୍ଦ ଆଙ୍କୁଥିବ ସ୍ୱପ୍ନ
ଅଜସ୍ର ଅଯୁତ

ମିଳେ କି ଏମିତି ନିଦ ?
ସ୍ୱାମୀର ସହସ୍ର ଅଭିଯୋଗ ବୋହୁ ବୋହୁ
ପିଠିରେ ଗୋଟେ କୁଜ
କେବେ ଝିଅର ବାହାଘର
କେବେ ପୁଅର ଦୂରତା
ବୋହୂର ବେଖାତିର୍ ଭାଙ୍ଗୁଥାଏ
କାଲିର ଭରସା
ପୁଣି କେବେ ଆତ୍ମୀୟଙ୍କ ଅବିଶ୍ୱାସ
ପଡ଼ୋଶୀର ଅବୁଝାମଣା

ସତ କୁହ
ଏମିତିରେ ନିଦ ହୁଏ ତମକୁ
ସତ-ସତିକା !
ନା ଅଳସ ଭାଙ୍ଗି
ହାଇ ମାରି
ଆଙ୍ଗୁଠିରେ ଚୁଟ୍‌କି ଫୁଟେଇ
ଅନିଦ୍ରା ଆକ୍ରାନ୍ତ ଜୀବନ
ଅଭିନୟ କରୁଥାଏ ନିଦର
ମିଛିମିଛିକା !

ସଂଘର୍ଷରେ ସରିଗଲା ତିନି ଭାଗରୁ ବେଶି
ଭାଗେ ବି ବଳକା ନାଇଁ ଆଉ
ଏଥର ଚାଲ ଦେଖିବା
ଗଛଙ୍କର ସାବ୍‌ଜା ହସ
ଶୁଣିବା ପାହାଡ଼ ଛାତିର କୁଳୁକୁଳୁ
ଲେସିହେବା ଜହ୍ନଗାତି
ଆସୁ କି ନଆସୁ ନିଦ
ନିଦକୁ ଭରସା କରି
ନିଦ ବିଶ୍ୱାସରେ
ଆସ ଶୋଇଯିବା
ବହୁତ ହେଲାଣି ରାତି !

ନିଆଁ

Ashutosh Malla
Mechanical Department.

ମରମକୁ ବାଧେ ଲୋ ସ୍ୱର୍ଣ୍ଣାମ୍ବରୀ
ସୁନା ସବୁ ମାଟି ହେଇଗଲା

ସବାଖାଇ ପେଟକୁ ତୋର କିଛି ବି ଅଣ୍ଟୁନି
ପୁର୍ଥା ତ ଦଶମାସର ଗର୍ଭ ଧରିଲାଣି
ତୋ ପେଟ କାହିଁକି ପୁରୁନି ଯେ !

ରାତିପାଣି ପିଇପିଇ ଜୁଆନ୍ ହୁଏ ମନଅରଣ୍ୟ
ଛାତିରେ ଝୁଲେ ବାଘନଖି ଲକେଟ୍ ହେଇ ଦିନନିଆଁ ।

ନିଦ ତ ନେଇଗଲା ସେ ସୂର୍ଯ୍ୟବର୍ଣ୍ଣ ପାଟ
ପିଇଗଲି ଠାକୁରାଣୀ ଝୁଣା ଧୂଆଁ, କର୍ପୂର ନିଆଁ
କହିଲେ ନାଗିବି କାଳିସି । ଉଠ୍ ନାର୍
ନାଚିଲି ବେଧଡ଼କ ଆସିବା ଯାଏଁ ତିନ୍ତିଆଣି ମେଘ ।

ହଁ ଟିକକରେ ମୋ ସରକାର ଚୁଲି ଜଳେ
ମନସୁଖ ମାଟିଆଳ ମାଟି ମୂର୍କି ମୋହର ମାରେ
ଆମ ପାରିଲା ପଣିଆର ନଥାଏ ଗଣତି
ଥାଅ କୁଶଳରେ କହିବାକୁ ନେଉଟେନି ଜିଭ
କେତେ ଆଉ ଦେଖିମି ତୋ ପାଇଁ ସ୍ୱପ୍ନ
ରହ ଟିକେ ଚୁମୁଟି ସାରେ ନିଜକୁ ।

