JAN-JUNE ISSUE
VOL-4, 2023

NIET
Greater Noida
GET FUTURE READY
Estd.2001
AN AUTONOMOUS INSTITUTE

MECHAZINE

SCHOOL OF MECHANICAL ENGINEERING

THE TECHNICAL BULLETIN

EXCLUSIVE COVERAGE

ARVR Technology

Metaverse: A New World of Opportunities Beyond Reality

...Story @ Page 07

VISION

The department envisions to be recognized globally for its outstanding technical education and research & consultancy capabilities to ethically address the ever-changing Socio-Global issues.

MISSION

M1 To develop state-of-the-art industry aligned research facilities to provide opportunities to interpret, apply, disseminate and create knowledge.

M2 To inculcate a culture of upgrading the knowledge and skills of human resources through Self-learning, E-learning and Training activities

M3 To equip the students with academic, corporate and entrepreneurial leadership, communication skill and global awareness as required by the engineering profession and society in general.

M4 To establish an environment that encourages and builds an exemplary degree of citizenship, professional and personal integrity and ethical behavior.

EDITORIAL COMMITTEE.....

CONTENTS

MECHAZINE

MESSAGE FROM HONOURABLE MANAGEMENT

Success is not a one-shot process. It is the result of a continuous improvement after each failure.

" कर्म ही दीन है। कर्म ही ईमान है।
कर्म ही पूजा है। कर्म ही धर्म है। "

Dr. O. P. Agarwal
MANAGING DIRECTOR

We believe in valuing the 21st century education system. Today, when education is going through a sea change, we leave no stone unturned to match our pace with emerging trends & newer technologies. My best wishes to the Department of Mechanical Engineering for the fourth issue of their Departmental Technical Magazine.

Dr. Neema Agarwal
ADDITIONAL MANAGING DIRECTOR

NIET has been helping its students to write their own stories since its inception. Committed in providing the best jobs by creating life-changing educational opportunities and collaborative learning environment. I congratulate the Mechanical Engineering Department for their 4th and consecutive Technical Magazine.

Mr. Raman Batra
EXECUTIVE VICE PRESIDENT

Proactive scanning of the recent development in technology space, early identification of upcoming needs of the industries and a curriculum designed for holistic development of the students and meticulous execution of the teaching and learning process are the hallmark of our value chain to deliver "Industry ready professionals".

Mr. Praveen Soneja
DIRECTOR GENERAL

We motivate our students to dream big and ensure that right spirit and necessary talent are inculcated in the students to help them realize their objectives. We also continuously strive to instil ethical values in our wards so that they become responsible citizens of the future.

Dr. Vinod Mansiram Kapse
DIRECTOR

FROM THE PEN OF CHIEF EDITOR

Dr. D.R. SOMASHEKAR
DEAN (ADMIN) &
HOD - SME, NIET

The impact of Artificial Intelligence (AI) and Machine Learning (ML) on employment has been a subject of intense debate and speculation in recent years. While AI/ML technologies offer tremendous opportunities for innovation and efficiency across various industries, they also pose significant challenges and changes to the job market.

On July 21, the Ministry of electronics and information technology said that the advent of Artificial Intelligence was not causing any job losses and was really on pace to improve India's Gross Domestic Product. The IT minister also said the AI/ML is being used as a tool for augmenting capability of skilled man power. But it is sure AI/ML may result in automating some routine jobs but will also result in job creation in various technologies. Meanwhile, Gartner's research indicates that out of the 10 lakh registered companies in India, a remarkable 75% are either investing or planning to invest in the field of Big data. Data scientist's stars out as the top earners in the digital economy, with a starting salary of 7.7 lakhs, closely followed by data analysts, data architects and others in the domain.

