K.D.K. COLLEGE OF ENGINEERING, NAGPUR

NEWS-LETTER MECHANICAL DEPARTMENT

SESSION-2019-20

EDITORS

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K.D.K.C.E., NAGPUR.

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"Hope is not found endless waiting, but taking initiative and acting in faith whenever silver lining are not seen in the cloud.

If you want to succeed, then win over the fear of failure and make your ambition of success deeper and greater than anything else."

HEAD
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VISION

Developing technocrats in Mechanical Engineering with computational and design skills, leadership and industrial practices, meeting the requirements of industry / business and society, through Quality Technical Education.

MISSION

M1 - Developing Quality Mechanical Engineering graduates by imparting theoretical and practical knowledge with the exposure to work practices in Industry and Business.

M2 - Develop graduates with over all personality, communication skills, computational skills and managerial skills with ethics to fulfill the expectations of the Industry and Society.

M3 - Provide opportunities to practice industrial processes, pursue higher studies and entrepreneurship skills for sustainable growth.

PROGRAM EDUCATIONAL OBJECTIVES (PEOS)

Graduates of Mechanical Engineering shall

- PEO1 - Have good technical competency to take up industrial projects / responsibilities as per the national / International requirements for enriched employability.
- PEO2 - Design and develop innovative products / systems through application of mechanical and allied engineering knowledge, computing skills to promote research and higher studies.

- PEO3 - Work successfully as leaders or as part of the team on multidisciplinary projects and undertake consultancy and entrepreneurship as their career option.

PROGRAM SPECIFIC OUTCOMES (PSOS)

- PSO1 - Acquire and apply knowledge in various domains like Design, Thermal, Production and allied areas through theory / practical / industrial visits.
- PSO2 - Acquired Engineering knowledge, Computational, Management, Software skills and Entrepreneurship skills for the betterment of Industrial and Social requirement.

MAJOR ACTIVITIES CODUCTED BY MECHANICAL DEPPT. DURING SESSION 2019-20

1. **A workshop for final year students on CNC programming in association with IGTR, Nagpur.**
   Resource person from IGTR - Mr Prasad Bandawar
   Faculty In charge - Dr P R Gajbhiye.
   DATE-15/2/2020

2. **Industrial motivation campaign for two days.**
   Sponsored by- MSME New Delhi
   Organized by- IGTR, Nagpur and Ed cell KDKCE, Nagpur
   DATE-06/03/2020

Technical Magazine

Department of Mechanical Engineering

Technical Editor

Dr. P. R. Gajbhiye

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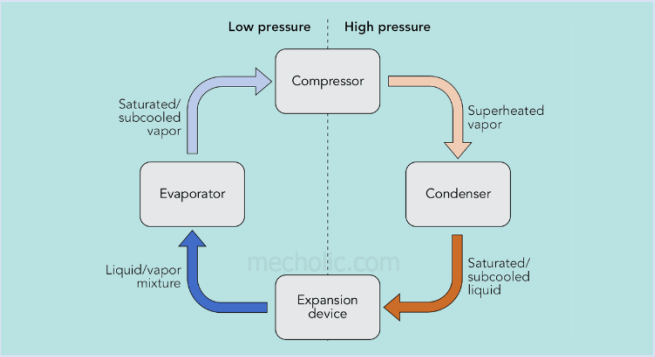
Refrigeration systems



Dr. P. R. Gajbhiye

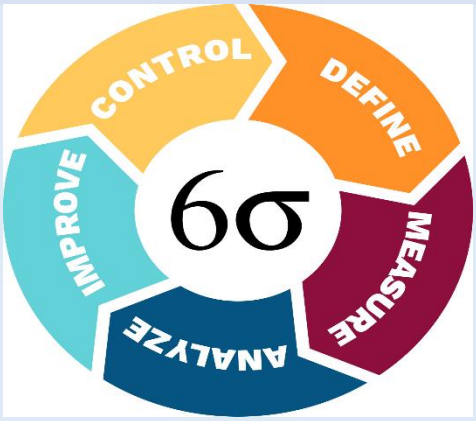
Faculty of Mechanical Engineering Department

Refrigeration systems refer to the different physical components that make up the total refrigeration unit. The different stages in the refrigeration cycle are undergone in these physical systems. These systems consist of an evaporator, a condenser, a compressor and an expansion valve. The evaporator is the space that needs to be

cooled by the refrigerant; the compressor compresses the refrigerant from the low pressure of the evaporator to the pressure at the condenser.

The heat gained by the refrigerant is rejected at the condenser and the high pressure refrigerant is expanded into the low pressure evaporator by the expansion valve. This is a very general representation of the various units in a refrigeration system. The refrigeration systems vary according to the purpose and the type of refrigerant used. They are the means by which we can actually carry out the refrigeration process. A better understanding of them is thus, very essential.