ନିୟମକାନୁନ ଭିତରେ ଆଦବକାଇଦାର ଖେଳ
ଧନରେ, ହଅ ନି ଅସମ୍ଭାଳ
ଦେଖିବୁ ଆଣିଦେବି ଚିତ୍ରିତ ସକାଳ
ଠେକାଟେ ଭିଡ଼ିଛି ତ ମଥାରେ ।

ଦି ଶହ ଛ ଖଣ୍ଡ ହାଡ଼ ମିଶେଇ ତିଆରିଛି ଦଣ୍ଡ
ଟେକି ଦେଇଛି ମଥାନକୁ ପୋଇଁବାକୁ ତେଜ
ଦ୍ୱାହି ମାନବତାର, ହସ୍ତେ ଥିବ ଶାନ୍ତି ଦଣ୍ଡ
ଦେଖିବୁ-
ପୂରିବ ସେ ହିରଣ୍ମୟ ଗର୍ଭ ।

ଅନ୍ଧ ମଣିଷ

Rahul Kumar Patra
Mechanical Department.

ବିଶ୍ୱାସ ଘାତକତାର ବାରୁଦ ଗଦାରେ ଠିଆ ହୋଇଥାଏ,
ଘୃଣାର ଚଷମା ପିନ୍ଧି, ରଙ୍ଗଚକ୍ଷୁ ଅନ୍ଧ ମଣିଷ ।
ଦରବାର ବସିଥାଏ କିପରି ଦଖଲ କରି ହେବ ସାରା ବିଶ୍ୱ
ଲୋପ କରି ସବୁ ଧର୍ମ, ସଂପ୍ରଦାୟ, ଗଢ଼ିବାକୁ ଜିହାଦୀ ସାମ୍ରାଜ୍ୟ
ଆତଙ୍କରୁ ସୃଷ୍ଟି ହେବ ମଣିଷର ରଙ୍ଗ ହୋରିଖେଳ
ଅନ୍ଧ ମଣିଷର କଣ୍ଠରୁ ଶୁଭିବ ମୃତ୍ୟୁର ହୁଙ୍କାର ।

ତା ର ହସ୍ତେ ଥିବ ଚକ୍‌ମକ୍ ବାରହାତ ଛୁରୀ
କେତେ ହେବ ଉଲ୍ଲସିତ ମଣିଷର କଟାମୁଣ୍ଡ ଧରି
ବିସ୍ଫୋରଣ ସଂହାରରୁ ବର୍ତ୍ତିବେନି ଶ୍ରାନ୍ତି ପ୍ରିୟ ଲୋକେ
ତା ଦୃଷ୍ଟିରେ ତାର ଧର୍ମ ନିୟମକାନୁନ୍ ଏକମାତ୍ର ସତ୍ୟ ।
ରାସ୍ତାରୁ ହରଣ ହେବେ ପୁଣ୍ୟମୟୀ ନାରୀ
ବନ୍ଦୀ ହେବେ ଅନ୍ଧ ମଣିଷର ଅଯ୍ୟସଖାନାରେ ।

ଏଇ ମଣିଷମାନେ ନାରୀକୁ ଦିଅନ୍ତି ନାହିଁ ବାକ୍ ସ୍ୱାଧୀନତା
ଦିଅନ୍ତିନି ପଢ଼ିବାର ଅଧିକାର, ଜୀବିକା ନିର୍ବାହ
ନାରୀ ଖାଲି ପଣ୍ୟ ପରି, ସନ୍ତାନର ଉତ୍ପାଦନକାରୀ
କଳା ଚଦରରେ ଢଙ୍କା, ନାଯିକାରେ ବିଳାସ କକ୍ଷର
ମଣିଷର ଗଣା ହୁଏ ନାହିଁ, ଜନ୍ମଦେବା ତାର ଅଧିକାର
ଅଖୋଜା ଅଲୋଡ଼ା ହୁଏ, ତ୍ରାହି ନାହିଁ ଯୌନ ଶୋଷଣର ।