IMPACT OF AI/ML ON EMPLOYMENT

Despite the vast job opportunities, the percentage of job seekers is only half the number of open positions, revealing a scarcity of talented resources. However, the AI/ML is expected to raise India's annual growth rate significantly. The impact of AI/ML on employment can be viewed from both positive and negative perspectives:

Positive Impact:
AI/ML technologies enable automation of repetitive and mundane tasks, freeing up human workers to focus on more creative and strategic aspects of their jobs. This can lead to increased efficiency and productivity in various sectors. As AI/ML technologies advance, they create new job opportunities in specialized fields such as AI engineering, data science, and machine learning.
The demand for skilled professionals who can develop, implement, and maintain AI systems is growing rapidly. AI/ML can process vast amounts of data and generate insights that

Negative Impact:
Automation powered by AI/ML can lead to the displacement of certain job roles, especially those involving repetitive tasks. Workers in industries like manufacturing, retail, and customer service may face job losses or reduced demand for their skills. The rapid integration of AI/ML technologies demands a workforce with advanced technical skills. However, there may be a skills gap, as many workers may lack the required expertise to work with AI systems effectively.
The impact of AI/ML on employment may lead to job polarization, where high-skilled workers benefit from new opportunities, while low-skilled workers experience job losses or face lower wages. The widespread use of AI/ML raises privacy and security concerns, as these technologies often require access to large datasets, potentially exposing sensitive information.

To conclude, any technology development significantly upends the job market. In order to stay up with the speed of digital transformation, every employee and companies require upskilling. Consistently upskilling oneself is of paramount importance at all times. Viewing oneself or a situation as a work in progress is essential for growth- as there is always room for improvement. Technologies and processes are always evolving, hence it is important to keep an open mind, adopt and build or learn new skills that can make one a more competent and effective leader in the long run. The qualitative factors are as important as the quantitative.

ENGINEERING ETHICS AND SOCIAL RESPONSIBILITY

Engineering ethics and social responsibility are fundamental principles that guide the actions and decision-making of engineers. As professionals responsible for designing and creating solutions that impact society and the environment, engineers must adhere to ethical standards and consider the broader social implications of their work. This interplay between engineering ethics and social responsibility is essential in shaping a sustainable and just future for humanity. Let's explore these concepts in more detail:

Engineering Ethics:
Engineering ethics refers to the moral principles and values that guide engineers in their professional conduct. It involves identifying and addressing ethical dilemmas that may arise in the course of engineering practice. Some key aspects of engineering ethics include:

a.**Professional Integrity**:
Engineers are expected to demonstrate honesty, fairness, and transparency in their professional interactions.
b.**Accountability:**
Engineers are accountable for the safety, health, and well-being of the public and the environment.
c.**Respect for Human Rights**:
Engineers must respect and uphold human rights, including the right to life, dignity, and privacy.
d.**Environmental Responsibility**: Engineers have a duty to minimize the environmental impact of their projects.

Social Responsibility:
Social responsibility in engineering involves recognizing the broader impact of engineering projects on society and actively seeking ways to contribute positively to communities. It encompasses the following principles:

a. **Public Interest**: Engineers should prioritize the public interest in their decision-making and ensure that their work benefits society as a whole.
b. **Stakeholder Engagement**: Engineers should engage with affected communities and stakeholders throughout the project lifecycle to understand their concerns, preferences, and needs.
c.**Humanitarian Engineering:** Engineers have a responsibility to address pressing global challenges, such as poverty, inequality, and access to basic needs like clean water and healthcare, through humanitarian engineering efforts.

Engineering ethics and social responsibility are indispensable aspects of the engineering profession. Engineers have a duty to uphold ethical principles, prioritize the public interest, and actively contribute to the well-being of society and the environment. By integrating these values into their practice, engineers can create a positive impact and advance the greater good, shaping a sustainable and just future for all.