Six Sigma



Ms. Omshree Jamaiwar
3rd Year

Six Sigma is a defined and disciplined business methodology to increase customer satisfaction and profitability by streamlining operations, improving quality and eliminating defects in every organization-wide process. Six Sigma is:

- **A Business Strategy:** Using Six Sigma Methodology, a business can strategize its plan of action and drive revenue increase, cost reduction and process improvements in all parts of the organization.
- **A Vision:** Six Sigma Methodology helps the Senior Management create a vision to provide defect free, positive environment to the organization.
- **A Benchmark:** Six Sigma Methodology helps in improving process metrics. Once the improved process metrics achieve stability; we can use Six Sigma methodology again to improve the newly stabilized process metrics. .
- **A Goal:** Using Six Sigma methodology, organizations can keep a stringent goal for themselves and work towards achieving them during the year. Right use of the methodology often leads these organizations to achieve these goals.
- **A Statistical Measure:** Six Sigma is a data driven methodology. Statistical Analysis is used to identify root-causes of the problem. Additionally, Six Sigma methodology calculates the process performance using its own unit known as Sigma unit.

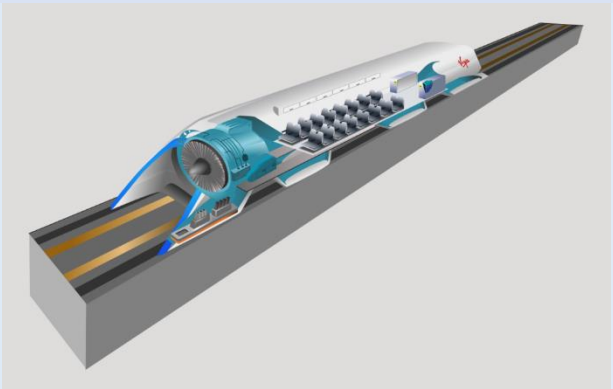
- **A Robust Methodology:** Six Sigma is the only methodology available in the market today which is a documented methodology for problem solving. If used in the right manner, Six Sigma improvements are bullet-proof and they give high yielding returns.

Six Sigma has its foundations in five key principles:

- Focus on the Customer
- Measure the Value Stream and Find Your Problem
- Get Rid of the Junk
- Keep the Ball Rolling.
- Ensure a Flexible and Responsive Ecosystem

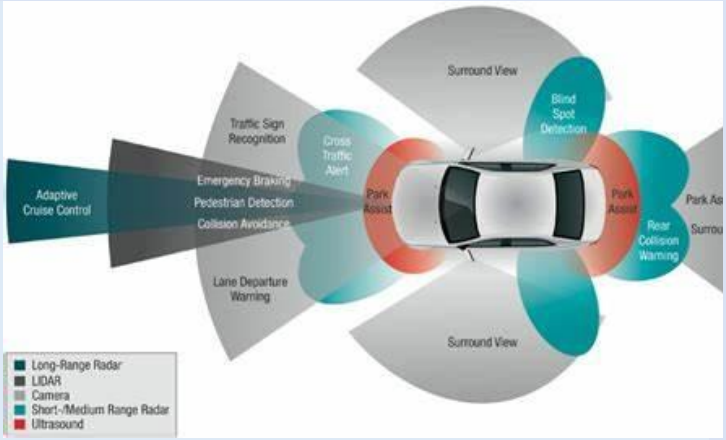
Hyperloop Technology

Miss. Pihu L. Ghodeswar
3rd Year



A Hyperloop is a proposed high-speed transportation system for both public and goods transport. The term was coined by Elon Musk to describe the modern open-source project derived from the vactrain concept. Hyperloop designs employ three essential components: tubes, pods, and terminals. The tube is a large sealed, low-pressure system (usually a long tunnel). The pod is a coach pressurized at atmospheric pressure that runs substantially free of air resistance or friction inside this tube, using aerodynamic or magnetic propulsion. The terminal handles pod arrivals and departures. The Hyperloop, in the initial form proposed by Musk, differs from vactrains by relying on residual air pressure inside the tube to provide lift by aerofoils and propulsion by fans.The hyperloop has its roots in a concept by George Medhurst in 1799 and subsequently developed under the names pneumatic railway, atmospheric railway or vactrain. Elon Musk renewed interest in hyperloop after mentioning it in a 2012 speaking event. Musk further promoted the concept by publishing a white paper in August 2013, which conceived of a hyperloop route running from the Los Angeles region to the San Francisco Bay Area, roughly following the Interstate 5 corridor. His initial concept incorporated reduced-pressure tubes in which pressurized capsules ride on air bearings driven by linear induction motors and axial compressors.