ଅଖୋଜା ଅଲୋଡ଼ା ହୁଏ ରୂପ ତା ର ଢଳିଗଲେ
ପାଏ ନାହିଁ ସନ୍ତାନର ସ୍ନେହଶ୍ରଦ୍ଧା, ସମାଜରେ ସ୍ଥାନ ।
ଯେ ଅନ୍ଧ ମଣିଷମାନେ ଅଧିକାର ସବୁ ସଂପଦର
ପାଟି ଫିଟଇଲେ ଗୁଳି, ମୃତ୍ୟୁଦଣ୍ଡ, ପ୍ରାଣ ସଂହାରର ।

ଅନ୍ଧ ମଣିଷଙ୍କ ଦେଶେ ପ୍ରେମ କରିବାଟା ପାପ
ଧରାହେଲେ, ରାସ୍ତାକଡ଼େ ଝୁଲେ ମୃତ ଦେହ
ନାରୀ ହୋଇ ଜନ୍ମହେବା ମହାପାପ, ପୁରୁଷ ହିଁ ଶକ୍ତିର ଆଧାର
ଅନ୍ଧ ମଣିଷର ଭୋକ ଗ୍ରାସିବାକୁ ତା ଧର୍ମର ତାତିଲା ଲୁହାରେ
ଭାଙ୍ଗିବାକୁ ଚାହେଁ ସିଏ ଛଦ୍ମବେଶେ ଶାନ୍ତିର ସାମ୍ରାଜ୍ୟ ।
ବିଶ୍ୱ ସାରା ଖୋଲିଦେଇ ସ୍ଥାନେ ସ୍ଥାନେ ସେମାନଙ୍କ ପ୍ରଚାରର ପୀଠ
କ୍ରମେ କ୍ରମେ ଗ୍ରାସୁଥାନ୍ତି ଶାନ୍ତିପ୍ରିୟ ଜନତା ହୃଦୟ ।
ଏଇମାନେ ସବୁଠାରୁ ବଡ଼ ଭୟ ଆତଙ୍କର ପ୍ରଚାରକ
ଧ୍ୱଂସକାରୀ ଏକୋଇଶ ବିଶ୍ୱ ମଣିଷର ।

କବିତାର କଥା

Dayanidhi Samal
Mechanical Department.

କବିତା ମୋ କଥା କହେ ଲାବଣ୍ୟବତୀର
କବିତା ବି କଥା କହେ
ଆମ ଗାଆଁ ଗ୍ରହଣଖଣ୍ଡି ଲବଣୀ ବେଓ୍ୱାର ।
କବିତା ମୋ ଖୁଲଣା ସୁନ୍ଦରୀ
କେବେ ପୁଣି ଯୋଗୀର କେନ୍ଦରା ସୁରେ
କାନ୍ଦଣା ଲହରୀ
କବିତା ମୋ କେତେବେଳେ
ଉଦ୍ଧବକୁ ଭାଗବତ ଅର୍ଜୁନକୁ ଗୀତା
କବିତା ମୋ କଥା କହେ
ଅତି ମାନସର
କେବେ ପୁଣି ପେଟ ଚାଖଣ୍ଡକ ପାଇଁ
ଧୂଳିମାଟି ତେଲଲୁଣ ଚିନ୍ତା ।

କବିତା ମୋ କଥା କହେ ସାତତଳ ପ୍ରାସାଦର
ଚର୍ବ୍ୟ ଚେଷ୍ୟ ଲେହର ସିଙ୍ଗୋନୀ
କେବେ ପୁଣି ଦରିଦ୍ର କୁଟୀରେ
ଅନ୍ନ ମୁଠେ ପାଇଁ ; କାନ୍ଦୁଥାଏ ବାହୁନି ବାହୁନି ।
କବିତା ବନ୍ଦିନୀ କେବେ ଅଶୋକ ବନରେ
କେବେ ଇରାନୀ କିଶୋରୀ ସହକାର ତଳେ
କବିତା ଶିଖାଏ ଜନ୍ମମୃତୁର ରହସ୍ୟ
ସିଏ ପୁଣି ଉପବାସୀ ମନେ
କାର୍ତ୍ତିକର ପଂଚୁକ ହବିଷ୍ୟ