Abdhesh Kumar Jha
Asst. Professor- SME

DEGRADATION OF MORAL VALUES IN TODAY'S GENERATION

The degradation of moral values in today's generation is a complex issue. It's essential to recognize that societal values and norms evolve over time, and what may be perceived as a decline in moral values by some may be seen as progress or change by others. However, there are several factors that have been discussed as contributing to the perceived decline in moral values in today's generation:

1.**Technology and Social Media**: The advent of technology and social media has changed the way people communicate and interact. It has led to a rise in cyberbullying, online harassment, and a sense of detachment from face-to-face relationships, potentially impacting empathy and compassion.
2.**Consumerism and Materialism**: Modern society's focus on consumerism and material possessions can lead to a culture of self-centeredness and a pursuit of immediate gratification, potentially overshadowing traditional values such as compassion, generosity, and community support.
3.**Changes in Family Structure:** Evolving family structures, including higher divorce rates and single-parent households, can impact the values and support systems transmitted to younger generations, potentially affecting their moral development.
4.**Influence of Media and Entertainment:** The media, including movies, TV shows, music, and video games, can play a significant role in shaping attitudes and behaviors.
5.**Lack of Role Models**: The absence of positive role models and leaders who exemplify moral values can lead to a lack of guidance for the younger generation, making it challenging for them to develop strong moral compasses.
6.Educational System: Critics of the education system argue that a focus on academic achievement and standardized testing may overshadow character education and moral development in schools.
7.**Cultural Relativism:** With increased globalization and exposure to diverse cultures, some argue that moral relativism is on the rise, leading to a lack of shared universal values and ethics.
8.**Political and Social Divisions**: Societal polarization and divisions can lead to a breakdown in trust and empathy, potentially undermining a sense of collective responsibility for upholding moral values.

It's important to note that while concerns about the degradation of moral values in today's generation exist, there are also many young people who actively engage in acts of kindness, social justice, and community service, challenging the notion of a universally declining moral compass. Addressing concerns about moral values requires a comprehensive approach that involves individuals, families, communities, educational institutions, and policymakers. Encouraging open dialogues, promoting empathy and compassion, fostering positive role models, and integrating character education into curricula are some potential strategies to support the development of strong moral values in the younger generation.

Prachee Srivastava
Asst. Professor- SME

CYBER PHYSICAL SYSTEMS IN MECHANICAL ENGINEERING

Cyber-Physical Systems (CPS) have revolutionized various industries, including mechanical engineering. In mechanical engineering, CPS refers to the integration of physical machines and processes with computational systems, enabling real-time data exchange and control. CPS in mechanical engineering has paved the way for significant advancements in automation, monitoring, and optimization, leading to more efficient and intelligent mechanical systems. From smart manufacturing and industrial robotics to condition monitoring and predictive maintenance, CPS has transformed mechanical systems into intelligent, interconnected, and adaptive entities. By leveraging the capabilities of CPS, mechanical engineers can design more efficient, reliable, and sustainable systems, leading to increased productivity and enhanced safety in various industries. Let's explore the applications and benefits of CPS in mechanical engineering:

Smart Manufacturing: CPS plays a pivotal role in transforming traditional manufacturing processes into smart and connected systems. Smart manufacturing, often referred to as Industry 4.0, utilizes CPS to achieve seamless communication and coordination between machines, sensors, and production systems.

Industrial Robotics: CPS has revolutionized industrial robotics, making robots more intelligent, autonomous, and safer to work with human operators.

Autonomous Vehicles: Advanced driver assistance systems (ADAS) in modern vehicles rely on CPS technologies to gather data from various sensors, analyze the surroundings, and make informed decisions for safe driving and collision avoidance.

Smart Sensors and Actuators: CPS-driven smart sensors and actuators are vital components in mechanical engineering applications. These sensors provide real-time data on temperature, pressure, vibrations, and other critical parameters, while actuators enable precise control and adjustments in response to the collected data.

Human-Machine Interaction: CPS enhances human-machine interaction in mechanical engineering applications. Collaborative robots, enabled by CPS, can safely work alongside human operators, assisting in complex tasks, and improving overall productivity.

Condition Monitoring and Predictive Maintenance: CPS enables continuous monitoring of mechanical systems, such as turbines, engines, and pumps, through sensors.

Supply Chain Management: CPS integration in mechanical engineering facilitates real-time tracking and management of the supply chain.