AUTOPILOT MODE TECHNOLOGY IN VEHICLES

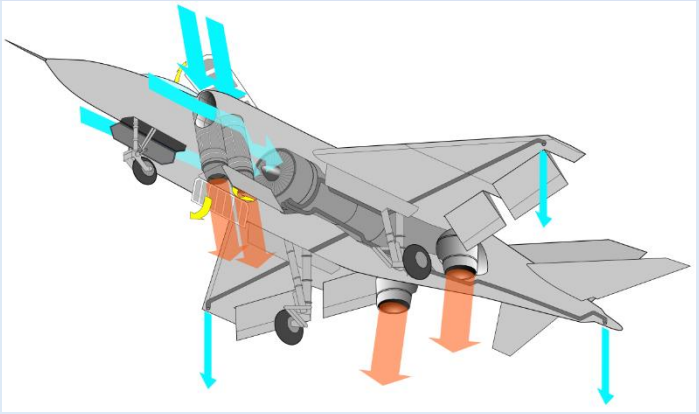


Mr. Kashinath G. Meshram
3rd Year

The word "Auto pilot" mode means the process of implementing advanced technology in vehicles which enables it to self-drive in roads without control of the driver. This system is to be achieved using Radars, Sensors, and Advanced GPS maps. First a compact path of the place where user wants to go is selected on the GPS map. When the engine is started, all equipment's will start to take positioning. The readings are obtained from the radar every second. It detects the objects at the limit of 180' angle and continuously feed the control unit. This control unit is built with a lot of conditions that makes the vehicle to move in the possible safe directions. Here 50% of the job is done by the radar equipment's and rest of the job is done by the advanced GPS mapping to make a safe journey. Separate signals are obtained from the ground level to detect the speed breakers and conditions of the road. Same set of equipment's is fixed on the rear side of the vehicle to avoid other vehicles hit on rear side of the user's vehicle.

Vertical Take-off and Landing (VTOL)

Mr. Yash Thakre
3rd Year



A vertical take-off and landing (VTOL) aircraft is one that can hover, take off and land vertically without relying on a runway. This classification can include a variety of types of aircraft including helicopters as well as thrust-vectoring fixed-

wing aircraft and other hybrid aircraft with powered rotors such as cyclogyros/cyclocopters and gyrodynes. Some VTOL aircraft can operate in other modes as well, such as CTOL (conventional take-off & landing), STOL (short take-off & landing), or STOVL (short take-off & vertical landing). Others, such as some helicopters, can only operate by VTOL, due to the aircraft lacking landing gear that can handle taxiing. VTOL is a subset of V/STOL. Some lighter-than-air aircraft also qualify as VTOL aircraft, as they can hover, takeoff and land with vertical approach/departure profiles. Electric and hybrid-electric vertical takeoff and landing aircraft, or eVTOLs, are being developed in the quest for fully autonomous personal air vehicles (PAVs).[Besides the ubiquitous helicopters, there are currently two types of VTOL aircraft in military service: tiltrotor aircraft, such as the Bell Boeing V-22 Osprey, and thrust-vectoring airplanes, such as the Harrier family and new F-35B Lightning II Joint Strike Fighter (JSF). In the civilian sector currently only helicopters are in typical use (some other types of commercial VTOL aircraft have been proposed and are under development as of 2017). VTOL aircraft capable of STOVL use it wherever possible, since it typically significantly increases takeoff weight, range or payload compared to pure VTOL.

Advanced Food Processing Technologies In Agriculture

Mr. Karshit S. Dongre
3rd Year

Modern agriculture is an evolving approach with innovations in agricultural practices that help in increasing efficiency and reduce the loss of natural resources. The advanced food processing has led to automation and improved process control within the agri-food processing chain. Technology plays a vital role in developing the agricultural industry and improving agribusiness. If modern agriculture is applied widely in the near future, millions of farmers will be able to benefit from the acquisition of real-time farm information

Cloud Computing

Cloud computing is one application that farmers can use to better manage crops and their business through its application called software-as-a-service. In this sector, start-up firms are developing business applications that are specifically helpful to the agricultural sector. Work plans against weather forecast can also be chalked out, and progress monitored. Mobile task management tools and data integration techniques are available, that will measure machine operations and production.

RFID and Security Technologies

The technology used for agricultural tracking and security is called Radio Frequency Identification RFID. For example, livestock can be tracked using 'livestock tracking tags' equipped with RFID. Additionally, during crop shipments, especially certified organic crops, using this technology helps in cutting down on counterfeiting/ impure food shipments through its security tagging. The Artificial Intelligence (AI) has improved the way of food processing. Many developed countries have adopted the fruit picking robots that have reduced the time required to pluck the fruits.

UV light:

Ultraviolet light (UV) holds considerable promise in food processing as an alternative to traditional thermal processing. Its applications include pasteurization of juices, post lethality treatment for meats, treatment of food contact surfaces and to extend the shelf-life of fresh produce. UV light is used for disinfection,

mycotoxin elimination, enzyme inactivation and infrared preservation and processing such as; drying, baking, roasting, blanching and pasteurization.

Extrusion:

The food processing industry generates an immense amount of waste, which leads to major concerns for its environmental impact. Extrusion is one of the most versatile and commercially successful processing technologies. It allows a high degree of user control over the processing parameters that significantly alters the quality of final products. This review features the past research on the manufacture of extruded foods with integration of various plant food processing byproducts.

Nanotechnology:

Nanotechnology in agriculture has gained momentum in the last decade, but the pace of development is modest, even though many disciplines come under the umbrella of agriculture.Briefly, the above-mentioned technologies will not only increase the shelf life of food but maximize food safety as well. These processes hold benefits both at individual and social level. It will help to increase the output and hence the revenue of farmers meanwhile ensuring food abundance for the growing population. Therefore, soon, more governments and private organizations should invest in food processing technologies.