ହେଲେ...
କବି ଓ କବିତା ମଧ୍ୟେ ବଢ଼ିଚାଲେ
ଯେତିକି ଦୂରତା
ପାଠକ ପାଇଁ ପରଶେ ସେତିକି ଶଠତା
ଏଣୁ କବିତାର ବାର୍ତ୍ତା ବନ୍ଧୁ କାନ ଡେରି ଶୁଣ
ଛୁଇଁ ଯାଉ ଦେହମନ ତୁମ ପଂଚପ୍ରାଣ ।

हिन्दी

बिभाग

लगता है ये संसार बस ससांर है

Ranjit Das
Mechanical Department

कभी लगता है इस जिन्दगी में खुशियां बेशुमार है,
तो कभी लगने लगता है जिन्दगी ही बेकार है।
कभी लगता है लोगो में बहुत प्यार है,
तो कभी लगता है रिश्तों में सिर्फ दरार है ।
कभी लगता है हम भी जिन्दगी जीने के लिए बेकरार है ,
तो कभी कभी लगता है सिर्फ हमे मौत का इंतजार है ।
कभी लगता है हमको भी उनसे प्यार है,
तो कभी लगता है सिर्फ प्यार का बुखार है।
कभी लगता है शायद उनको भी हमसे इजहार है,
फिर लगता है हम दोनों में तो सिर्फ तकरार है ।
कभी लगता है सब अपने ही यार है,
फिर लगता है इनमें भी छिपे गद्दार है ।
कभी लगता है कितना प्यारा संसार है ,
तो कभी लगता है ये संसार बस संसार है ।

अपनी तुलना दसूरों से न करे

Biswajit Jena
Mechanical Department

एक बार की बात है,किसी जंगल मेंएक कौवा रहता था, वो बहुतही खुशथा, क्योंकक उसकी ज्यादा इच्छाएंनहींथीं।वह अपनी जजंदगी सेसंतुष्ट था, ले ककन एक बार उसने जंगल मेंककसी हंस को देख ललया और उसे देखतेही सोचनेलगा कक येप्राणी ककतना सुन्दर है,ऐसा प्राणी तो मैं नेपहले कभी नहींदेखा! इतना साफ और सफेद। यह तो इस जंगल मेंऔरों से बहुतसफेद और सुंदर है,इसललए यह तो बहुतखुशरहता होगा।

कोवा हंस केपास गया और पछूा, भाई तुमइतनेसुंदर हो, इसललए तुमबहुतखुश होगे?

इस पर हंस ने जवाब ददया, हांमैंपहलेबहुतखुशरहता था, जब तक मैं नेतोतेको नहीं देखा था। उस देखनेकेबाद सेलगता हैकक तोता धरती का सबसेसुंदर प्राणी है।हम दोनों केशरीर का तो एक ही रंगहैले ककन तोते केशरीर पर दो-दो रंगहै,उसकेगलेमें लाल रंग का घेराऔर वो सूखखहरेरंगका था, सच मेंवो बेहद खूबसूरत था।

अब कौवे नेसोचा कक हंस तो तोतेको सबसेसुंदर बता रहा है,तो कफर उसेदेखना होगा। कौवा तोतेकेपास गया और पूछा, भाई तुमदो-दो रंगपाकर बड़ेखुशहोगे?

इस पर तोतेनेकहा, हांमैंतब तक खुशथा जब तक मैं नेमोर को नहींदेखा था। मेरेपास तो दो ही रंगहैंले

ककन मोर केशरीर पर तो कई तरह केरंगहैं।

अब कौवे नेसोचा सबसेज्यादा खशुकौन है,यह तो मैंपता करकेही रहूंगा। इसललए अब मोर सेलमलना ही पड़ेगा। कौए नेमोर को जंगल मेंढूंढा ले ककन उसे पूरेजंगल में

एक भी मोर नही लमला और मोर को ढूंढते-ढूंढतेवह चचड़ड़याघर मेंपहुंचगया, तो देखा मोर को देखनेबहुतसेलोग आए हुएहैंऔर उसकेआसपास अच्छी खासी भीड़ है।

सब लोगों केजानेकेबाद कौवेन मोर सेपछूा, भाई तुमदनुनया केसबसेसुंदर जीव हो और

रंगबबरंगेहो, तुम्हारेसाथ लोग फोटो खखचंवा रहेथे।तुम्हेंतो बहुतअच्छा लगता होगा और

तुमतो दनुनया केसबस खुशजीव होगे?