Pulkit Srivastava
Asst. Professor- SME

METAVERSE: A NEW WORLD OF OPPORTUNITIES BEYOND REALITY

The "metaverse" is a hypothetical iteration of the Internet as a single, universal, and immersive virtual world that is facilitated by the use of virtual reality (VR) and augmented reality (AR) headsets. The metaverse has the potential to open up a vast array of opportunities and possibilities beyond our current reality:

Social Interaction: The metaverse allows people from all over the world to connect and interact in ways that were previously impossible.

Economy and Business: The metaverse could create new economic opportunities through virtual businesses, virtual goods, and services.

Education and Learning: Virtual classrooms and interactive learning environments within the metaverse can revolutionize education, making it more engaging and accessible to learners of all ages.

Entertainment and Gaming: The metaverse could take gaming and entertainment to a whole new level, offering more immersive and interactive experiences for players and audiences.

Healthcare and Therapy: Virtual reality environments within the metaverse could be used for therapeutic purposes, training, or simulations in healthcare.

Travel and Exploration: The metaverse can provide a platform for virtual tourism, allowing people to explore places they might not have access to in the physical world.

Research and Innovation: Collaborative spaces within the metaverse could facilitate global research and innovation efforts, accelerating progress in various fields.

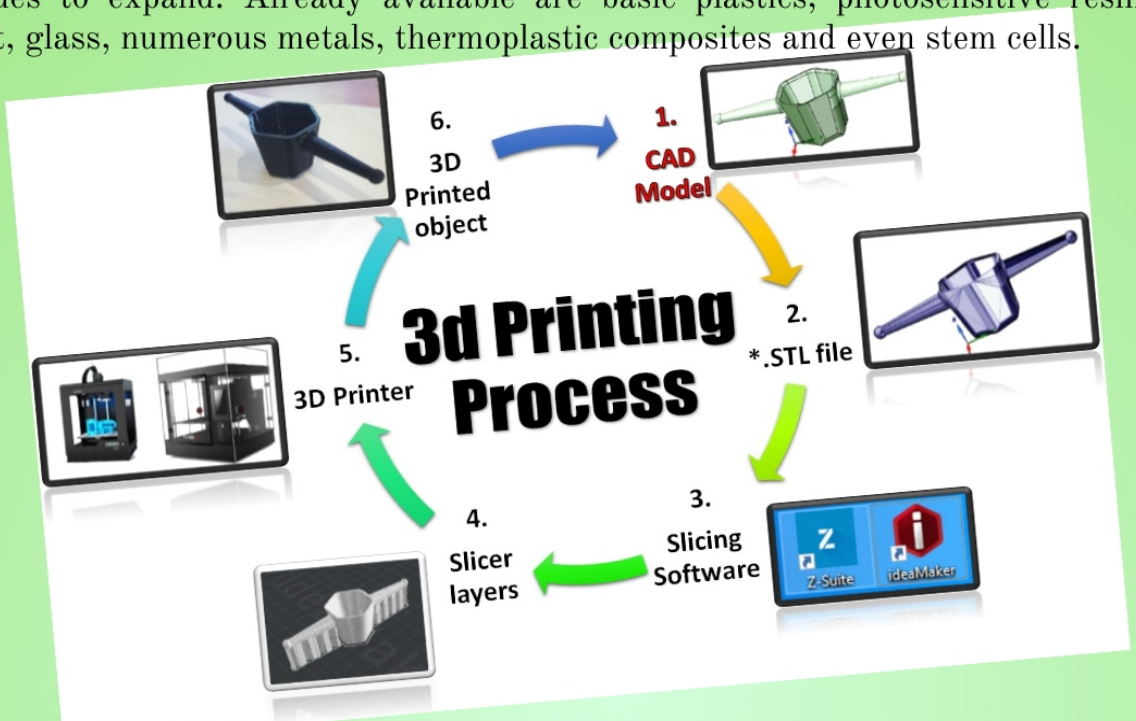
However, it's important to note that the metaverse is still an evolving concept, and its realization faces various challenges. Privacy, security, content moderation, inclusivity, and digital ownership rights are some of the significant concerns that need to be addressed as the metaverse continues to develop.

Several companies and projects have already been exploring aspects of the metaverse, but the full realization of this concept is likely to take many years of technological advancements and societal acceptance. As such, the metaverse presents both exciting opportunities and complex challenges as it becomes an integral part of our digital future.

Sanjay Kumar
GM- International Outreach & Partnerships
Associate Dean- Innovation Labs & MooCs
Dy. HoD & Asst. Professor- SME

THE 3D - PRINTING REVOLUTION

It enables the production of complex and intricate designs that might be challenging or impossible to achieve with traditional manufacturing methods. The use of 3-D printing, also known as additive manufacturing, has moved well beyond prototyping, rapid tooling, trinkets, and toys. Companies such as GE, Lockheed Martin, and BMW are switching to it for industrial production at scale. More companies will follow as the range of printable materials continues to expand. Already available are basic plastics, photosensitive resins, ceramics, cement, glass, numerous metals, thermoplastic composites and even stem cells.



Industrial 3-D printing is at a tipping point, about to go mainstream in a big way. Most executives and many engineers don't realize it, but this technology has moved well beyond prototyping, rapid tooling, trinkets, and toys. "Additive manufacturing" is creating durable and safe products for sale to real customers in moderate to large quantities.

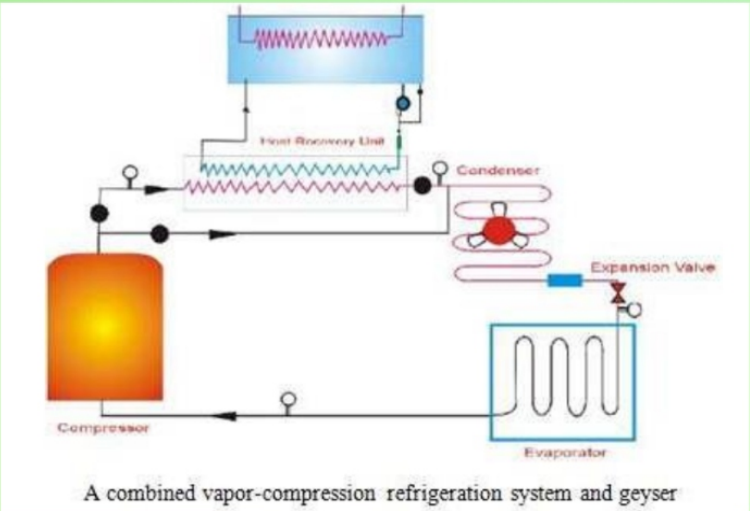
Ved Prakash
Asst. Professor- SME

WASTE HEAT RECOVERY FROM DOMESTIC REFRIGERATORS

Waste heat is heat, which is generated in a process by way of fuel combustion or chemical reaction, heat removed from thermal system by heat exchanger and then “dumped” into the environment even though it could still be reused for some useful and economic purpose. The essential quality of heat is not the amount but rather its “value”. The strategy of how to recover this heat depends in part on the temperature of the waste heat gases and the economics involved. Use of waste heat recovery is an important technique of reducing total energy costs in energy system design. Attachments need to be developed to recover waste heat energy from air conditioning or refrigeration systems. If the heat recovery system is designed optimally and implemented in residential and small-scale commercial systems, the cumulative benefits would be significant.

Households need both refrigeration and water heating. Refrigeration at temperatures below 4°C is employed for food preservation, while hot water at temperatures around 55°C is used for bathing and showering. But it is common for refrigeration and water heating to be separated and unconnected, each consuming their own purchased energy. A more efficient use of this electrical energy would be to integrate the refrigeration and hot water systems. This would reduce the electrical power consumed by heating water, by making use of the heat rejected by refrigerators.