इस पर मोर ने दखुी होते हुएकहा, भाई अगर सुंदर हूंतो भी क्या फकखपड़ता है!मझेुलोग

इस चचड़ड़याघर मेंकैद करकेरखतेहैं, ले ककन तुम्हेंतो कोई चचड़ड़याघर में कैद करकेनहीं

रखता और तुमजहा ंचाहो अपनी मजी सेघूम-कफर सकतेहो। इसललए दनुनया केसबसे

संतुष्ट और खुशजीव तो तुम्हेंहोना चादहए, क्योंकक तुमआज़ाद रहतेहो। कौवा हैरान रह गया, क्

योंकक उसकेजीवन की अहलमयत कोई दसूरा बता गया। दोस्तों, ऐसा ही हम लोग भी करतेहैं

। हम अपनी खुलशयों और गुणों की तुलना दसूरों सेकरतेहैं, ऐसेलोगों सेजजनका रहन-सहन का माहौल हमसे बबलकुल अलग होता है।हमारी जजंदगी में

बहुतसारी ऐसी चीज़ेंहोती हैं , जो केवल हमारेपास हैं

, लेककन हम उसकी अहलमयत समझकर खुशनहींहोते।ले ककन दसूरों की छोटी ख़शुी भी हमेंबड़ी लगती है, जबकक हम अपनी बड़ी खलुशयों को इग्नोर कर देतेहैं।

भ्रम

Sourav Samal
Mechanical Department

बंध गई है जिंदगी हमारी इन मोबाइल और भ्रम की दुनिया में
असली दुनिया से डरने लगे हैं षायद
समझा लिया है खुद को कि ये दुनिया बड़ी खूबसूरत है
पर कहीं न कहीं ये डर भी है कि क्या होगा तब जब ये सपना टूटेगा
असल दुनिया इतनी भी खराब नहीं, बस एक नया नज. रिया लगेगा
संघर्श किसके नसीब में नहीं,
पर क्या इससे भागना सही है?
सच तो हम सब को पता है,
पर क्या इसे बार बार नकारना सही है?
फोन पर सारी दुनिया देख ली है
पर क्या कभी एक कोयल को घोंसला बनाते देखा है?
सारी दुनिया का ज्ञान संजोये बैठे हैं
पर क्या कभी एक हिरन को अपनी जान बचते हुए देखा है?
भावना उसमे हमसे ज्यादा होती है अपने परिवार के लिए
क्योंकि जुबान लाजमी नहीं होती उन्हें जताने के लिए
यूं तो हजारों पन्ने भर दिए होंगे व्हाट्सप्प की बातों में
पर क्या कभी आँखों का इस्तेमाल किया कुछ बताने के लिए
गाँव की षांत दोपहर में दोस्तों के साथ पेड़ों पर झूल कर तो देखो
दुनिया फिर से सुन्दर लगेगी ,फिर एक नयी उमंग जग. `गी संघर्श की
जरा इस भ्रम को मिटा कर तो देखो
जरा फोन से नज़रें हटा कर तो देखो

आषावादी कविता

Surya Kanta Majhi
Mechanical Department

तू रह आषावादी सदा
तू कर निराषा को खुद से जुदा
नहीं है कुछ मुष्किल जग में
ये बात रखना तू सदा अपने मन में ।।

होगा वही जो तू चाहेगा
पूरा विष्व तेरी वाह वाह गाएगा
नहीं है कुछ मुष्किल जग में
ये बात रखना तू सदा अपने मन में ।।

तू हर मोड़ पर चुनौतियों से टकराएगा
पर रह कर आषावादी तू पुनः संभल जाएगा
मंजिलें सभी होंगी तेरे बस में
नहीं है कुछ मुष्किल जग में
ये बात रखना तू सदा अपने मन में ।।

सफलता की सीढियों पर तू स्वतः ही चढ़ जाएगा
जब होगी तेरे भीतर आषा तू असफलता से नहीं घब. राएगा
बस रख याद कि
नहीं है कुछ मुष्किल जग में
ये बात रखना तू सदा अपने मन में ।।

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