A home’s single largest electricity expense is water heating, which typically accounts for about 40% of their electricity usage. The total energy consumption by geysers will continue to increase as the population grows. As electricity demand increases, the adverse environmental effects and the economic costs associated with electricity generation will also increase. Both refrigerators and heat pumps move heat from a cold thermal reservoir to a warm thermal reservoir. The objective of refrigerators is to remove heat from a cold space whereas the objective of heat pumps is to put heat into a warm space. Both heat pumps and refrigerators use the same thermodynamic cycle and principles.



A combined vapor-compression refrigeration system and geyser

Manas Jha
2nd Year, B.Tech- ME

AGILE MANUFACTURING: EMPOWERING INNOVATION AND ADAPTABILITY

In today's fast-paced industrial landscape, traditional manufacturing methods are no longer enough to keep up with the ever-changing demands of consumers. Enter agile manufacturing: a revolutionary approach that empowers companies to be more flexible, efficient, and innovative than ever before.

Agile manufacturing is a production methodology that prioritizes flexibility and adaptability. Rather than relying on rigid processes and long lead times, agile manufacturers are able to quickly pivot in response to changes in demand or other external factors. At its core, agile manufacturing emphasizes collaboration between different teams and departments within an organization. By breaking down silos and fostering cross-functional communication, companies can respond more quickly to changing market conditions and customer needs. One of the key principles of agile manufacturing is continuous improvement. This means that companies are constantly looking for ways to streamline their processes, eliminate waste, and improve efficiency.

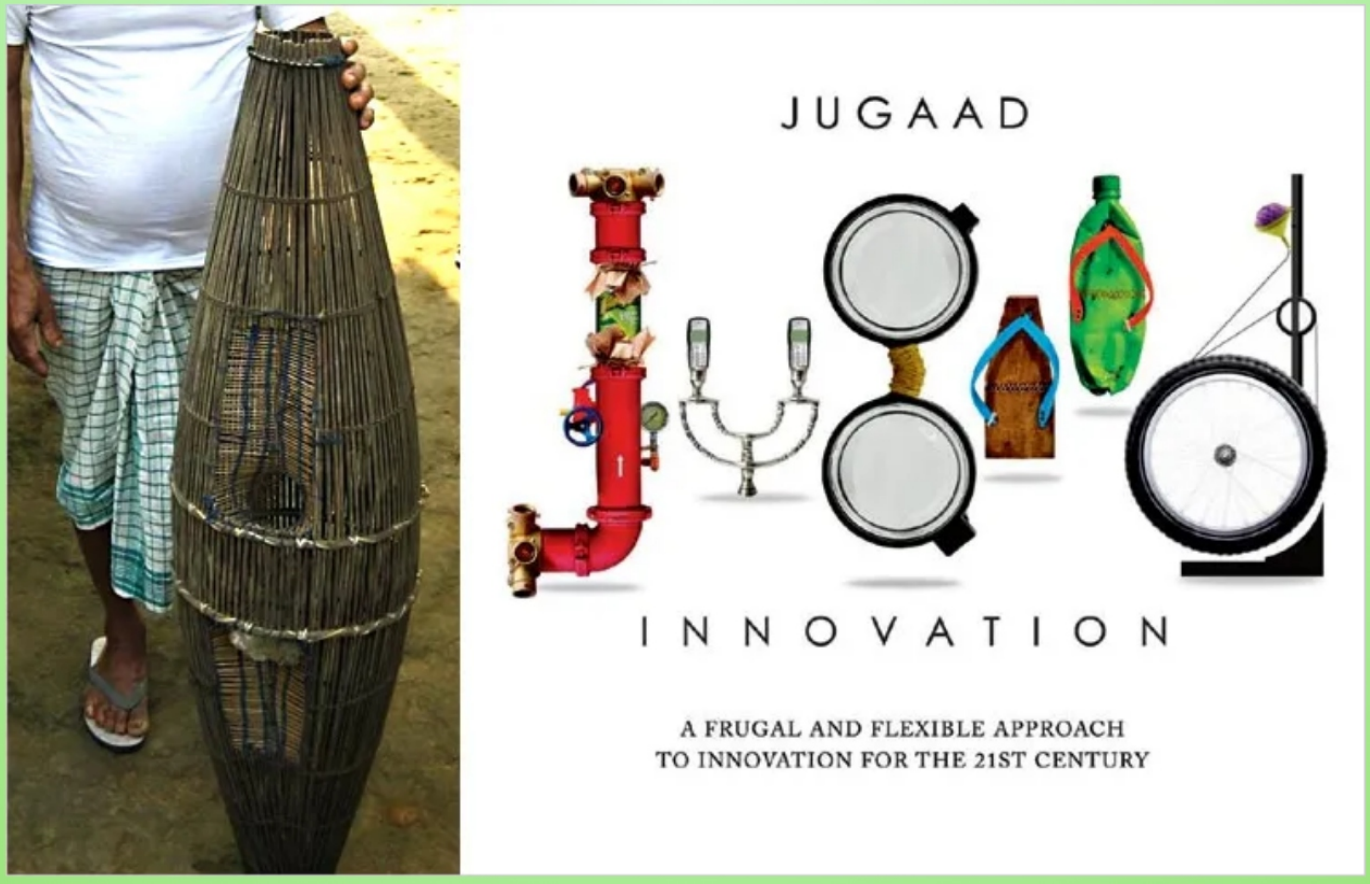
Agile manufacturing offers several benefits to companies that implement it. Firstly, agile manufacturing allows for faster production times and quicker delivery of products to customers. This is because the production process can be adjusted quickly in response to changing demand or new product designs. Another benefit of agile manufacturing is increased flexibility. Companies can easily adjust their operations to accommodate changes in customer preferences, market conditions, or supply chain disruptions. The benefits of agile manufacturing are numerous - from enhanced speed and flexibility in production processes all the way through encouraging innovation while promoting collaboration across business units!

Vishwajeet Singh
2nd Year, B.Tech- ME

JUGAAD VS SYSTEMATIC INNOVATIONS

In 1959, the Hindustan Machine Tools (HMT) Factory in Bengaluru started the assembly of radial drilling machines mainly out of imported components from Kolb in Cologne, Germany. Dr S.M. Patil, who would later go on to become the chief was executive officer and managing director, was a general manager then. In 1960, when the manufacture of the machines indigenized, the machines started making jerky noises while ascending and descending. It was found that a worn-out screw was causing the malfunctioning. A workaround was devised and implemented, which only served to increase the customer complaints. The unit was assigned to expert assemblers, yet the defect persisted. In fact, the rate of failure increased and one in five machines started getting stuck. Eventually, an assembly foreman of the same section was sent to Kolb to study the methods followed there. After three weeks the foreman returned, confident that he could fix the problem. The confidence didn't last long as he realized that the problem persisted even after close monitoring of the assembly process.

One day in 1961, Patil was taking a walk through the shop floor when the foreman of the heavy parts planning section- let's call him Rajappa-told him that he had a solution for the problem. Rajappa also requested Patil to allow him to demonstrate his idea through a few prototypes. Patil gave him a chance despite resistance from the section managers. Rajappa designed a simple solution. He made sure that the arm that was carried throughout the assembly was always placed vertically. The simple solution solved the problem permanently. Rajappa was promoted to a deputy manager's position.



JUGAAD VS SYSTEMATIC INNOVATIONS

Let's compare this story with one that happened in a town called Jamshedpur, about a couple of thousand kilometres away from Bengaluru, around the same time as the Rajappa-Patil chance meeting. P.K. Chakraborty, then charge-man in the Loco Shops at Tata Engines and Locomotives Company (Telco, now Tata Motors) gave a suggestion to the works manager. 10 On 31 May 1957, he suggested a simple milling fixture for milling bolt heads, nuts, pins etc. Until then the work was carried out on costly dividing heads imported from foreign countries. He also attached a sketch of the fixture. A prototype of the machine was made from scrap materials, and it ran satisfactorily, impressing everyone. Operators found it easier to handle because it was lightweight and the chance of any error in indexing was minimized. It saved 25 to 30 per cent time and required less maintenance.
Chakraborty received a cash award of Rs 50 from the director-in-charge. He also received a letter from R.H. Broacha, then manager (Loco), which read: 'Your excellent effort in designing and constructing a milling fixture for the production of hexagonal heads has been greatly appreciated by the management."!!

Rajappa and Chakraborty's stories reinforce the idea that anyone can innovate. But they differ in an important way. Unlike HMT, Telco went ahead and turned the insight that ideas can come from anybody-even shop-floor workers-into a process called the suggestion box scheme that was rolled out in 1959. Tisco (now Tata Steel) started a suggestion scheme even earlier in 1932 though it was formalized as a suggestion box in 1945.
Through a typical suggestion box scheme, the management invites ideas from employees on how to improve things in the workplace. On a regular basis, say once a month, ideas are evaluated by a committee and some ideas are implemented. A suggestion scheme has an associated incentive scheme where people who submit ideas and/or those whose ideas are implemented get rewarded. When innovation happens in the organization only through ad hoc means and chance meetings like that between Rajappa. and Patil, it seems more like jugaad. The word has its origin in north India where transportation vehicles are made by sourcing locally available parts, including the engine. We can call it 'ad hoc creative improvisation' as well. On the other hand, when an organization has a disciplined way of generating, selecting. Nurturing and implementing ideas, like the suggestion scheme of Telco, we call it 'systematic innovation'.

Saurabh Sharma
4th Year, B.Tech- ME

मशीन: गुलाम या भगवान

Anurag Jha
Asst. Professor, SME

हमारे Social media के कचरे से data भर लोगे..

AI लगा कर हमे categorise भी कर दोगे...

हमारी category के हिसाब से हमारी preferences भी भर दोगे..

हम क्या देखें, सुने,चुने, पढ़े, खरीदे decide भी कर लोगे..

पर क्या सुन पाओगे हमारी अनकही,

समझ पाओगे जो हमने कभी सोचा भी नहीं..

सिर्फ महसूस भर किया है..

एक अहसास भर है जिसे हमने जिया है..

इंसान है मशीन नहीं अपनी मूल प्रकृति के खिलाफ बहुत कुछ करते हैं..

तुम्हारे डब्बे के बाहर भी बहुत से लोग जीते हैं मरते हैं ..

इंसान हो भगवान नहीं कि सब को कंट्रोल कर लोगे..

औकात नहीं तुम्हारी कि हमारी दुनिया अपने "1" और "0" से ही भर दोगे..

Nature preservation: Act and Aware

I was amazed to know about a locality in Germany. People avoid switching on their lights, so that bats residing there may live and feed on insects peacefully. They consider bats as their friends, as they are natural insecticides.

One more location of Germany offers rental gardens at very affordable rates. One can do plantation and enjoy his quality time there.
One of other place there, has developed bicycle lanes across the city to promote cycling..

These kind of things are happening in India as well.. In a village of Himachal Pradesh, People make their interior wall of their house with clay and leave a hollow space there. So that beehives can be developed. And in this way they get pure and natural honey for their family.
Biodiversity park of Delhi was developed a few years back. This place provided shelters for variety of birds. Besides that wetlands were developed near the shores of Yamuna. The wetlands stops water from floodings and it serves as natural filters as well..
A lot of things are happening around us to sustain and protect our nature. To be aware and act is the need of time.

Anurag Jha

A mechanical engineer
is able to do everything.

-Wouter Van Den Bosch, mechanical engineer

NOIDA INSTITUTE OF ENGINEERING & TECHNOLOGY

कौशलं परमं बलम्

Estd.2001

NIET
Greater Noida

GET FUTURE READY

AN AUTONOMOUS INSTITUTE

NOIDA INSTITUTE OF ENGINEERING & TECHNOLOGY

19, Knowledge Park-II, Institutional Area, Greater Noida (UP) -201306